

Synapse

Autumn/Winter 2015

www.acpin.net

"One third of patients have MSK pain *prior* to the PD diagnosis and 60% report back pain."

**Musculoskeletal pain:
a study of its effect on
patients with idiopathic
Parkinson's Disease**

**Use of mechanical insufflation-
exsufflation in neurological
conditions in the UK**

**Sharing good practice:
Use of Electrical Stimulation
following Stroke**

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



Syn'apse



JOURNAL OF THE **ASSOCIATION OF CHARTERED PHYSIOTHERAPISTS IN NEUROLOGY**
Autumn/Winter 2015
ISSN 1369-958X

Contents

Forethought

- 2 From the Chair
- 3 Let's make the design fit the question not the question fit the design – a few words from the ACPIN President

Articles

- 5 Musculoskeletal pain: a study of its effect on patients with idiopathic Parkinson's Disease
- 11 Use of mechanical insufflation-exsufflation in neurological conditions: a UK national physiotherapy survey
- 16 Optimising motor recovery following stroke: the role of attention in motor learning

22 News

Focus on

- 24 The life of a PhD student

Sharing good practice

- 26 Use of Electrical Stimulation following stroke: a consensus statement

Resources

- 27 Articles in other journals

33 Regional reports

35 Writing for Syn'apse

36 Regional representatives

Cover image: Elderley man suffering from backache © Ollyy (Shutterstock)

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

Position vacant

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

A hectic period!

It has been a hectic period for the ACPIN community since the last *Syn'apse*.

After a successful conference in March 2015, we have taken up the challenge to develop a programme for an international neurophysiotherapy conference in March 2016 (Save the date: 17th-18th March). This is a collaboration between ACPIN and the International Neuro Physiotherapy Association (INPA). It will be the first time in history that this conference will take place outside of the programme at WCPT and we are very excited to be pulling the line on this fantastic new development for our members and the neurophysiotherapy community.

In order to make some of our commitments easier to manage, we are progressing with the development of an office support function in ACPIN. This will help those members who are doing many volunteer hours a week to organise aspects of our community's activity. We hope to have this ACPIN office function up and running in support of the international conference and some of the executive roles before the end of the year.

In our Spring national committee meeting, we discussed the current membership structure and the cost of membership. Membership costs have been unchanged for some years and with the ACPIN community taking up more responsibility and a greater role in the promotion of the neurophysiotherapy profession as part of delegated tasks by the CSP, it will become necessary to increase the cost of membership from 2016. The national committee have voted in favour of an increase but have asked the Treasurer to do some work on predicting costs and budget pressures for 2016 onwards. This will inform the decision of the new cost of membership at our national meeting in November.

Some members may have heard that following the conference in March of this year, ACPIN was subject to a malicious cyber-attack. This included access to the ACPIN.net email server, deletion

of shared files and creation of bogus invoices. Unfortunately some of the bogus invoices were paid and this money has been lost. As soon as we became aware of the attack, we had to close the email server which has disrupted communication with the members for which I apologise. On behalf of the executive committee, I have asked our President, Fiona Jones, in April to start an investigation into the attack. This investigation includes the actions of executive committee members and a review of the ACPIN IT structure which is to highlight how the attack happened and how to prevent it happening again. Fiona has requested the help of an independent IT professional to complete a thorough survey of the IT structure and investigate the months leading up to the attack. Fiona has presented preliminary findings at our national meeting in July and the national committee has accepted all urgent recommendations from the preliminary report. Relevant actions have all been undertaken with great urgency and the system is secure again. We expect the final full report to be ready by the next national meeting in November and available to members on request.

Work on the ACPIN website has been given a new boost following a workshop held at the CSP. The current website has been running on a platform which has not been updated and struggles to cope with the demands of current internet use and smartphone technology in particular. The aim is for the new website to be more dynamic and have a members and non-members section. We are waiting for a costed plan for the website to support decision-making and a review of options. We are also looking for members of the ACPIN community to come forward and help populate the new website with content.

ACPIN has been working closely with a few other organisations to develop CPD opportunities for members. As usual, this includes the CSP conference but

also includes the UK Stroke Forum and both the Therapy Expo and the Neuro Rehabilitation Expo held in November and June respectively.

We are looking to develop a long-term partnership with these events to ensure they offer an inviting programme for our members and to secure the best rate for attendance. Together with our own ACPIN conference, this will promote five events spread geographically as well as throughout the year for members to access for CPD and networking.

Collaborative work with Handicap International (HI) has continued, following the completion of a SCI training pack. The latest collaboration has involved the development of an ABI training pack for therapists on the trauma register who are to be sent out for humanitarian disaster relief. The contingent of therapists who were sent to Nepal, following the earthquakes in April and May of this year, had all been trained in SCI practical skills and theory, developed in partnership by ACPIN/SCITL and HI. HI have provided feedback that this training was found to be especially useful given the number

of SCI cases seen in the aftermath of the earthquake. Unfortunately, due to the significance of the humanitarian relief at the time of the earthquake, HI was unable to fully report at WCPT on their development of a comprehensive training package. We hope to give them this opportunity at our international conference in March 2016.

At WCPT, INPA held their AGM which included voting in of the INPA committee members. Next to this, the development of a recurring international conference was well supported. INPA is a relatively new group which will need to develop further in order to be able to influence the global position of neurophysiotherapists in various health care systems. Its aims are clearly to do this in those countries where there is a developing neurophysiotherapy specialisation or where there is no neurophysiotherapy specialisation.

The new ACPIN awards will see request for nominations come out soon and combined with the new research and professional development funding available to members, as well as abstracts for the

international conference, we will have our work cut out with short listing and allocating. There are always opportunities for members to get a taste of these activities and support the various groups involved in these tasks. The collaborative work with COT on the development of splinting guidelines is continuing, after the publication of the guidelines, with a first review of new publications and emerging evidence. Hopefully this will mean that we can stay abreast of developments in this area and have a guideline which remains up to date over time.

All in all, there is a lot of ongoing development and some has been finalised with great success. It makes ACPIN feel like a dynamic and inviting organisation to be a part of. I hope you can share this impression with me.

I look forward to seeing many of you at the international conference in March or at any of the other national events before then. Please feel free to stop by the ACPIN stand for a chat and share your views on the way ACPIN is developing.

Let's make the design fit the question not the question fit the design: a brief guide to writing a research question that needs answering

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 am interested in...' often starts a sentence which can turn into a ramble from a student embarking on their first foray into research.

I can clearly remember sitting with a group of MSc students in their first group research session and encouraging them to share their ideas, and almost all started by explaining the area they were interested in. However virtually no one at that early stage had a research question. Over the years I have spent quite a lot of time listening to people share their research ideas and almost always the question fails to show its head. I have been no different,

and can remember countless times being asked by my supervisors, both during my MSc and PhD, and by many other researchers, 'But what is your question?'. It should be so simple to define a question but for many of us it requires a great many blind alleys and dead ends before the right question and route emerges. Here is how it could be done and why it is important to get it right.

One way to start outlining a research

question is to think widely first; by this I mean get everything out that bothers you. I have long been a fan of mind maps, ever since my daughter, who was 11 at the time, managed to learn all of the words to Wordsworth's 'I wandered lonely as a cloud' in about 30 minutes using this method. Start with an image or word that bothers and needs attention. For example, '45 minutes' which has been a focus for researchers since its inclusion in the *NICE Stroke Rehabilitation Guidelines*. Draw your image, or write your word in the middle of a big sheet of paper, then spread what looks like the boughs of a tree from this word, and represent all the areas which

require some thought. Let your mind wander all over the place into every nook and cranny that is connected to your main word or image – this is the exciting bit, because if you have a strange attraction to stationery you have permission to invest in coloured pens! Using a different colour for each bough, start to add branches, to build each line of thought. However random the words and ideas appear along the branches keep going, and don't be put off at this stage by how messy the whole thing looks. At various stages take a look at what you have done, and if necessary (to be encouraged) create more maps, ditch some of your ideas (you can't change the world – yet), and work on the ones which seem to have more promise. The most important thing here is to look for themes, connections or ideas of interest.

OK, what now? Well you have an idea of all the thoughts which are connected to the thing you are interested in; believe me you have now moved on from just saying 'I am interested in...!'. This is now the part where you can start to think about the questions which lie hidden in all your little branches. Have faith in these branches as they will contain a research question. Don't worry if the research question doesn't sound right; ask questions like 'Why do we do this (here)?', or 'Is there something which could work, better, faster, cheaper?', or 'What do people actually think about x,y,z?' One thing to remember: every research funder requires the ideas and the plan to be written in a language which can be understood by a lay panel or reviewer, so we all might as well start with creating questions which make sense to the majority rather than the few. Now, this is where you can start to make a list of questions from those in your branches, on a separate sheet of paper. Using different coloured pens again, keep writing them out and refining them. Best of all try saying the questions out loud to yourself and to others.

Well here you are with a list of questions. They may not quite be research questions worth answering yet, but stick with it. This is the next most important bit: you now need to ask yourself what sort of question it is. If your area of attention is about a particular intervention, let's say an exercise regime for balance retraining, your question is likely to be 'Does it work?', which is an 'effectiveness question'. But equally your question could be 'Is this regime just as useful for people who have cognitive decline?', in which case it's an 'equity or consistency question'. Or you may ask 'What do people think and would they want to do the regime anyway?',

which is more of an 'acceptability question'. This process really helps to get to the stage when you can work out the best way to answer the question – yes the title of this editorial – we are getting there!

Next, like me, you probably need to take a reality check. In other words, how much time and money do you have and how much do you really want to answer this question? I have even said to people 'Are you doing an MSc, or two PhDs?', as we can all be guilty of the occasional overly ambitious goal. If you are aiming for research funding it's critical to get your question and the scale of your research plan right and most importantly to make sure it fits the funder's aim. But equally it could be a successful small-scale research project which is implemented as part of your work, or through collaboration with other colleagues. Even if you never manage to get funding for your research, this whole process of generating questions and thinking in a radiant way rather than down a linear, traditional route (ie we use 'x' because we have always done it this way), must be for the good. One other possibility is using the mind map method to understand what you and your colleagues know about current research in a particular area, for instance, fatigue management. Using your image, the boughs of a tree, and the branches, generate questions and ideas about what you already know about fatigue management, what you want to know, what happens in your place of work, whether it works and if it is equitable, consistent etc. Then refine the questions and look for the evidence. An additional technique which can help at this stage is to ask yourself where you would go if you had ten minutes, thirty minutes or one hour to find the answer to your question. Go armed with your question and try Google Scholar; see what comes up in ten minutes and you will be amazed. But be warned – you will now need to watch out for your divergent thought processes. These are unwanted friends, otherwise you will be following up every title that looks interesting, using up your ten minutes and not getting close to the answer to your research question.

To finish, just one small nod to theory and conceptual frameworks that might be helpful. As physiotherapists we can be guilty of inhabiting theory-free zones, and we need to be better at stating what our ideas, assumptions, concepts, beliefs and expectations are that inform our research. Social scientists are much better at this than we are, so try and ask yourself 'What has informed my research question?' And 'How have my own beliefs influenced

what I have arrived at?' This sort of thinking can be done after arriving at your research question, but also can help you understand and interpret the results of your research. Whatever you do, make the question the most important thing and try to think widely in terms of research designs which can fit the question. Can all questions be answered by a randomised controlled trial? I think we all know the answer to that one. Well that's it for now. I have run out of words and space, by thinking too widely and starting with a mind map. Part two, relating more to different research designs and how they fit different questions, will be in your next *Syn'apse*!

Musculoskeletal pain

A study of its effect on patients with idiopathic Parkinson's Disease

MSK pain is a common complaint in people with PD (PwPD) (Politis *et al* 2010) with prevalence reported between 28-70% (Beiske *et al* 2009, Rana *et al* 2013, Hanagasi *et al* 2011). One third of patients have MSK pain prior to their PD diagnosis (Farnikova *et al* 2012) and 60% report back pain (Etchepare *et al* 2006). However, pain is often undertreated (Young *et al* 2013).

Physiotherapy was shown to be beneficial for movement symptoms in PwPD but its impact on pain was not assessed (Tomlinson *et al* 2012; Deane *et al* 2009). No other studies have examined the 'lived experience' of PD with MSK pain.

Aim

To explore the 'lived experience' of musculoskeletal (MSK) pain in patients with idiopathic Parkinson's disease (IPD). This was for an MSc in Clinical Research at University of East Anglia (UEA).

Research question

How does MSK pain affect the function and life of a person with IPD?

Hypotheses

- 1 Higher levels of MSK pain in people with IPD are associated with lower quality of life (QOL) and function.
- 2 Higher levels of MSK pain in people with IPD are not associated with Parkinson's disease (PD) severity.
- 3 Higher levels of MSK pain in people with IPD are associated with higher levels of anxiety and depression.

METHODS

Design

This was a mixed methods cross-sectional study. The qualitative component employed interpretive phenomenology (Dowling 2007) to collect detailed interview data on the experience of pain in IPD and then used thematic analysis to identify themes. The quantitative component used validated questionnaires to quantify symptoms. The role of the researcher was to use her

insider knowledge and clinical experience as a senior physiotherapist to guide the semi-structured interview (Pyett 2003, Carpenter 1997).

Setting

The study was approved by the East of England – Norfolk, Ethics Committee, reference: 14/EE/0142. Participants were recruited from Acute and Community NHS Trusts in the East of England.

Participants

We recruited a purposive sample of 15 people with IPD and MSK pain. The IPD was diagnosed by a consultant neurologist and the MSK pain was diagnosed by a doctor or a physiotherapist. Patients assessed, by referrer or researcher, to have insufficient cognitive capacity to manage the two-hour research session, were excluded. Five of the participants had received physiotherapy from the author previously but none were currently under her care.

Procedure

The research was carried out in the participant's home. All participants gave informed consent followed by a two-hour interview and questionnaire session (Saxena *et al* 2013) and were given the numerical identifiers. The semi-structured interview, using interpretive phenomenology, was based around the following questions:

- 1 Where do you feel the pain?
- 2 What activities does the pain affect?
- 3 How does your pain affect your life?
- 4 How does it affect your well-being?
- 5 Does the pain affect your sleep?
- 6 What effect does the pain have on your carer?
- 7 Does it make anything more expensive eg cost of taxis, prescriptions?
- 8 What helps you to manage your pain?

AUTHORS

Lucy JJ Baines

MSc Clinical Research
BSc Hons Physiotherapy
(lead author)
Senior neuro
and community
physiotherapist, Norfolk
Community Health &
Care NHS Trust

Katherine HO Deane

PhD Rheumatology
BSc Hons Applied Biological
Sciences
(co author)
Senior lecturer in
Research, University of
East Anglia

The voice recordings were transcribed and then sent to the participants for verification. The interviews were then coded using thematic analysis by the author and confirmed and refined with my co-author, Katherine Deane.

The validated questionnaires below were completed by the patient with the assistance of the researcher who talked them through the assessments.

- 1 Visual Analogue Scale (VAS), 10 point scale (Boonstra *et al* 2008)
- 2 Comprehensive Pain Evaluation Questionnaire (CPEQ) a more functional score on pain (Nelli *et al* 2012)
- 3 Unified Parkinson's Disease Rating Scale (UPDRS) (Goetz *et al* 2007)
- 4 Parkinson's Disease Questionnaire-39 (PDQ-39) quality of life (Peto *et al* 2001)
- 5 Non-Motor Symptoms Questionnaire (Non-Motor) (Chaudhuri *et al* 2007)
- 6 Hospital Anxiety and Depression Score (HADS) (Bjelland *et al* 2002)
- 7 Hoehn and Yahr score (H&Y) (Tsanas *et al* 2012)

RESULTS

Nine themes were identified from the interview data.

1 Musculoskeletal pain

Most of the participants had mechanical pain made worse with certain movements.

'And I'm bent like that, then I straighten up, and then I start feeling the pain in my back, and then my legs.' (Participant 004)

This participant had the highest VAS, 8/10 and CPEQ, 64/85 scores, but his UPDRS score was in the mid-range (49). This was an example of where high pain scores were not associated with worse symptoms of PD.

Many participants had cramp, osteoarthritis and hand/wrist problems.

'the cramp pains can be in the toe area, on top of the foot, at the ankle, calves, upper leg muscles, all the way up to the shoulders and also at times for driving.' (Participant 013)

2 Falls

Participant 004 was at great risk of falls when fatigued which clearly worried his daughter.

'And if something's in the way, dad can't move quickly so he will fall...it's an accident waiting to happen.' (Carer for 004)

Both participant 008 and 007 had fractured their hips during falls which led to persistent pain.

3 Activities affected

Walking and standing often increased back or leg pain. Participant 003 felt disorientation and stamina difficulties when walking. She had only 27/147 for UPDRS but she scored the highest HADS anxiety score 13/21.

'The only thing I can say about Parkinson's... it has affected my walking...and it's frightening to me because I would like to walk more.' (Participant 003).

Many minor domestic duties were exhausting. Participant 015 had a high non-motor score at 17/30 and moderate VAS 6/10.

'...when there's a lot of washing up to be done ... I get very bad pains in my neck and shoulders ... I feel as though I want to collapse. I've got to go and sit down.' (Participant 015)

Half of the cohort would not even attempt doing gardening now. For those with a lower H&Y score, such as participant 013, H&Y 2, they had to pace themselves to manage it.

'I used to be able to garden without any stoppage at all. Now, I find that the ache just increases so much that ... it stops me from carrying on.' (Participant 013)

4 Well-being

All the participants had positive attitudes despite their increased level of impairment.

'... if I can try and smile and have a laugh with people, at the end of the day I haven't done so bad.' (Participant 007; H&Y 4)

Participant 009 and wife carer were determined that they would not get down and about their situation. He had a HADS total 2/42 but one of the highest CPEQs at 60/85.

'No we don't believe in depression. You can't alter things that are there. You have just got to go forward and do the best you can in the circumstances.' (Carer for 009)

For a lesser affected participant 012 (Schwab-score was 70/100), her husband felt that his wife's condition had not held them back.

'I wouldn't say the pattern of our life has changed that much ... We still live a fairly full, busy life don't we?' (Carer for 012)

5 Carers

The wife of participant 009 described how hard it was to look after her heavily dependent husband who had a score of H&Y 4/5 and Schwab 20/100.

'It's hard work ... Because you are doing everything for your husband.' (Participant 009)

Participant 003 described her sons' annoyance about her condition. She was moderately affected and had a different level of ability compared to before she was diagnosed.

'Frustration on their part. I know they shout. But I think it is all because of frustration.' (Participant 003)

For those who had professional carers visit, it was important that they knew their patients' symptoms. Participant 004 needed someone who could identify when he should rest.

'With dad having different carers, it's difficult for them to see dad as he is, so whilst he might be swaying, they think that that's the norm. So trying to get somebody in consistently ... and she is beginning to see ... the effect that dad's legs will have on his ability to do things...' (Carer for 004)

6 Sleep and fatigue

Most of the participants had their sleep affected by either pain or Parkinson's symptoms. Participant 009 was extremely affected (VAS 7, H&Y 4) and was at great risk of falling and injuring himself at night.

'He is nocturnal now. He is awake at night turning, dozing, twisting and falling and during the day he is twisting and turning in the chair when he is asleep.' (Carer for 009)

Participant 015 (CPEQ 49/85, Non motor 17/30) would be woken up by pain if he lay on his bad side in bed.

'Well, I only get about three or four hours a night ... if I wake up, I've been lying on my right-hand side and I've got to turn over to take the pressure off this leg.' (Participant 015)

Most had tried to optimise their sleep hygiene; for example, a new bigger bed solved the problem of participant 012 and her husband waking each other up.

'... we've got an enormous bedroom now, it's wonderful ... So neither of us knows when the other one is moving.' (Participant 012)

There were a few participants who were not affected negatively by their sleep. Participant 005 was mildly affected by the PD (H&Y 1.5) and was a good sleeper.

'Once I am asleep, I am gone. And I am hard to wake up as well.' (Participant 005)

Participant 010 described exhaustion with his symptoms. He had a high VAS score (7/10) but a low HADS (6/42).

'I can be at the point where I'm kind of dragging myself along. You know, the pain – body's tightening up, you know, with the discomfort and tiredness.' (Participant 010)

7 Expense/cost

The extra help and care was expensive for some. Several participants on a low budget struggled.

'I pay my daughter-in-law to do my housework ... Then there's the cost of having a delivery of food ... I buy frozen dinners which are more expensive ... I have to pay for a carer to ... help me shower in the mornings ... You're talking of paying quite a few hundred pounds a month.' (007)

On the other hand, there were a number of participants who could afford any help they needed.

Most of the participants liked warmer weather for their aches and pains, so being able to afford holidays in warmer climates was beneficial.

'We quite often say, you know, we consider ourselves very lucky that we can do what we want to do.' (Participant 013)

8 Healthcare professionals involved

The principle healthcare professionals involved in the care of our participants were the neurologist, general practitioner, neuro-nurse, physiotherapist and occupational therapist. Overall patients were happy with their care. Participant 005 (H&Y 1.5) was waiting for physiotherapy advice.

'... let's get physio before he goes to the gym because you don't know if you are using the right muscles or doing the right things.' (Carer for 005)

Participant 009 who was severely affected (H&Y 4) had experienced a number of serious episodes.

'The Parkinson's nurse and physios have been brilliant and they help me as much as I want. So we get over the situation at the time.' (Carer for 009)

9 Management

There was a low usage of pain relief by most of the participants. This was due to beliefs that paracetamol would react badly with their anti-Parkinsonian medication. They thought it would mask the pain then they would make it worse by doing too much. Participant 001 saw using paracetamol as a 'last resort'. She had quite a high pain score (VAS 6/10, CPEQ 43/85).

'... only about three paracetamols a week ... It is very painful but I put up with it rather than keep taking too many tablets.' (Participant 001)

Comfort when resting in a chair or bed was very important. Participant 005's new chair helped his leg pain.

'... it's a lovely comfortable chair. And the achiness does go after a little while – even if I don't take anything, it does go.' (Participant 005)

Pacing was another very important aspect of management. Some of the participants managed this easily but for others it was quite difficult to do less than they were used to.

'... coming up with a schedule of work ... and being very strict about resting ... I'm not a very disciplined person, so it's very difficult to follow.' (Participant 010)

Some participants did not see the purpose of exercise and if they had not done it previously they were uninclined to start now. Whereas those who had always done exercises continued to do so.

'I've always done my own exercises.' (Participant 015)

DISCUSSION

MSK pain's effect on the function and life of patients with IPD varied from mild to severe impact. Those with milder symptoms were able to continue their retired life without much restriction. If both the IPD and MSK pain were severe then life was extremely difficult.

Hypothesis 1

Higher levels of MSK pain in people with IPD are associated with lower QOL and function.

The interview data showed lower QOL which was often activity related. However, some of the cohort were still able to get out and do stimulating activities. The interview data demonstrates support of the hypothesis but also shows the importance of positive coping strategies.

Hypothesis 2

Higher levels of MSK pain in people with IPD are not associated with Parkinson's Disease severity.

A minority of participants felt the MSK pain was easy to manage and was not associated with their Parkinson's. Whereas others had pain that was directly linked to the severity of their IPD. The individual interview data supported the idea that pain was variably linked with PD severity.

Hypothesis 3

Higher levels of MSK pain in people with IPD are associated with higher levels of anxiety and depression.

Although none of the participants scored depression in the HADS, many of them experienced frustration, loss, anxiety or worry. The individual interview data demonstrated examples both for and against the hypothesis.

Theme 1 MSK pain

Broetz *et al* (2007) called for routine evaluation of all types of pain in people with IPD. Several of the cohort found their pains improved with the start of Parkinson's medication and analgesia (da Silva *et al* 2008). The medication helps to enable more mobility which can reduce MSK pain.

Theme 2 Falls

Falls can cause injury and potentially more MSK problems. Ashburn *et al* (2008) recommended standard practice of environmental adaptation, movement rehabilitation, cognitive training and the use of a falls diary.

Theme 3 Activities affected

Every participant in this study, were, to a greater or lesser extent, compromised in their activities. Hariz and Forsgren (2011) found patients had limitations in their ADL's and QOL compared to controls. Thordardottir *et al* (2014) reported participation in ADL's needed planning to cope with the energy and stress involved.

Theme 4 Well-being

Although none of our participants had depression by the HADS criteria, many expressed problems with mood and this could impact on their pain coping strategies. Other studies (Ehrt

et al 2009) have found a significant relationship between pain and depression in PD and subclinical depression can impact on QOL (Menon *et al* 2015, Lawrence *et al* 2014). Consideration should be given to the use of CBT, which is known to be helpful in both mild depression and pain (NICE 2009).

Theme 5 Carers

Some of the carers in the study were under pressure. This reinforced Drutye *et al* (2014) findings that reported very high emotional strain on carers for people with Parkinson's, which might be reduced with better symptom management.

Theme 6 Sleep and fatigue

Sleep disturbances including nocturnal, REM sleep disorder and excessive daytime sleepiness are common in PD (Chaudhuri 2002). Most of the participants had disrupted sleep which aggravated their PD and pain levels. Fatigue and poor sleep are linked to higher levels of pain and poor coping strategies (Skogar *et al* 2012; Havlikova *et al* 2011). Therefore patients may benefit from education about good sleep hygiene practices (Gregory *et al* 2012).

Theme 7 Expense/cost

The hidden costs associated with pain and IPD could be substantial. Those on a small budget found it hard to manage. Those who were financially fortunate could pay for help and enjoy relaxing luxuries that helped them manage their pain better.

Theme 8 Healthcare professionals involved

The MDT should be encouraged to ask specifically about pain as they can provide key interventions for improving its management. Physiotherapists educate the patients on exercises and management of symptoms (Magennis and Corry 2013). Occupational therapy provide equipment to promote participation (Sturkenboom 2012). Neuro nurses have a pivotal role in education on drug therapy including analgesics (Cranwell-Bruce 2010).

Theme 9 Management

Most of the participants had poor adherence with analgesic medications due to concerns about interactions with their anti-Parkinsonian medications and dependency issues. This is an obvious point for professionals to address with clear information and reassurance. A number of them took exercise which is known to improve QOL with PD including domains of pain, energy levels and sleep (Rodrigues de Paula *et al* 2006). Heat brought relief to many of the participants. Most had discovered positions of comfort. All had developed at least some good coping skills.

Limitations

In hindsight the researcher realised it would have been useful to have tested for mild cognitive impairment which may have impacted on the coping skills of the participants. All of the

participants were aware of the author's professional post of physiotherapist, and she had treated five of them. This could have introduced bias as they may have been reluctant to criticize.

Strengths

By offering the interviews in the patient's home we enhanced the projects acceptability; we had no problem with recruitment and managed to get a sample that covered a range of pain and IPD impairment.

CONCLUSIONS

Pacing, comfort and appropriate exercise were important pain management techniques. Patients should be reassured of the benefits and low risk of step 1 analgesics (WHO 2009). Ability to cope was dependent on the skill of the individual to self-manage, the support of the carer and their financial situation. Patient's unique experience of pain and their expertise in its management should be respected and treated on an individual basis by professionals.

Ethical Approval

The organisation providing ethical approval was the East of England, Norfolk Ethics Committee. The ethics protocol reference was: 14/EE/0142.

Conflicts of interest

The author had treated five of the participants in the past in her role as senior neurophysiotherapist. This could have introduced a bias as they may have been reluctant to criticize. None of the participants were in the author's current care at the time of the research.

Acknowledgements

The researcher received a grant for her MSc study-time from the National Institute for Health Research (NIHR).

REFERENCES

- Ashburn A, Stack E, Ballinger C, Fazakarley L and Fitton C (2008) *The circumstances of falls among people with Parkinson's disease and the use of falls diaries to facilitate reporting* **Disability and Rehabilitation** 30(16) pp1205-1212.
- Beiske AG, Loge JH, Renningen A and Svensson E (2009) *Pain in Parkinson's Disease: Prevalence and characteristics* **Pain** 141 pp173-177.
- Bjelland I, Dahl AA, Haug TT and Necklemann D (2002) *The validity of the Hospital Anxiety and Depression Scale. An updated literature review* **Journal of Psychosomatic Research** 52 pp69-77.
- Boonstra AM, Schiphorst HR, Reneman MF, Posthumus JB and Stewart RE (2008) *Reliability and validity of the visual analogue scale for disability in patients with chronic musculoskeletal pain* **International Journal of Rehabilitation Research** 31(2) pp165-169.
- Broetz D, Eichner M, Gasser T, Weller M and Steinbach JP (2007) *Radicular and nonradicular back pain in Parkinson's disease: a controlled study* **Movement Disorders** 22(6) pp853-856.
- Carpenter C (1997) *Conducting Qualitative Research in Physiotherapy. A methodological example* **Physiotherapy** 83(10) pp547-552.
- Chaudhuri KR, Martinez-Martin P, Brown RG, Sethi K, Stocchi F, Odin P, Ondo W, Abe K, MacPhee G, MacMahon D, Barone P, Rabey M, Forbes A, Breen K, Tluk S, Naidu Y, Olanow W, Williams AJ, Thomas S, Rye D, Tsuboi Y, Hand A and Schapira AHV (2007) *The metric properties of a novel non-motor symptoms scale for Parkinson's Disease: results from an international pilot study* **Movement Disorders** 22(13) pp1901-1911.
- Chaudhuri KR (2002) *The basis for day and night-time control of symptoms of Parkinson's Disease* **European Journal of Neurology** 9(3) pp40-43.
- Cranwell-Bruce LA (2010) *Drugs for Parkinson's Disease* **MEDSURG Nursing** 19(6) pp347-355.
- Deane K, Jones DE, Ellis-Hill C, Clarke CE, Playford ED, and Ben-Shlomo Y (2009) *Physiotherapy for Parkinson's disease: a comparison of techniques* (Review) **The Cochrane Collaboration** Issue 1 John Wiley & Sons, Ltd.
- Dowling M (2007) *From Husserl to van Manen. A review of different phenomenological approaches* **International Journal of Nursing Studies** 44 pp131-142.
- Drutye G, Forjaz MJ, Rodriguez-Blazquez C, Martinez-Martin P and Breen KC (2014) *What impacts on the stress symptoms of Parkinson's carers? Results from the Parkinson's UK members' survey* **Disability and Rehabilitation** 36(3) pp199-204.
- Ehrt U, Larsen JP and Aarsland D (2009) *Pain and its relationship to depression in Parkinson's Disease* **American Journal of Geriatric Psychiatry** 17(4) pp269-275.
- Etchepare F, Rozenberg S, Mirault T, Bonnet AM, Lecomte C, Agid Y, Bourgeois P and Fautrel B (2006) *Back problems in Parkinson's disease: an underestimated problem* **Joint Bone Spine** 73 pp298-302.
- Farnikova K, Krobot A and Kanovsky P (2012) *Musculoskeletal problems as an initial manifestation of Parkinson's Disease: A retrospective study* **Journal of the Neurological Sciences** 319 pp102-104.
- Goetz CG, Fahn S, Martinez-Martin P, Poewe W, Sampaio C, Stebbins GT, Stern MB, Tilley BC, Dodel R, Dubois B, Holloway R, Jankovic J, Kulisevsky J, Lang AE, Lees A, Leurgans S, LeWitt PA, Nyenhuis D, Olanow W, Rascol O, Schrag A, Teresi JA, Hiltten JJV and LaPelle N (2007) *Movement disorder society-sponsored revision of the unified Parkinson's disease rating scale (MDS-UPDRS): Process, format, and clinimetric testing plan* **Movement Disorders** 22(1) pp41-47.
- Gregory P, Morgan K and Lynall A (2012) *Improving sleep management in people with Parkinson's* **British Journal of Community Nursing** 17(1) pp14-18.
- Hanagasi HA, Akat S, Gurvit H, Yazici J and Emre M (2011) *Pain is common in Parkinson's Disease* **Clinical Neurology and Neurosurgery** 113 pp11-13.
- Hariz GM and Forsgren L (2011) *Activities of daily living and quality of life in persons with newly diagnosed*

- Parkinson's Disease according to subtype of disease, and in comparison to healthy controls *Acta Neurologica Scandinavica* 123 pp20-27.
- Havlikova E, Dijk J PV, Nagyova I, Rosenberger J, Middel B, Dubayova T, Gdovinova Z and Groothoff JW (2011) The impact of sleep and mood disorders on quality of life in Parkinson's disease patients *Journal of Neurology* 258 pp2222-2229.
- Lawrence BJ, Gasson N, Kane R, Bucks KK and Loftus AM (2014) Activities of daily living, depression, and quality of life in Parkinson's Disease *Plos One* 9(7) pp1-5.
- Magennis B and Corry M (2013) Parkinson's Disease: top 10 causes of sudden deterioration *British Journal of Neuroscience Nursing* 9(5) pp234-239.
- Menon B, Nayar R, Kumar S, Sandhya C, Venkatachalam A, Surendran K and Deepak KS (2015) Parkinson's disease, depression and quality of life *Indian Journal of Psychological Medicine* 37(2) pp144-148.
- Nelli J, Nicholson K, Lakha F, Louffat AF, Chapparo L, Furlan J and Mailis-Gagnon A (2012) Use of a modified comprehensive pain evaluation questionnaire: characteristics and functional status of patients on entry to a tertiary care pain clinic *Pain Research Management* 17(2) pp75-82.
- NICE National Institute for Health and Care Excellence (2009) *Depression in Adults. The treatment and management of depression in adults* [Online] Available at: <http://www.nice.org.uk/guidance/cg90/resources/guidance-depression-in-adults-pdf> (Accessed: 30 May 2015)
- Peto V, Jenkinson C and Fitzpatrick R (2001) Determining minimally important differences for the PDQ-39 Parkinson's Disease questionnaire *Age and Ageing* 30 pp299-302.
- Politis M, Wu K, Molloy S, Bain PG, Chaudhuri KR and Piccini P (2010) Parkinson's Disease Symptoms: The Patient's Perspective *Movement Disorders* 25(11) pp1646-1651.
- Pyett PM (2003) Validation of Qualitative Research in the 'Real World' *Qualitative Health Research* 13(8) pp1170-1179.
- Rana AQ, Saeed U, Masroor MS, Yousuf MS and Siddiqui I (2013) A cross-sectional study investigating clinical predictors and physical experiences of pain in Parkinson's Disease *Functional Neurology* 28(4) pp297-304.
- Rodrigues de Paula F, Teixeira-Salmela LF, Coelho de Moraes Faria CD, Rocha de Brito P and Cardoso F (2006) Impact of an exercise program on physical, emotional and social aspects of quality of life of individuals with Parkinson's Disease *Movement Disorders* 21(8) pp1073-1077.
- Saxena P, Prakash A, Acharya AS and Nigam A (2013) Selecting a study design for research *Indian Journal of Medical Specialities* 4(2) pp334-339.
- Skogar O, Fall PA, Hallgren G, Bringer B, Carlsson M, Lennartsson U, Sandbjork H, Tornhage CJ and Lökk J (2012) Parkinson's Disease patients' subjective descriptions of characteristics of chronic pain, sleeping patterns and health-related quality of life *Neuropsychiatric Disease and Treatment* 8 pp435-442.
- Da Silva EG, Viana MA and Quagliato EMA (2008) Pain in Parkinson's Disease *Archives Neuropsychiatry* (Spanish). 66(1) pp26-29.
- Sturkenboom IH, Graff MJ, Borm GF, Veenhuizen Y, Bloem BR, Munneke M and Nijhuis-van der Sanden MW (2012) The impact of occupational therapy in Parkinson's disease: a randomised controlled feasibility study *Clinical Rehabilitation* 27(2) pp99-112.
- Thordardottir B, Nilsson MH, Lwarsson S and Haak M (2014) 'You plan, but you never know' – participation among people with different levels of severity of Parkinson's Disease *Disability and rehabilitation* 36(26) pp2216-2224.
- Tomlinson CL, Patel S, Meek C, Clarke CE, Stowe R, Shah L, Sackley CM, Deane KHO, Herd CP, Wheatley K and Ives N (2012) Physiotherapy versus placebo or no intervention in Parkinson's disease (Review) *The Cochrane Collaboration* Issue 8 John Wiley & Sons, Ltd.
- Tsanas A, Little MA, McSharry PE. and Scanlon BK (2012) Statistical analysis and mapping of the unified Parkinson's Disease rating scale to Hoehn and Yahr staging *Parkinsonism and Related Disorders* 18(5) pp697-699.
- Young EK, Woong-woo L, Ji YY, Hui JY, Han-Joon K and Beom SJ (2013) Musculoskeletal problems in Parkinson's disease: Neglected issues *Parkinsonism and Related Disorders* 19 pp666-669.
- World Health Organisation (WHO) (2009) *WHO's pain relief ladder* [Online] Available at: <http://www.who.int/cancer/palliative/painladder/en/> (Accessed 6 June 2015).

Use of mechanical insufflation-exsufflation in neurological conditions

a UK national physiotherapy survey

As neuromuscular disease progresses, altered chest wall mechanics, inflammation and infection, reduced airflow and decreased gaseous exchange results in a less effective cough, increased sputum retention, and difficulty in performing airway clearance to remove secretions (Botanio 2006, Panitich 2009). Effective airway clearance requires the mobilisation of secretions and an increase in lung volume prior to an effective cough (Finder 2006).

Weakness of the diaphragmatic, intercostal, inspiratory, expiratory and glottic muscles results in an inability to ventilate, decreased cough efficiency and, with bulbar muscle dysfunction, comes an increased risk of aspiration (Benditt *et al* 2006). Additional factors, which contribute to cough ineffectiveness and alveolar hypoventilation are: micro atelectasis; stiffening of the rib cage with loss of compliance; scoliosis or thoracic deformity; cardiomyopathy; obesity; fatigue; bronchial obstruction; sleep alterations (Servera *et al* 2006, Morrow *et al* 2013). This respiratory insufficiency is compounded as disease severity progresses and when there is an exacerbation due to a chest infection (Simonds 2007).

It is necessary to ensure adequate secretion management in the care pathway of patients at risk of developing respiratory compromise (Gauld 2009). The timely use of airway clearance, including either manual or mechanical cough augmentation techniques, should be incorporated into physiotherapy management, for people with neuromuscular disease resulting in respiratory compromise, in order to decrease hospital admissions due to respiratory problems, improve health-related quality of life and alleviate disability (BTS/ACPRC 2009, Bushby 2010).

A component of airway clearance, mechanical insufflation-exsufflation (MI-E), is a cough augmentation technique used by physiotherapists to manage people who present with an impaired cough (BTS/ACPRC 2009). Neuromuscular clinical guidelines from around the world state that the use of MI-E is based on moderate to low level evidence (ATS Respiratory Care of the Patient with Duchenne Muscular Dystrophy 2004, Motor Neurone Disease Association 2006, Consensus Statement for Standard of Care in Spinal

Muscular Atrophy 2007, Bushby *et al* 2010, ACI Respiratory Network 2010, Consensus Statement for Standard of Care for Congenital Muscular Dystrophies 2010, BTS 2012). Previously, a single question posted on an interactive discussion forum for members of the Chartered Society of Physiotherapy established that approximately 64 healthcare organisations use MI-E in the United Kingdom (Chatwin, 2010).

In order to understand and further explore the clinical utility of MI-E in the care package of patients with respiratory compromise, due to a neurological condition, it is necessary to establish existing practice. Determining the clinical decision-making process to choose MI-E as a treatment technique will help inform future guidelines and training in clinical practice. The aim of this study was to assess the usage of MI-E by physiotherapists managing neurological conditions in the UK. Specific objectives included establishing neuromuscular conditions in which physiotherapists use cough augmentation techniques including MI-E; why and how MI-E is used; the outcome measures used clinically to ascertain effectiveness and how knowledge is gained.

METHODS

A questionnaire was developed after a review of relevant literature and discussion with the multidisciplinary team. The questionnaire was piloted for content validity and test-retest reliability ($n=6$), and necessary changes were made: definitions were provided to aid understanding; order and wording were changed for clarity; space was provided for additional answers; and questions were added regarding the pneumotachograph as an outcome measure and where training occurred. Twenty-four questions were included

AUTHORS

JM Bradley

PhD
Professor in Physiotherapy, Institute of Nursing and Health Research, School of Health Sciences, Ulster University

JS Elborn

MD
Dean, School of Medicine Dentistry and Biomedical Sciences, Queen's University Belfast

M Hannon-Fletcher

PhD
Head of School of Health Sciences, Institute of Nursing and Health Research, Ulster University

WG Kernohan

PhD
Professor of Health Research, Institute of Nursing and Health Research, School of Nursing, Ulster University

FM Moran

PhD, PGDUT, BSc (Hons), MCSP, HCPC
Lecturer, School of Health Sciences, Institute of Nursing and Health Research, Ulster University

A Patterson

PhD
Institute of Nursing and Health Research, School of Health Sciences, Ulster University

in the final version to capture: cough augmentation techniques used; the clinical populations using MI-E; factors determining the decision to use MI-E machine parameters and outcome measures used clinically; and sources of training.

Questionnaires were sent to members of the Health and Care Professions Council registered chartered physiotherapists currently practising in the United Kingdom who were also members of a clinical interest group managing people with respiratory compromise due to an underlying neurological condition: Association of Chartered Physiotherapists Interested in Neurology (ACPIN) (n=1,739), the Association of Paediatric Chartered Physiotherapists interested in Respiratory Physiotherapy (APCP) (n=107) and the Association of Chartered Physiotherapists in Respiratory Care (ACPRC) (n=750) (Total n=2,596). The questionnaire was sent to each membership database using electronic (SurveyMonkey) or postal methods, as directed by their individual preference. Follow-up reminders were sent out to non-respondents. The survey took place between June and July 2011. A favourable ethical opinion was provided by the Office for Research Ethics Committee in Northern Ireland (Ref: 11/NIR03/1).

STATISTICAL ANALYSIS

Closed categorical data was analysed descriptively using frequencies and percentages (IBM SPSS Statistics for Windows, Version 22). Open responses were quantitatively analysed using standardised content analysis and collapsed into categories with descriptive frequencies and percentages calculated (Stemler 2001; Krippendorff 2013). A p value of <0.05 was considered statistically significant.

RESULTS

A total of 2,596 questionnaires were administered of which 1,058 responses were returned, a response rate of 41%. A number of respondents were not eligible to reply: not currently practising; respondents responded to a yes/no question re MI-E use but did not consent to complete the full questionnaire, therefore, 912 completed responses were analysed.

A retrospective power calculation was carried out using a confidence level of 95%, a margin of error of 5% and a population size of 2,596. It was identified that a sample size of 335 would be required; therefore the actual 1,058 responses resulted in a margin of error of 2.3% which was deemed to be acceptable.

The majority of respondents worked in England (87%, 769/ 912) with a minority in Scotland (5%, 49/ 912); Wales (4%, 32/ 912) and Northern Ireland (4%, 34/ 912).

Cough augmentation techniques

The majority of respondents used the cough augmentation technique of suction (86%, 784/912) or manually assisted cough (81%, 736/912) and just over a third of respondents used air stacking

either with: a self-inflating resuscitator (Ambu® bag) (39%, 351/912); intermittent positive pressure breathing (35%, 319/912); or non- invasive ventilation (32%, 287/912).

MI-E was used by half of respondents (48%, 479/1,002). Note the larger denominator is due to the 90 additional responses of those who completed a single question to determine if they used MI-E. MI-E was used primarily in those over 21 years (89%, 427/ 479) or in young adults from 16 – 20 years (43%, 207/ 479) and in children: 0–15 years (59%, 284/479). MI-E was used most frequently in the progressive neurological conditions of Motor Neurone Disease (57%, 272/ 479), Multiple Sclerosis (46%, 219/ 479) and Duchenne Muscular Dystrophy (45%, 216/ 479). MI-E was used in the respiratory management of spinal cord injury patients (61%, 291/ 479).

MI-E was most commonly used in the hospital environment (87%, 415/ 479); in the treatment of acute respiratory exacerbations (91%, 434/ 479); or as a prophylactic measure to prevent respiratory exacerbations (57%, 275/ 479). It was used less often at home (28%, 136/479). MI-E was used by patients who were spontaneously breathing (96%, 459/479). Patient's already prescribed non-invasive ventilation used MI-E as an adjunct to remove secretions (67%, 321/479). MI-E was less often used as an airway clearance adjunct by those patients who were mechanically ventilated (26%, 123/479).

Working parameters cited for cough augmentation

Optimal pressures of ± 40 cmH₂O are necessary to clear secretions (Philips Respironics 2014; ACI 2010; McKim 2011; BTS/ACPRC 2009). The number of physiotherapists using these parameters was: +40cmH₂O (25%, 119/479) and -40cmH₂O (33%, 158/ 479). The most common factor influencing choice of pressure was patient comfort and tolerability (78%, 373/479); failure to remove secretions (76%, 363/ 479); and pressures taught in training (67%, 323/ 479). Other factors which directed pressure settings were: restrictive thoracic mobility (59%, 283/ 479); size of thorax (48%, 232/ 479); reduced oxygen saturations (39%, 187/ 479); pressures already set (4%, 18/479); evidence (3%, 14/ 479); and co-existing conditions (1%, 5/ 479). A quality assurance mechanism exists in the form of local standard operating procedures in half of the clinical environments (49%, 236/479).

Outcome measures

Pulse oximetry (76%, 362/479); sputum production (71%, 339/479) and arterial blood gases (71%, 339/479) were the most commonly used physiological outcome measures to determine the effectiveness of MI-E and a smaller proportion of respondents used peak cough flow (28%, 135/479) and vital capacity (24%, 133/479). Half the respondents used the clinical measure of respiratory infection frequency (50%, 238/479). Patient reported outcome measures used

clinically include: quality of life (23%, 108/ 479); patient acceptability (39%, 188/ 479) and patient satisfaction (38%, 183/ 479).

Adverse events were reported by 20% (97/479) of respondents: change in heart rate; (61%, 59/97); change in blood pressure (53%, 51/97); thoracic soreness or chest wall pain (29%, 28/97); abdominal distention (26%, 25/97); vomiting (20%, 19/97); blood streaked sputum (10%, 18/97) or pneumothorax (9%, 9/97).

Factors influencing decision to use MI-E

For those respondents who use MI-E, the main factors which influenced their decision-making regarding its use in patient management were: access to the equipment (95%, 455/479); lack of training or competency (91%, 437/479); lack of evidence (79%, 377/479) or if other cough augmentation techniques were ineffective (90%, 432/479). Respondents using MI-E strongly agreed or agreed that MI-E is useful in assisting a cough in neurological conditions (74%, 355/479).

Training

Training almost exclusively occurred through in-service education (93%, 446/479) and advice from medical sales representatives (47%, 223/479). Training was less commonly received through postgraduate courses (21%, 98/479).

Respondents who do not use MI-E

Respondents who did not use MI-E (hence lower denominator) identified their barriers as: lack of training or competency (70%, 265/ 381); lack of medical or allied health profession staff advice regarding MI-E (58%, 219/ 381). Physiotherapists had difficulty either accessing MI-E equipment (55%, 210/ 381) or insufficient funding to support the cost of using MI-E equipment (31%, 117/ 381), while others were unaware of the existence of MI-E (50%, 191/ 381). A third of physiotherapists who did not use MI-E already felt they were using sufficient technique/s to augment a cough (33%, 127/ 381).

DISCUSSION

This study has identified that physiotherapists find MI-E useful in the management of impaired cough in a variety of neurological conditions. Physiotherapists need to incorporate existing evidence into their clinical practise and this study could assist in influencing further provision of MI-E in the UK and beyond.

There are a number of methods available for augmenting a cough and enabling secretion removal (Anderson *et al* 2005, Simonds 2007). In this study, suction was used extensively in clinical practice; however, this is an invasive procedure and it has been suggested that MI-E could remove the need for suction (Morrow *et al* 2013). Other established manual techniques which aid inspiration and expiration, such as air stacking and manually assisted cough, were also considered useful in clinical practice and further research comparing MI-E with other methods of augmenting a cough is required (Morrow *et al* 2013).

MI-E was the third most commonly used cough augmentation technique by physiotherapists managing a change in respiratory status due to muscle weakness and disease progression in those with progressive neurological disease. MI-E was extensively used within the spinal cord injury population to prevent respiratory complications which are the leading cause of morbidity and mortality in upper level spinal cord injury (Reid *et al* 2010).

Neuromuscular diseases can affect all ages and MI-E was used in both adult and paediatric neuromuscular population management. However, this study found less usage in those under 15 years despite the existence of guidelines and consensus statements advocating early introduction in order to accustomise children to treatment, prior to disease progression and medical emergencies (ATS 2004, SMA 2007).

Whilst usage was predominately in the hospital environment, for the management of respiratory exacerbations, there is some evidence of its use in patient management within primary care. This could have implications for service development within the multidisciplinary team as MI-E should be incorporated into the home environment to reduce unnecessary and costly hospital admissions and improve quality of life (MD Campaign 2011, Bento *et al* 2010). The majority of physiotherapists are using MI-E as a non-invasive adjunct in patients who are spontaneously breathing. It is also used in conjunction with non-invasive ventilation to enable optimal ventilation and secretion clearance identifying a role for both devices (ACI 2010, NICE 2010, Chen *et al* 2014). A clinical study supporting the introduction of MI-E as a weaning strategy to prevent re-intubation in those with acute respiratory failure (Goncalves *et al* 2012) is supported by this studies findings on the extended usage of MI-E in those who are intubated and ventilated in intensive care.

Evidence based practice reports that pressures of ± 40 cmH₂O need to be generated for effective airway clearance (Castro and Bach 2002, Goncalves and Winck 2008, Fauroux *et al* 2008, ACI 2010, Philips Respironics 2014). However, the results of this study demonstrate that this is not being achieved in clinical practice. The theoretical rationale, supporting physiological changes in airflow and volume using MI-E, needs to be utilised clinically and greater awareness of pressure requirements could be encouraged during training.

This study found that outcome measures used in clinical practice do not fully reflect the clinical guidelines strong recommendations of using peak cough flow and spirometry to monitor muscle weakness and direct the escalation of respiratory interventions (BTS/ACPRC 2009, ACI 2010, NICE 2010). Patient reported outcome measures which determine clinical efficacy such as frequency of respiratory infections and hospitalisations, duration of hospital stays and quality of life markers (Morrow *et al* 2013) were

less commonly used and are required in order to influence service development and assess the long-term effectiveness of MI-E usage.

As MI-E is delivering a pressure directly to the lungs it may adversely affect patients. A minority of respondents did identify events such as abdominal distention due to air being forced into the stomach. However, barotrauma resulting in a serious event such as pneumothorax was rare and correlates with existing evidence (Suri *et al* 2008).

Limited access to MI-E has affected its implementation within the patient care pathway and this needs addressing at a national as well as local level to enable optimal management in line with clinical guidelines. This study highlights the necessity to formalise training so that competency-driven training, with regular updates, is provided for physiotherapy staff.

In this study lack of evidence was identified as a reason for not using MI-E in clinical practice. There is moderate to low level short-term evidence and expert opinion to support use of MI-E in neuromuscular populations as reported in clinical guideline recommendations. However, long-term evaluation of MI-E as a component of the neuromuscular respiratory management of a patient's care package is necessary (Morrow *et al* 2013).

Limitations of this study

This study's findings are representative of physiotherapists who are members of neurological, respiratory and paediatric special interest groups who manage people with neuromuscular conditions. The response rate was low, even with robust methodological processes; however, the retrospective power calculation provides some assurance that the results are meaningful and have captured information which should be representative of the physiotherapy population studied.

CONCLUSION

Usage of MI-E by physiotherapists is established practice in the neuromuscular population. This study has identified gaps in service delivery and provided information that could be useful in informing education, training and service development.

At present clinical guidelines, based on moderate to low evidence, recommend the use of MI-E in those neurological populations with respiratory compromise. Until more robust evidence for the use of MI-E in people with neuromuscular disease is provided, enabling fully informed decision making, MI-E usage should continue in line with clinical audit and evaluation. Physiotherapists need to implement recommendations in clinical guidelines to ensure the translation of existing evidence into clinical practice.

Acknowledgements

This study was supported by the Department of Employment and Learning, Northern Ireland.

Corresponding author and contributors

JM Bradley PhD Professor in Physiotherapy, Institute of Nursing and Health Research, School of Health Sciences, Ulster University and Respiratory Medicine, Belfast City Hospital, Belfast, Northern Ireland. *Contributed to questionnaire design; collection and analysis of data; paper write up.*

JS Elborn MD Dean, School of Medicine Dentistry and Biomedical Sciences, Queen's University, Northern Ireland. *Contributed to questionnaire design; collection and analysis of data; paper write up.*

M Hannon-Fletcher PhD Head of School of Health Sciences, Institute of Nursing and Health Research, Ulster University, Northern Ireland. *Contributed to paper write up.*

WG Kernohan PhD Professor of Health Research, Institute of Nursing and Health Research, School of Nursing, Ulster University, Northern Ireland. *Contributed to paper write up.*

FM Moran PhD, PGCU, BSc (Hons), MCSP, HCPC Lecturer in Physiotherapy, School of Health Sciences, Institute of Nursing and Health Research, Ulster University, Northern Ireland. *Principle Investigator and corresponding author; contributed to questionnaire design; collection and analysis of data; paper write up.*

Room 14J06
School of Health Sciences
Ulster University
Shore Road
Newtownabbey
Northern Ireland
BT37 0QB

e: f.moran@ulster.ac.uk
t: 02890366193
f: 2890368419

A Patterson PhD c/o Institute of Nursing and Health Research, School of Health Sciences, Ulster University, Northern Ireland. *Contributed to questionnaire design; collection and analysis of data; paper write up. Funded by Department of Employment and Learning.*

REFERENCES

- Agency for Clinical Innovation Respiratory Network (2010) *Domiciliary non-invasive ventilation in adult patients – a consensus statement* Australia.
- American Thoracic Society (2004) *Respiratory care of the patient with duchenne muscular dystrophy ATS consensus statement* *American Journal of Respiratory and Critical Care Medicine* 170 (4) pp456-465 (expert evidence).
- Anderson JL, Hasney KM, Beaumont NE (2005) *Systematic review of techniques to enhance peak cough flow and maintain vital capacity in neuromuscular disease: the case for mechanical insufflation-exsufflation* *Physical Therapy Reviews* 10 (1) pp25-33.
- Benditt J (2006) *The neuromuscular respiratory system: physiology; pathophysiology and a respiratory care approach to patients* *Respiratory Care* 51 (8) pp829-837.

- Bento J, Goncalves M, Silva N, Pinto T, Marinho A, Wincke JC (2010) *Indications and compliance of home mechanical insufflation-exsufflation in patients with neuromuscular diseases* **Arch Bronconeumol** 46 (8) pp420-425.
- Boitano LJ (2006) *Management of airway clearance in neuromuscular disease* **Respiratory Care** 51 (8) pp913-922.
- British Thoracic Society/Association of Chartered Physiotherapists in Respiratory Care (2009) *Physiotherapy management of the adult, medical, spontaneously breathing patient* **Thorax** 64 (supplement 1) ppi1-i51.
- Bushby K et al (2010) *Diagnosis and management of Duchenne muscular dystrophy, Part 1: diagnosis, and pharmacological and psychosocial management. Part 2: implementation of multidisciplinary care* **The Lancet Neurology** 9 (1) pp77-93.
- Castro C, Bach JR (2002) *Letters to the editor: Mechanical Insufflation Exsufflation* **Thorax** 57 pp281-282.
- Chatwin M (2010) *Interactive CSP Hospitals with cough assist devices*. [Online] Available at: http://www.interactivecsp.org.uk/network/viewTopic.cfm?network_id=24AD46C6E2BD5B8E2594492624DED978&startrow=181&item_id=F6B7AD0BB93961A7870B19D0CC3E15BE&topic [Accessed 05 Dec 2014].
- Chen TH, Hsu JH, Wu JR, Dai ZK, Chen IC, Liang WC, Yang SN, Jong YJ (2014) *Combined non-invasive ventilation and mechanical in-exsufflator in the treatment of pediatric acute neuromuscular respiratory failure* **Pediatric Pulmonology** 49 (6) pp589-96.
- Fauroux B, Guillemot N, Aubertin G, Nathan N, Labit A, Clement A, Lofaso F (2008) *Physiological benefits of mechanical insufflation-exsufflation in children with neuromuscular disease* **Chest** 133 (1) pp161-168.
- Finder J (July 2006-last update) *Review of airway clearance technologies* [Homepage of RT for Decision Makers in Respiratory Care], [online] Available: www.rtmagazine.com/about.asp
- Gauld LM (2009) *Airway clearance in neuromuscular weakness* **Developmental Medicine & Child Neurology** 51 (5) pp350-355.
- Gonçalves MR, Honrado T, Winck JC, Paiva JA (2012) *Effects of mechanical insufflation-exsufflation in preventing respiratory failure after extubation: a randomized controlled trial* **Critical Care** 16 R48.
- Gonçalves MR, Winck JC (2008) *Commentary: Exploring the potential of mechanical insufflation-exsufflation* **Breathe** 4 (4) pp326-329
- Hull J, Aniapravan R, Chan E, Chatwin M, Forton J, Gallagher J, Gibson N, Gordon J, Hughes I, McCulloch R, Russell RR, Simonds A (2012) *British Thoracic Society guideline for respiratory management of children with neuromuscular weakness* **Thorax** 67 (Supplement 1) ppi1-i40.
- Krippendorff K (2013) *Content analysis: an introduction to its methodology* 3rd edition Los Angeles: SAGE.
- McKim DA, Road J, Avendano M, Abdool S, Cote F, Duguid N, Fraser J, Maltais F, Morrisson DL, O'Connell C, Petrof BJ, Rimmer K, Skomro R (2011) *Home mechanical ventilation: A Canadian Thoracic Society clinical practice guideline* **Canadian Respiratory Journal** 18 (4) pp197-215.
- Morrow B, Zampoli M, van Aswegen H, Argent A (2013) *Mechanical insufflation-exsufflation for people with neuromuscular disorders*. **Cochrane Database of Systematic Reviews** 12 Article Number: CD010044. DOI:10.1002/14651858.CD010044.pub2
- Motor Neurone Disease Association (2006) *Management of respiratory insufficiency in motor neurone disease/amyotrophic lateral sclerosis patients: an evidence based review* **Amyotrophic Lateral Sclerosis** 7(1) pp5-15.
- Muscular Dystrophy Campaign (2010) *Building on the foundations: state of the nation* **The 2010 National Survey** UK.
- NICE (2010) *The use of non-invasive ventilation in the management of motor neurone disease* UK.
- Panitich HB (2009) *The pathophysiology of respiratory impairment in pediatric neuromuscular disease*. **Pediatrics** 123 (Supplement 4) ppS215-S218.
- Philips Respironics Cough Assist 3000-3200 User Manual and Cough Assist E70 Quick start guide. [online]. Available: http://www.healthcare.philips.com/main/homehealth/respiratory_care/coughassist/default.wpd
- Reid WD, Brown JA, Konnyu KJ, Rurak JME, Sakakirara B M (2010) *Physiotherapy secretion removal techniques in people with spinal cord injury: A systematic review* **Journal of Spinal Cord Medicine** 33 (4) pp353-370.
- Servera E, Sancho J, Gomez-Merino E, Briones ML, Vergara P, Perez D, Marin J (2003) *Non-invasive management of an acute chest infection for a patient with ALS*. **Journal of the Neurological Sciences** 209 pp111-113.
- Simmonds AK (2006) *Recent advances in respiratory care for neuromuscular disease* **Chest** 130 (6) pp1879-1886.
- Simonds AK (2007) *Non-invasive respiratory support: a practical handbook* Hodder Arnold 3rd edition.
- Stemler S (2001) *An overview of content analysis* **Practical Assessment, Research and Evaluation** 7(17) Retrieved December 19, 2014 from <http://PAREonline.net/getvn.asp?v=7&n=17>.
- Suri P, Burns SP, Bach JR (2008) *Pneumothorax associated with mechanical insufflation-exsufflation and related factors* **American Journal of Physical Medicine and Rehabilitation** 87 (11) pp951-955.
- Wang CH, Bonnemann CG, Rutkowski A, Sejersen T, Bellini J, Battista V, Florence JM, Schara U, Schuler PM, Wahbi K et al (2010) *International Standard of Care Committee for Congenital Muscular Dystrophy Consensus statement on standard of care for congenital muscular dystrophies* **Journal of Child Neurology** 25 (12) pp1559-1581.
- Wang CH, Finkel RS, Bertini ES, Schroth M, Simonds A, Wong B, Aloysius A, Morrision L, Main M, Crawford TO, Trela A (2007) *Participants of the International Conference on SMA Standard of care. Consensus Statement for Standard of Care in Spinal Muscular Atrophy* **Journal of Child Neurology** 22 (8) pp1027-1049.

Optimising motor recovery following stroke

the role of attention in motor learning

AUTHOR

Louise Johnson

PhD
Consultant Therapist in
Stroke and Neurological
Rehabilitation, Royal
Bournemouth Hospital
and Post-Doctoral
Research Fellow,
Health Education
Wessex/University of
Southampton

The use of detailed and specific coaching statements (instructions and feedback), that encourage patients to think about how they are moving, is common within neurological physiotherapy practice (Johnson *et al* 2013, Durham *et al* 2009, Talvitie 2000). Yet a growing body of evidence within the motor learning literature questions the value of prompting learners to consciously attend toward their own body movements (see Wulf 2012). This paper will discuss the influence that therapist communication may have on attention, and the potential impact on learning and recovery.

Attention refers to what we are thinking about, or what we are aware of, when we perform activities (Magill 2010). When coaching statements are provided by an external 'coach', they may influence two elements of attention – capacity and focus. Coaching statements will generate an attentional load on the receiver, who will need adequate resources to attend to and interpret the incoming information. High quantities of information will place demands on working memory. This may interfere with the practiced movement; whilst at the same time, the practised movement may interfere with the comprehension of the information (Haggard *et al* 2000). These factors relate to attentional capacity. In addition, coaching statements play an important role in directing attention of the learner. This may be either internal (toward body movements), or external (toward the environment). For example, 'think about bending your knee' would promote an internal focus, whereas 'focus on the step' would promote an external focus. The location of attention in relation to specific aspects of the task being performed is known as attentional focus.

Whilst there is considerable research to indicate that coaching statements have an important effect on learning in healthy individuals, there is relatively little evidence within the stroke literature. Despite this, therapists are known to spend considerable time instructing patients. In a previous observational study of physiotherapy practice for post stroke gait rehabilitation, we found the use of coaching statements during

physiotherapy to be high; with an average of one verbal instruction or feedback statement being given every 14 seconds (Johnson *et al* 2013). Therapists favoured the use of internally focused statements (67% of all statements); and unfocused statements such as 'good' or 'keep going', were also used regularly. Patients were frequently encouraged to 'think about' their performance, or be aware of their movements (Johnson *et al* 2013). Similar findings have also been reported during upper limb rehabilitation post stroke (Durham *et al* 2009).

QUANTITY OF COACHING STATEMENTS

Although evidence within stroke rehabilitation is lacking, evidence from other fields raises questions about the usefulness of such communication. Research with healthy individuals has specifically compared how different quantities of feedback influence motor learning. Reducing the proportion of trials for which feedback is presented can result in more effective learning than presenting feedback after every trial (Weeks and Kordus 1998, Winstein and Schmidt 1990, Lai and Shea 1998). Typically, these studies compare feedback after every practice trial (100% feedback) to feedback after every third trial (33% feedback). Similar benefits of reduced frequency feedback have also been shown in patients with traumatic brain injury learning a novel upper limb sequence (Croce *et al* 1996). Croce *et al* (1996) found that during acquisition trials subjects receiving feedback on every trial

were the most accurate and the most consistent in their responses (ie higher performance); however, subjects in groups receiving summary and average feedback were the most accurate during immediate retention, with the group receiving summary feedback being the most accurate during longer retention (ie greater learning) (Croce *et al* 1996). Readily correcting performance may not therefore be as helpful as allowing someone to find their own motor solution through practice alone.

CONTENT OF COACHING STATEMENTS

The basic finding that inducing an external focus of attention is more advantageous to learning when compared to an internal focus has been demonstrated in numerous studies involving motor tasks; examples include baseball (Castaneda and Gray 2007), field hockey (Jackson *et al* 2006), and soccer (Beilock *et al* 2002). Studies have also shown that not only do external focus instructions result in more effective learning than internal focus instructions, but they are also preferential to no instruction at all, leading to the interpretation that an external focus actually seems to enhance learning (Wulf *et al* 1998, Ford *et al* 2005, Koedijker *et al* 2011). Furthermore, in addition to the functional benefits of an external focus of attention, studies utilising surface EMG have shown neuromuscular activity to be more efficient under external focus conditions (Vance *et al* 2004, Wulf *et al* 2010, Zachry *et al* 2005). This body of evidence is compelling, but transferability into a stroke rehabilitation setting is unknown.

Although evidence in stroke is limited, there are a small number of studies that broadly replicate the beneficial effects of an external focus of attention during lateral weight transfer (Muckel and Mehrholz 2014) and reach to grasp (Durham *et al* 2014, Fasoli *et al* 2002). For example, Muckel and Mehrholz (2013) compared the immediate effects of an external focus to enhance lateral body weight shift after stroke. Whilst sitting, patients with hemiplegia were prompted to shift their weight sideways onto their hip (internal focus) or sideways toward a marker on the plinth (external focus). Despite a small sample size ($n=20$), the effects were statistically significant. Patients in the external focus group achieved significantly greater lateral body weight support than those in the internal focus group. As these studies only assessed performance, the impact on learning (carryover) is not known.

THEORIES RELATING TO ATTENTION AND LEARNING

Theories propose that focusing on specific movements (internal focus) may constrain or interfere with automatic control processes that would normally regulate movement, whereas if attention is focused towards the movement effect (external focus) the motor system is able

to more naturally self-organize (Wulf *et al* 2001). By adopting an external focus unconscious or automatic processes control the movement, resulting in more effective performance and learning (Vance *et al* 2004). This conceptualisation is known as the Constrained Action Hypothesis. Similarly, Reinvestment Theory supports the idea that relatively automated motor processes can be disrupted if they are run using consciously accessed, declarative knowledge to control the mechanics of the movements (Masters and Maxwell 2008). Complex skills with many units become broken down into sequences of smaller, separate units. Once broken down, each unit must be activated and run separately, which slows performance and, at each transition between units, creates an error that was not present in the 'chunked' control structure.

There are a number of reasons why the breakdown of skill under conscious learning conditions (ie with high quantities of task relevant information/an internal focus) may be seen more readily in patients with stroke:

- Stroke patients often report the need to consciously control the execution of their movements and are encouraged to do so by their therapists.
- During rehabilitation, stroke patients may receive many verbal and explicit instructions on how to perform a movement.
- Movements are constantly evaluated by rehabilitation staff which may increase stress/pressure to perform well.
- Patients may have reduced attentional capacity and slowed information processing as a result of the neurological damage.
- Movement deficits may lead to a negative body image and low self-esteem and therefore increased self-consciousness. (Kleynen *et al* 2011)

GAPS IN THE LITERATURE

Current literature identifies information provision, both in terms of quantity and focus of attention, to be important factors in motor learning. Whilst there is considerable evidence linking these factors to learning within healthy individuals, particularly in the fields of sports science and psychology, there is little evidence in stroke rehabilitation. Studies in stroke primarily assess performance (not learning) or investigate computer based activities (eg Boyd and Winstein 2003). Whilst such studies provide valuable insights into learning behaviour, they do not represent the complexities of motor learning in natural settings. The current evidence base does not therefore provide sufficient knowledge to guide the optimal delivery of rehabilitation interventions; and transferability of findings into a stroke rehabilitation setting is unknown. Future research is required firstly to understand how practice can be adapted in order to change attentional demands/focus; and secondly to

evaluate the impact that different attention conditions have on motor learning and recovery.

RESEARCH PROGRAMME

As part of a programme of research, we have developed guidelines for early gait rehabilitation using a reduced attentional demand (RAD) strategy. This strategy incorporates both a reduction in the overall quantity of communication, as well as promotion of an external focus of attention. These guidelines were developed empirically through observation of clinical practice, with input from clinicians and with due consideration to the existing evidence base. They have been successfully tested within an acute stroke unit setting through a feasibility trial (Johnson 2014). The next stage is to conduct a pilot study, fully exploring the application of the reduced attentional demand strategy in acute stroke rehabilitation and testing elements of the overall research design, before ultimately moving on to a larger randomised controlled trial.

This field of work demonstrates the value of looking beyond the neuro-rehabilitation literature, as there is considerable evidence relating to motor learning within other fields. If the findings from healthy populations were to be replicated in stroke rehabilitation, it could have important implications for the delivery of rehabilitation interventions. Reducing attentional demand by reducing the use of coaching statements and promoting an external focus of attention, could play an important role in optimising motor recovery. The challenge now is to apply and test the applicability of this within neurological rehabilitation.

REFERENCES

- Beilock SL, Carr TH, MacMahon C and Starkes JL (2002) *When paying attention becomes counterproductive: impact of divided versus skill-focussed attention on novice and experienced performance of sensorimotor skills* **Journal of Experimental Psychology: Applied** 8 pp6-16.
- Boyd L and Winstein C (2003) *Impact of explicit information on implicit motor sequence learning following middle cerebral artery stroke* **Physical Therapy** 83 pp976-989.
- Castaneda B and Gray R (2007) *Effects of focus of attention on baseball batting performance in players of differing skill levels* **Journal Of Sport and Exercise Psychology** 29 pp60-77.
- Croce R, Horvat, M and Roswal G (1996) *Augmented feedback for enhanced skill acquisition in individuals with traumatic brain injury* **Perceptual and Motor Skills** 82 pp507-514.
- Durham K, Sackley C, Wright C, Wing A, Edwards M and Van Vliet P (2014) *Attentional focus of feedback for improving performance of reach-to-grasp after stroke: a randomised crossover study* **Physiotherapy** 100 pp108-115.
- Durham K, Van Vliet P, Badger F and Sackley C (2009) *Use of information feedback and attentional focus of feedback in treating the person with a hemiplegic arm* **Physiotherapy Research International** 14 pp77-90.
- Fasoli S, Trombly C, Tickle-Degnen L and Verfaellie M (2002) *Effect of instructions on functional reach in persons with and without cerebrovascular accident* **American Journal of Occupational Therapy** 56 (4) pp380-390.
- Ford P, Hodges NJ and Williams AM (2005) *Online attentional-focus manipulations in a soccer-dribbling task: implications for the proceduralization of motor skills* **Journal of Motor Behavior** 37 pp386-394.
- Haggard P, Cockburn J, Cock J, Fordham C and Wade D (2000) *Interference between gait and cognitive tasks in a rehabilitating neurological population* **Journal of Neurology Neurosurgery Psychiatry** 69 pp479-486.
- Jackson R, Ashford K and Norsworthy G (2006) *Attentional focus, dispositional reinvestment, and skilled motor performance under pressure* **Journal of Sport and Exercise Psychology** 28 pp49-68.
- Johnson L, Burridge JH and Demain SH (2013) *Internal and external focus of attention during gait re-education: an observational study of physical therapist practice in stroke rehabilitation* **Physical Therapy** 93 pp957-966.
- Johnson L (2014) *Explicit and Implicit Motor Learning During Early Gait Rehabilitation Post Stroke* University of Southampton, Faculty of Health Sciences, Doctoral Thesis [online] Available: <http://eprints.soton.ac.uk/369974/1.hasCoversheetVersion/Final%20Thesis.pdf>
- Kleynen M, Braun S, Verbunt J, Wade DT and De Bie R (2011) *Can paying attention be counterproductive? The use of the Dutch version of the Movement Specific Reinvestment Scale in Stroke* World Congress of Physical Therapy, Amsterdam.
- Koedijker JM, Poolton JM, Maxwell JP, Oudejans R, Beek PJ and Masters RSW (2011) *Attention and time constraints in perceptual-motor learning and performance: instruction, analogy, and skill level* **Consciousness And Cognition** 20 pp245-256.
- Lai Q and Shea C (1998) *Generalized motor program (GMP) learning: Effects of reduced frequency of knowledge of results and practice variability* **Journal of Motor Behavior** 30 pp51-59.
- Magill R (2010) *Motor Learning Concepts and Applications*, New York, McGraw-Hill.
- Masters RSW and Maxwell J (2008) *The theory of reinvestment* **International Journal of Sport and Exercise Psychology** 1 pp160-183.
- Muckel S and Mehrholz J (2014) *Immediate effects of two attention strategies on trunk control on patients after stroke. A randomized controlled pilot trial* **Clinical Rehabilitation** 28 pp632-636.
- Talvitie U (2000) *Socio-affective characteristics and properties of extrinsic feedback in physiotherapy* **Physiotherapy Research International** 5 pp173-188.
- Vance J, Wulf G, Tollner T, McNevin N and Mercer J (2004)

EMG activity as a function of the performer's focus of attention **Journal of Motor Behavior** 36 pp450-459.

Weeks D and Kordus R (1998) Relative frequency of knowledge of performance and motor skill learning **Research Quarterly For Exercise And Sport** 69 pp224-230.

Winstein C and Schmidt R (1990) Reduced frequency of knowledge of results enhances motor skill learning **Journal of Experimental Psychology: Learning, Memory and Cognition** 16 pp677-691.

Wulf G (2012) Attentional focus and motor learning: a review of 15 years **International Review of Sport and Exercise Psychology** 6 pp77-104.

Wulf G, Dufek JS, Lozano L and Pettigrew C (2010) Increased jump height and reduced EMG activity with an external focus **Human Movement Science** 29 pp440-448.

Wulf G, Höß M and Prinz W (1998) Instructions for motor learning: Differential effects of internal versus external focus of attention **Journal of Motor Behavior**, 30 (2) pp169-170.

Wulf G, McNevin N and Shea C (2001) The automaticity of complex motor skill learning as a function of attentional focus **The Quarterly Journal of Experimental Psychology (A) Human Experimental Psychology** 54 pp1143-1154.

Zachry T, Wulf G, Mercer J and Bezodis N (2005) Increased movement accuracy and reduced EMG activity as the result of adopting an external focus of attention **Brain Research Bulletin** 67 pp304-309.

Evidence into practice

ACPIN – INPA

International Neurophysiotherapy Conference

QE2 Centre • London UK

17th-18th March 2016

Concurrent programme streams
covering the diversity of
neurorehabilitation

SPEAKERS

KEYNOTE Prof Derick Wade

Prof Mindy Levin (Canada)

Prof Steve Wolf (USA)

Prof Louise Ada (Australia)

Prof Gert Kwakkel (the Netherlands)

Prof Jonathan Marsden (UK)

Prof Lisa Harvey (Australia)

Prof the Baroness Finlay

of Llandaff (President of the CSP)

Prof Monica Busse (UK)

Prof Robert van Deursen (UK)

Prof Fiona Jones (UK)

Prof Birgitta Langhammer (Norway)

Dr Elisa Pelosin (Italy)

Dr Jan Mehrholz (Germany)

Dr Stephen Ashford (UK)



TICKETS

ACPIN members

Two day ticket:

Early bird £150*

Regular **£200**

One-day ticket:

Early bird £100*

Regular **£150**

Non-members

Two day ticket:

Early bird £250*

Regular **£300**

One-day ticket:

Early bird £150*

Regular **£200**

* Early bird rate ends
31 December 2015

To register go to **www.acpin.net**



International Neurological
Physical Therapy Association



News

ACPIN research grants

ACPIN is able to award research grants to support members to undertake research in their clinical practice.

Applications need to be submitted by the 31st January. There are also grants to support travel to participate in research overseas.

We are also making grants available to support your continual professional development, to cover costs to attend national and international conferences, and towards study for a PGdip and MSc.

Please see table below for more details. Applications can be made through our website.

ACPIN research grants schedule

Research grants are awarded at the National ACPIN Conference and AGM in March. Applications need to be submitted by 31st January. Grants will only be

awarded to researchers who are able to attend the AGM to explain the benefit to ACPIN of their research at the AGM and Conference.

Grant	Purpose	Amount	Application	Criteria/contact
Research Project Grant: ACPIN members, masters students or PhD students	To support ACPIN members who wish to undertake a research in their clinical practice; for those undertaking research for the fulfilment of their MSc or PhD	Six grants each year up to £1,000	Application form	ACPIN member for two years. Research must be disseminated through ACPIN route. Publication in professional journals is recommended and ACPIN needs to be acknowledged in publications.
ACPIN Presidents Grant	Project or research felt by the ACPIN president to be in the interest of ACPIN and the furthering of the neuro-physiotherapy profession	Once a year up to £2,000	A call for applications will be announced at the ACPIN AGM. There will be a four month application period until the deadline. The committee will decide each year whether there will be a call announced.	ACPIN member for two years. Research must be disseminated through ACPIN route. Publication in professional journals is recommended and ACPIN needs to be acknowledged in publications.
International ACPIN Research Facilitation Grant	The International ACPIN Research Facilitation Grant is to support travel to participate in research overseas in the field of neurological physiotherapy	Up to £1,000	Application form	ACPIN member for two years. Research must be disseminated through ACPIN route. Publication in professional journals is recommended and ACPIN needs to be acknowledged in publications.

Interactive CSP update

September 2015

Task group for the development of the ACPIN research project grants scheme: terms of reference

Purpose

- To provide the strategic lead on the development, implementation and evaluation of the ACPIN Research Project Grants Scheme
- To report to the ACPIN national executive committee on progress and issues

Outline of functions

- Develop the vision of ACPIN Research Project Grant Scheme with a framework of criteria and timescales for application and decision
- Provide a cost plan of an outline of the ACPIN Research Project Grant Scheme
- Provide a timescale for phased implementation of the ACPIN Research Project Grant Scheme
- Process applications and provide recommendation to the ACPIN executive committee on which applications to process
- Provide a structure that ensures successful applicants will contribute to ACPIN
- Oversee the delivery and evaluation of ACPIN Research Project Grant Scheme
- Develop and implement a review mechanism for the ACPIN Research Project Grant Scheme with set timescales

Membership/Representation

It is envisaged that this group will have no more than eight and no less than five members. Membership will primarily consist of ACPIN members which may include:

- ACPIN research officer (nominated secretary to the group)
- Executive committee members
- Regional representatives
- Regional committee members
- ACPIN members
- ACPIN members with experience in developing research applications and a research portfolio
- ACPIN members in a role in voluntary sector organisations with a remit for, or interest in supporting research in the neuro physiotherapy profession

- Patients, service users, local public representatives of people with long term neurological condition

Sub-groups

There may be occasion to undertake sub-group meetings to complete a specific piece of work. This may also apply when a member of the group has an interest in a received application and the application needs discussing without that member present in order to ensure impartiality of the group.

Any formed sub-groups will report to the main group, who will agree and lead on the direction to be undertaken.

Frequency

The frequency of meetings will be as agreed by the group to achieve the objectives in a timely manner. The frequency of meetings should be agreed by the task group within a three month period initially, and annual thereafter.

Reporting

Progress reports of the task group will be shared with the ACPIN national executive committee in a timely manner so they can be studied before meetings.

The group is to use the research@acpin.net email address for communication.

Review of terms of reference

This will be undertaken after the first three months initially, then annually thereafter, to ensure continuing relevance and ongoing development of the ACPIN Research Project Grant Scheme is in line with the general ACPIN strategy.

Chris Manning iCSP link moderator for neurology.

There are 10,768 CSP members registered with the neurology network.

This is more than the membership of ACPIN. So if you post a discussion or event on iCSP it will be viewed by a much greater audience and attract different points of view and reach a wider pool of possible course attendees.

A recent discussion on administering botulinum toxin injections under sedation or general anaesthetic has already attracted a significant number of posts. Anxiety or pain experienced during injections may be more common than is evident from the literature <http://www.csp.org.uk/icsp/topics/botox-sedation?networkid=226047>

Also have a look at this discussion if you haven't already: Novak review casts doubt on efficacy of Bobath. Should we embrace or ignore it? <http://www.csp.org.uk/icsp/topics/novak-review-casts-doubt-efficacy-bobath-should-we-embrace-or-ignore-it?networkid=226047&editorspick>

Make sure you read the whole discussion. It has been copied from the paediatric network.

The 'News' section has information about new guidelines and consultations. Keep an eye on this as the timescale for response to some consultations is short.

Recent additions to documents have been useful. If you do come across useful policies, updates of documents, or articles please share them with the network.

Focus on

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. Here they both bring us up to date.

It is finished!

It feels great to say 'It is finished!' Surreal even! Wow! I think I need to say that again! 'It is finished!' I guess you can tell that I am excited! All the months of collecting data, analysing and the mammoth tasks of writing what appeared to be never-ending drafts are finished! Hmm... But I must also admit that mixed into this level of excitement is a hint of anxiety.

Common phrases used to describe a PhD are, 'the beast', 'the journey', 'the process' etc. I guess my favourite of all these descriptors is 'the journey', because it has been a journey indeed. A journey into what I described in my first blog as *The unknown* (Synapse Spring 2012). I remember watching a presentation with someone describing a journey. They used a picture of a straight road as their background slide for this presentation. A lovely picture too, I might add, but then, after some reflection, I thought about my journey and the picture I would use to illustrate my journey (see image below). I would still use the road analogy, but

the road would have turns, bends, hills (high points), troughs (low points) and a few potholes (smile). So, the journey for me was not straightforward yet overall rewarding.

In this final blog I would like to share briefly some tips about how I navigated my way along this journey over the course of the PhD.

Top tips

- Believe that you have the ability to complete the PhD.
- Supervisors are not optional – they are crucial to have along the PhD journey. Therefore, build an open, honest and transparent relationship from early on in the journey. This will help you get through the points in the journey where you feel stuck, for example, in a pot hole or in a trough (low points).
- Surround yourself with people (family, friends, and colleagues) who support you and your vision. They also come in handy to help you proofread chapters

"Set goals but make sure they are realistic and achievable. I have found that ticking off my short-term goals gave huge psychological mileage."

and/or just to talk through/clarify some ideas that you might have.

- Set goals but make sure they are realistic and achievable. I have found that ticking off my short-term goals gave huge psychological mileage. Although short-term goals do not always seem like much, remember that they add to the bigger picture in ultimately achieving the long-term goal.
- Make use of opportunities along the journey; for example, teaching at the university and presenting at conferences, as well as collaborating with other researchers within and outside academia and beyond the boundaries of physiotherapy.
- Know when to take some time out! If you find you are getting stressed about a particular chapter, take a break from it! Do something fun! Anything that takes your mind off the PhD.
- Eat healthily and do not forget the exercise! It is so easy to sit for hours writing! Build exercise into your schedule.
- Remember to enjoy the journey.
- If all the above fail, then keep breathing – where there is life, there is hope!

This is where I say goodbye! At this point, I would like to say thanks for providing this platform to share this journey over the past three years. I have been honest with these blogs to highlight the phases and/or stages one can go through. If you are interested in embarking on a PhD, my advice would be, 'Go for it!' You will not only gain a PhD at the end but I can guarantee that you will learn a lot more about yourself during the journey as well.

So I bid you farewell and all the best with your future career choice.



Image by Zairon (Own work) [CC BY-SA 3.0 (<http://creativecommons.org/licenses/by-sa/3.0/>)], via Wikimedia Commons https://commons.wikimedia.org/wiki/File:Möre_og_Romsdal_Trollstigen_11.JPG

Hitting the wall

My previous blog finished somewhat melodramatically with '...my future is very much undecided. I am just focused on submitting the PhD.' Let's deal with these two points in order first. To recap – The NHS Trust where I had been working for ten years had made it clear that it would be easier for them if I did not return to clinical work once the research secondment had finished.

With this information, and a change in family circumstances, my wife and I took the huge step of deciding to move our family from Birmingham to Northern Ireland where my wife is from. Since May 2015 I have therefore been completing my PhD in Northern Ireland which is where I write this blog now (something totally unpredicted as I wrote the last blog). I also have a new job in stroke rehabilitation which starts in one month's time at the South Eastern Trust.

So my future is decided but what of the PhD? I have used many metaphors over the last years to describe a PhD from mountaineering, with its many false summits, to marathon running. To continue the latter – I think I 'hit the wall' around April and have been jogging/limping the final mile to the finish line ever since. The exciting parts of learning, finding out results and patient interaction were all behind me and all that stood in the way was attempting to achieve the best thesis I could (or as close to it as I can bear). It involved reading the minutiae of every sentence and deciding whether it could be better explained in a different way.

The frustrating issues that arise when you are writing any academic paper, such as referencing and labelling of tables and figures, is all complete and the final document is now with my supervisor for a final read through; come what may, I

will submit it in the next fortnight. I think I am too involved at this moment to reflect fully on the whole experience and I hope to complete one final blog in the next *Syn'apse*.

I am aware that this blog was not to put people off research but to encourage more clinicians to become active in research and hopefully carry out post-

"A PhD is a fantastic chance to develop knowledge in a specific area of clinical practice but will also allow you to develop knowledge and critical thinking that transfers across all disciplines of physiotherapy practice."

graduate research that helps drive our profession forward. So I will be more positive for the rest of this entry.

I continued to present papers at conferences and this included the WCPT 2015 conference in Singapore. I was really impressed by the scientific rigour at this conference and was able to make contact with teams from Canada and Australia that I had previously met as well as form other connections. There was also a very welcoming, small and encouraging team of neurophysio's from the UK who were friendly faces in the crowd during my presentation. I will not dwell too much on this conference as it is described in other sections of *Syn'apse*.

Another conference was the International Society for Physical and Rehabilitation Medicine that took place in Berlin in June. This was a disappointing conference in terms of the science being discussed but allowed me to make further contacts. It was also my first experience of having to stand up and directly contradict the speaker that had been on before me. Being someone who doesn't care too much for argument this is something that I would previously have done anything to avoid. On this occasion I felt I was on the scientific high ground and was confident in my knowledge of the subject and felt I took it in my stride. This experience really showed me how far I have come in many ways. My understanding of spasticity, confidence in presenting, openness to question current practice and ability to overcome anxieties were all tested in these 15 minutes. These will be tested under even more daunting conditions for a prolonged period when I defend my thesis in my viva which should occur before Christmas.

A PhD is a fantastic chance to develop knowledge in a specific area of clinical practice but will also allow you to develop knowledge and critical thinking that transfers across all disciplines of physiotherapy practice. Perhaps more importantly it develops skills such as coping with stress and problem solving that allow you to become a more rounded individual generally. I truly believe that anyone with the interest to develop research skills should have the chance to do so. It is up to us as a profession to make this as easy to access as possible.

Sharing good practice

Use of Electrical Stimulation following stroke: a consensus statement

There is an increasing body of evidence supporting the use of electrical stimulation (ES) for patients affected by stroke. However, the available guidance is limited and practice is varied. As a result of this, the Scottish Stroke Allied Health Professionals Forum (SSAHPF) wished to explore the evidence base, particularly with respect to details of ES interventions, and to consult with clinicians about current practice in Scotland; the aim being to establish a consensus of opinion, based on the available evidence, and agreement on best practice for the use of ES following stroke.

The SSAHPF committee members nominated AHP practitioners, with an interest in ES following stroke, to form a working group. This dedicated, hardworking, enthusiastic and knowledgeable working group of physiotherapists and occupational therapist completed this unfunded piece of work in less than two years.

A Scotland-wide survey, aimed at physiotherapists, occupational therapists and orthotists, was conducted using SurveyMonkey®. Each question in the survey referred to the use of ES with stroke patients.

A literature search was carried out and the evidence used to provide specific guidance on the following interventions:

- The use of ES to restore motor control
- The use of ES for shoulder subluxation following stroke

It also considered:

- parameters of treatment
- contraindications
- ES devices available

Two audits were carried out (one in NHS Greater Glasgow and Clyde and one in NHS Ayrshire and Arran) to examine the feasibility of using ES to prevent shoulder

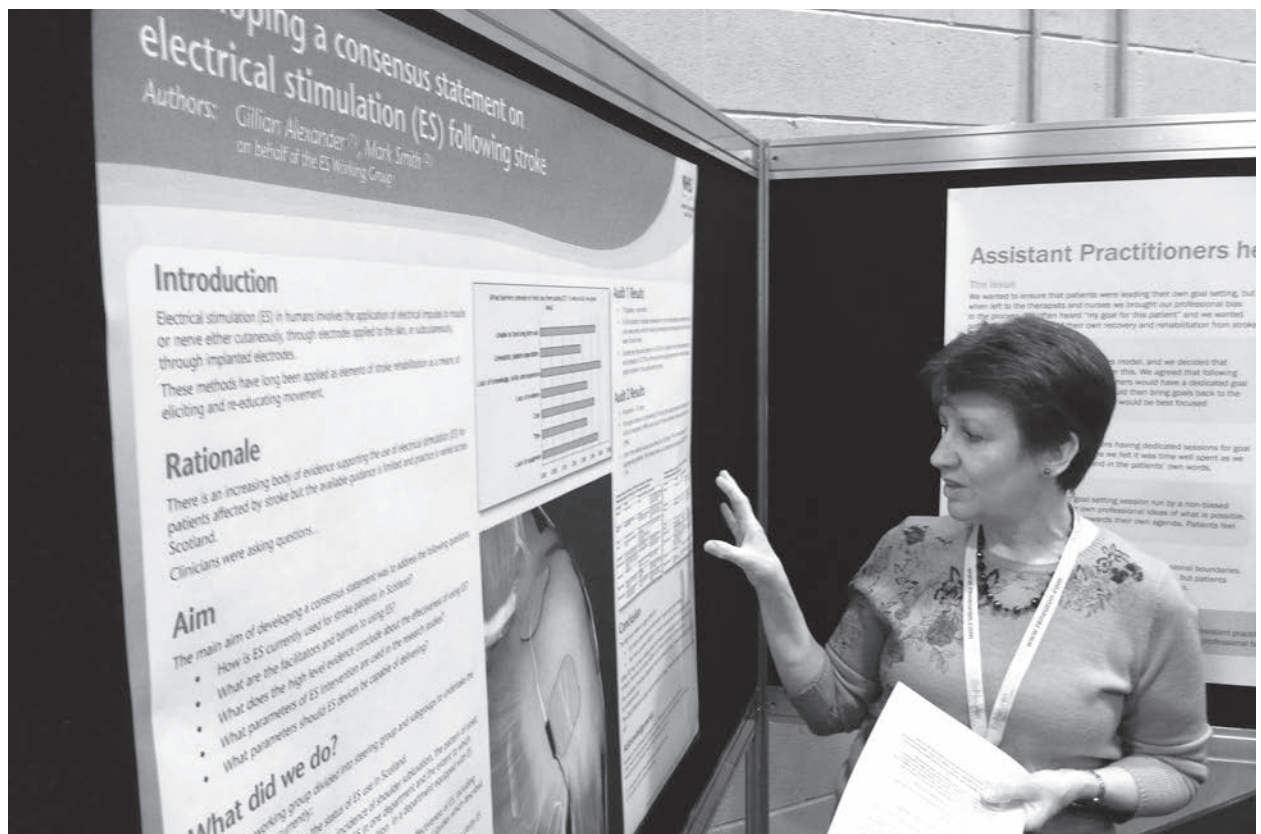
subluxation in a ward setting.

The Clinical Physics and Bioengineering Medical Device Unit (Software) Department at NHS Greater Glasgow and Clyde reviewed a short list of potential ES devices for home use in stroke rehabilitation.

The consensus statement was critically reviewed by an expert panel of academics and practitioners before being published by the Medical Illustrations Department at NHS Greater Glasgow and Clyde. The full statement can be downloaded at: www.chss.org.uk/ssahpf/ecs-statement.pdf

A quick reference guide has also been produced and can be downloaded at: www.chss.org.uk/ssahpf/ecs-guide.pdf

Physiotherapist Gillian Alexander, Chair SSAHPF presenting the ES poster at the UK Stroke Forum in December 2014



Resources

Articles in other journals

Archives Physical Medicine and Rehabilitation

Volume 96: 6

Basford JR, Malec JF *Brief overview and assessment of the role and benefits of cognitive rehabilitation* pp977-980.

Brooks JC, Shavelle RM, Strauss DJ, Hammond FM, Harrison-Felix CL *Long-term survival after traumatic brain injury part 1: external validity of prognostic models* pp994-999.e2.

Brooks JC, Shavelle RM, Strauss DJ, Hammond FM, Harrison-Felix CL *Long-term survival after traumatic brain injury part II: life expectancy* pp1000-1005

Chang YJ, Chou CC, Huang WT, Lu CS, Wong AM, Hsu MJ *Cycling regimen induces spinal circuitry plasticity and improves leg muscle coordination in individuals with spinocerebellar ataxia* pp1006-1013.

Dijkers MP *Reporting on interventions: issues and guidelines for rehabilitation researchers* pp1170-1180.

Giesbrecht EM, Wilson N, Schneider A, Bains D, Jonathan Hall J, Miller WC *Preliminary evidence to support a 'boot camp' approach to wheelchair skills training for clinicians* pp1158-1161.

Heetla HW, Halbertsma JP, Dekker R, Staal MJ, van Laar T *Improved gait performance in a patient with hereditary spastic paraplegia after a continuous intrathecal baclofen test infusion and subsequent pump implantation: a case report* pp1166-1169.

Kwakkel G, van Wegen EE, Meskers CM *Invited commentary on comparison of robotics, functional electrical stimulation, and motor learning methods for treatment of persistent upper extremity dysfunction after stroke: a randomized controlled trial* pp991-993.

McCabe J, Monkiewicz M, Holcomb J, Pundik S, Daly JJ *Comparison of robotics, functional electrical stimulation, and motor learning*

methods for treatment of persistent upper extremity dysfunction after stroke: a randomized controlled trial pp981-990.

Meterko M, Marfeo EE, McDonough CM, Jette AM, Ni P, Bogusz K, Rasch EK, Brandt DE, Chan L *Work disability functional assessment battery: feasibility and psychometric properties* pp1028-1035.

van Mierlo ML, van Heugten CM, Post MW, de Kort PL, Visser-Meily JM *Psychological factors determine depressive symptomatology after stroke* pp1064-1070.

New PW, Reeves RK, Smith É, Townson A, Eriks-Hoogland I, Gupta A, Maurizio B, Scivoletto G, Post MW *International retrospective comparison of inpatient rehabilitation for patients with spinal cord dysfunction epidemiology and clinical outcomes* pp1080-1087.

Ripat JD, Brown CL, Ethans KD *Barriers to wheelchair use in the winter* pp1117-1122.

Sakakibara BM, Miller WC, Rushton PW *Rasch Analyses of the Wheelchair Use Confidence Scale* pp1036-1044.

Visser-Keizer AC, AHogenkamp A, Westerhof-Evers HJ, Egberink IJL, Spikman JM *Dutch Multifactor Fatigue Scale: a new scale to measure the different aspects of fatigue after acquired brain injury* pp1056-1063.

Wajda DA, Moon Y, Motl RW, Sosnoff JJ *Preliminary investigation of gait initiation and falls in multiple sclerosis* pp1098-1102.

Wecht JM, Weir JP, Galea M, Martinez S, Bauman WA *Prevalence of abnormal systemic hemodynamics in veterans with and without spinal cord injury* pp1071-1079.

Volume 96: 7

Adamson BC, Ensari I, Motl RW *Effect of exercise on depressive symptoms in adults with neurologic disorders: a systematic review and meta-analysis* pp1329-1338.

Brown MR, Personeus K, Langan J *Preventing lower back pain among caregivers* pp1365-1366.

Gäverth J, Parker R, MacKay-Lyons M *Exercise stress testing after stroke or transient ischemic attack: a scoping review* pp1349-1359.e12.

Grigorovich A, Forde S, Levinson D, Bastawrous M, Cheung AM, Cameron JI *Restricted participation in stroke caregivers: who is at risk?* pp1284-1290.

Guillén-Solà A, Chiarella SC, Martínez-Orfila J, Duarte E, Alvarado-Panesso M, Figueres-Cugat A, Bas N, Marco E *Usefulness of citric cough test for screening of silent aspiration in subacute stroke patients: a prospective study* pp1277-1283.

Jimenez N, Osorio M, Ramos JL, Apkon S, Ebel BE, Rivara FP *Functional independence after inpatient rehabilitation for traumatic brain injury among minority children and adolescents* pp1255-1261.

Kegelmeyer D, Ellis T, Esposito A, Gallagher R, Harro CC, Hoder J, Hussey E, O'Neal S *Measurement characteristics and clinical utility of the Mini BESTest in individuals with Parkinson Disease* pp1367-1368.

Kushner DS, Peters KM, Johnson-Greene D *Evaluating Siebens Domain Management model for inpatient rehabilitation to increase functional independence and discharge rate to home in geriatric patients* pp1310-1318.

Meldrum D, Herdman S, Vance R, Murray D, Malone K, Duffy D, Glennon A, McConn-Walsh R *Effectiveness of conventional versus virtual reality-based balance exercises in vestibular rehabilitation for unilateral peripheral vestibular loss: results of a randomized controlled trial* pp1319-1328.

Nguyen VQC, PrvuBettger J, Guerrier T, Hirsch MA, Thomas JG, Pugh TM, Rhoads III CF *Factors associated with discharge to home versus discharge to institutional care after inpatient stroke rehabilitation* pp1297-1303.

Pangalila RF, van den Bos GA, Bartels B, Bergen M, Stam HJ, Roebroek ME *Prevalence of fatigue, pain, and affective disorders in adults with duchenne muscular dystrophy and their associations with quality of life* pp1242-1247.

Pearson M, Dieberg G, Smart N *Exercise as a therapy for improvement of walking ability in adults with multiple sclerosis: a meta-analysis* pp1339-1348.

Rand ML, Darbinian JA *Effect of an evidence-based mobility intervention on the level of function in acute intracerebral and subarachnoid hemorrhagic stroke patients on a neurointensive care unit* pp1191-1199.

Reistetter TA, Kuo YF, Karmarkar AM, Eschbach K, Teppala S, Freeman JL, Ottenbacher KJ *Geographic and facility variation in inpatient stroke rehabilitation: multilevel analysis of functional status* DOI: <http://dx.doi.org/10.1016/j.apmr.2015.02.020> pp1248-1254.

Rulleau T, Mauvieux B, Toussaint L *Influence of circadian rhythms on the temporal features of motor imagery for older adult inpatients* pp1229-1234.

Sakakibara BM, Miller WC *Prevalence of low mobility and self-management self-efficacy in manual wheelchair users and the association with wheelchair skills* pp1360-1363.

Silverman AM, Molton IR, Alschuler KN, Ehde DM, Jensen MP *Resilience predicts functional outcomes in people aging with disability: a longitudinal investigation* pp1262-1268.

Zhang L, Yan T, You L, Li K *Barriers to activity and participation for stroke survivors in rural China* DOI: <http://dx.doi.org/10.1016/j.apmr.2015.01.024> pp1222-1228.

Volume 96: 8

Basso DM, Velozo C, Lorenz D, Suter S, Behrman AL *Interrater reliability of the Neuromuscular Recovery Scale for spinal cord injury* pp1397-1403.

Behrman AL, Velozo C, Suter S, Lorenz D, Basso DM *Test-retest reliability of the Neuromuscular Recovery Scale* pp1375-1384.

Bisson EJ, Peterson EW, Finlayson M *Delayed initial recovery and long lie after a fall among middle-aged and older people with multiple sclerosis* pp1499-1505.

Brenner LA, Bahraini N, Homaifar BY, Monteith LL, Nagamoto H, Dorsey-Holliman B, Forster JE *Executive functioning and suicidal behavior among veterans with and without a history of traumatic brain injury* pp1411-1418.

Chen P, Hreha K, Kong Y, Barrett AM *Impact of spatial neglect on stroke rehabilitation: evidence from the setting of an inpatient rehabilitation facility* pp1458-1466.

Craig A, Perry KN, Guest R, Tran Y, Dezarnaulds A, Hales A, Ephraums C, Middleton J *Prospective study of the occurrence of psychological disorders and comorbidities after spinal cord injury* pp1426-1434.

Jaffe KM, Nathalia Jimenez N *Disparity in rehabilitation: another inconvenient truth* pp1371-1374.

Jeffries EC, Hoffman SM, de Leon R, Dominguez JF, Semerjian TZ, Melgar IA, Dy CJ *Energy expenditure and heart rate responses to increased loading in individuals with motor complete spinal cord injury performing body weight-supported exercises* pp1467-1473.

Kegelmeyer D, PD EDGE Task Force *Measurement characteristics and clinical utility of the Parkinson Disease Quality of Life Measure (39- and 8-item versions) in individuals with Parkinson Disease* pp1551-1552.

Klyce DW, Bombardier CH, Davis TJ, Hartoonian N, Hoffman JM, Fann JR, Kalpakjian CZ *Distinguishing grief from depression during acute recovery from spinal cord injury* pp1419-1425.

Sandhoff BM, Benedict RH, Motl RW *Nonsignificant associations between measures of inhibitory control and walking while thinking in persons with multiple sclerosis* pp1518-1524.

Sinha R, Slavin MD, Kisala PA, Ni P, Tulskey DS, Jette AM *Functional ability level development and validation: providing clinical meaning for spinal cord injury functional index scores* pp1448-1457.

Tielemans NS, Schepers VP, Visser-Meily JM, Post MW, van Heugten CM *Associations of proactive coping and self-efficacy with psychosocial outcomes in individuals after stroke* pp1484-1491.

Velozo C, Moorhouse M, Ardolino E, Lorenz D, Suter S, Basso DM, Behrman AL *Validity of the Neuromuscular Recovery Scale: a measurement model approach* pp1385-1396.

Visser MM, Heijenbrok-Kal MH, van't Spijker A, Oostra KM, Busschbach JJ, Ribbers GM *Coping, problem solving, depression, and health-related quality of life in patients receiving outpatient stroke rehabilitation* pp1492-1498.

Clinical Rehabilitation

Volume 29: 6

Bang DH, W Shin WS, Choi SJ *The effects of modified constraint-induced movement therapy combined with trunk restraint in subacute stroke: a double-blinded randomized controlled trial* pp561-569.

Bastawrous M, Gignac MA, Kapral MK, and Cameron JI *Adult daughters providing post-stroke care to a parent: a qualitative study of the impact that role overload has on lifestyle, participation and family relationships* pp592-600.

Brands I, Stapert S, Köhler S, Wade D, van Heugten C *Life goal attainment in the adaptation process after acquired brain injury: the influence of self-efficacy and of flexibility and tenacity in goal pursuit* pp611-622.

Forsberg F, Widén-Holmqvist L, Ahlström G *Balancing everyday life two years after falling ill with Guillain-Barré syndrome: a qualitative study* pp601-610.

Tosun OC, Mutlu EK, Ergenoglu AM, Yeniel AO, Tosun G, Malkoc M, Askar N, and Itil IM *Does pelvic floor muscle training abolish symptoms of urinary incontinence? A randomized controlled trial* pp525-537.

Volume 29: 7

Barbic SP, Bartlett SJ, Mayo NE *Emotional vitality in caregivers: application of Rasch Measurement Theory with secondary data to development and test a new measure* pp705-716.

Chen MH, Huang LL, Lee CF, Hsieh CL, Lin YC, Liu H, Chen MI, Lu WS *A controlled pilot trial of two commercial video games for rehabilitation of arm function after stroke* pp674-682.

Faux SG, Kohler F, Mozer R, Klein LA, Courtenay S, D'Amours SK, Chapman J, Estell J *The ROARI project – Road Accident Acute Rehabilitation Initiative: a randomised clinical trial of two targeted early interventions for road-related trauma* pp639-652.

Van Heugten CM, Walton L, Hentschel U *Can we forget the Mini-Mental State Examination? A systematic review of the validity of cognitive screening instruments within one month after stroke* pp694-704.

Ntsiea MV, Van Aswegen H, Lord S, Olorunju S *The effect of a workplace intervention programme on return to work after stroke: a randomised controlled trial* pp663-673.

Slaman J, van den Berg-Emons HJG, van Meeteren J, Twisk J, van Markus F, Stam HJ, van der Slot WM, Roebroek ME *A lifestyle intervention improves fatigue, mental health and social support among adolescents and young adults with cerebral palsy: focus on mediating effects* pp717-727.

Yang X, Wang P, Liu C, He C, Reinhardt J *The effect of whole body vibration on balance, gait performance and mobility in people with stroke: a systematic review and meta-analysis* pp627-638.

Volume 29: 8

Baker JA, Pereira G *The efficacy of Botulinum Toxin A on improving ease of care in the upper and lower limbs: a systematic review and meta-analysis using the Grades of Recommendation, Assessment, Development and Evaluation approach* pp731-740.

Choi W, Lee GC, Lee S *Effect of the cognitive-motor dual-task using auditory cue on balance of survivors with chronic stroke: a pilot study* pp763-770.

Chou CY, Ou YC, Chiang TR *Psychometric comparisons of four disease-specific health-related quality of life measures for stroke survivors* pp816-829.

Estraneo A, Moretta P, Cardinale V, De Tanti A, Gatta G, Giacino JT, Trojano L *A multi-centre study of intentional behavioural responses measured using the Coma Recovery Scale-Revised in patients with minimally conscious state* pp803-808.

Faulkner J, McGonigal G, Woolley B, Stoner L, Wong L, Lambrick D *A randomized controlled trial to assess the psychosocial effects of early exercise engagement in patients diagnosed with transient ischaemic attack and mild, non-disabling stroke* pp783-794.

Franki I, Van den Broeck C, De Cat J, Molenaers G, Vanderstraeten G, Desloovere K *A study of whether video scoring is a reliable option for blinded scoring of the Gross Motor Function Measure-88* pp809-815.

Gomes-Osman J, Field-Fote EC *Cortical vs. afferent stimulation as an adjunct to functional task practice training: a randomized, comparative pilot study in people with cervical spinal cord injury* pp771-782.

Lee IH *The effect of postural control intervention for congenital muscular torticollis: a randomized controlled trial* pp795-802.

Marinho-Buzelli AR, Bonnyman AM, Verrier MC *The effects of aquatic therapy on mobility of individuals with neurological diseases: a systematic review* pp741-751.

Tomori K, Nagayama H, Ohno K, Nagatani R, Saito Y, Takahashi K, Sawada T, Higashi Y *Comparison of occupation-based and impairment-based occupational therapy for subacute stroke: a randomized controlled feasibility study* pp752-762.

Volume 29: 9

Kootker JA, Rasquin SMC, Smits P, Geurts AC, van Heugten CM, Fasotti L *An augmented cognitive behavioural therapy for treating post-stroke depression: description of a treatment protocol* pp833-843.

Lahtinen A, Leppilahti J, Harmainen S, Sipilä J, Antikainen R, Seppänen ML, Willig R, Vähäniikkilä H, Ristiniemi J, Rissanen P, Jalovaara P *Geriatric and physically oriented rehabilitation improves the ability of independent living and physical rehabilitation reduces mortality: a randomised comparison of 538 patients* pp892-906.

Morgan P, Murphy A, Opheim A, Pogrebnoy D, Kravtsov S, McGinley J *The safety and feasibility of an intervention to improve balance dysfunction in ambulant adults with cerebral palsy: a pilot randomized controlled trial* pp907-919.

Tyson SF, Burton L, McGovern A *The effect of a structured model for stroke rehabilitation multi-disciplinary team meetings on functional recovery and productivity: a Phase I/II proof of concept study* pp920-925.

Tyson SF, Burton L, McGovern A *The impact of a toolkit on use of standardised measurement tools in stroke rehabilitation* pp926-934.

Disability and Rehabilitation

Volume 37:11

Harries N, Loepky JA, Shaheen S, Al-Jarrah M, Molteni F, Hutzler Y, Bar-Haim S on behalf of the MESF Project *A stair-climbing test for measuring mechanical efficiency of ambulation in adults with chronic stroke* pp1004-1008.

Lundström U, Lilja M, Gray D, Isaksson G *Experiences of participation in everyday occupations among persons aging with a tetraplegia* pp951-957.

McKillop A, Parsons J, Slark J, Duncan L, Miskelly P, Parsons M *A day in the life of older people in a rehabilitation setting: an observational study* pp963-970.

Shpigelman CN *How to support the needs of mothers with physical disabilities?* pp928-935.

De Souza LH, Frank AO *Problematic clinical features of powered wheelchair users with severely disabling multiple sclerosis* pp990-996.

Stummer C, Verheyden G, Putman K, Jenni W, Schupp W, De Wit L *Predicting sickness impact profile at six months after stroke: further results from the European multi-center CERISE study* pp942-950.

Volume 37:12

Bergsma A, Cup EHC, Geurts ACH, de Groot IJM *Upper extremity function and activity in facioscapulohumeral dystrophy and limb-girdle muscular dystrophies: a systematic review* pp1017-1032.

Demers M, Thomas A, Wittich W, McKinley P *Implementing a novel dance intervention in rehabilitation: perceived barriers and facilitators* pp1066-1072.

Kersten P, McPherson KM, Kayes NM, Theadom A, McCambridge A *Bridging the goal intention-action gap in rehabilitation: a study of if-then implementation intentions in neurorehabilitation* pp1073-1081.

Muller I, Kirby S, Yardley L *The therapeutic relationship in telephone-delivered support for people undertaking rehabilitation: a mixed-methods interaction analysis* pp1060-1065.

Sangwan S, Green RA, Taylor NF *Stabilizing characteristics of rotator cuff muscles: a systematic review* pp1033-1043.

Volume 37:13

Brandenburg C, Worrall L, Rodriguez A, Bagraith K *Crosswalk of participation self-report measures for aphasia to the ICF: what content is being measured?* pp1113-1124.

Hamdani Y, Mistry B, Gibson BE *Transitioning to adulthood with a progressive condition: best practice assumptions and individual experiences of young men with Duchenne muscular dystrophy* pp1144-1151.

Hendrie WA, Watson MJ, McArthur MA *A pilot mixed methods investigation of the use of Oswestry standing frames in the homes of nine people with severe multiple sclerosis* pp1178-1185.

Nanninga CS, Meijering L, Schönherr MC, Postema K, Lettinga AT *Place attachment in stroke rehabilitation: a transdisciplinary encounter between cultural geography, environmental psychology and rehabilitation medicine* pp1125-1134.

Pluta A, Ulatowska H, Gawron N, Sobanska M, Lojek E *A thematic framework of illness narratives produced by stroke patients* pp1170–1177.

Read SA, Morton TA, Ryan MK *Negotiating identity: a qualitative analysis of stigma and support seeking for individuals with cerebral palsy* pp1162–1169.

White J, Janssen H, Jordan L, Pollack M *Tablet technology during stroke recovery: a survivor's perspective* pp1186–1192.

Volume 37:14

Van der Cruyssen K, Vereeck L, Saeys W, Remmen R *Prognostic factors for discharge destination after acute stroke: a comprehensive literature review* pp1214–1227.

Martin R, Levack WMM, K. Sinnott A *Life goals and social identity in people with severe acquired brain injury: an interpretative phenomenological analysis* pp1234–1241.

McGlinchey MP, Davenport S *Exploring the decision-making process in the delivery of physiotherapy in a stroke unit* pp1277–1284.

McNamara A, Walker R, Ratcliffe J, George G *Perceived confidence relates to driving habits post-stroke* pp1228–1233.

Scobbie L, Duncan EA, Brady MC, Wyke S *Goal setting practice in services delivering community-based stroke rehabilitation: a United Kingdom (UK) wide survey* pp1291–1298.

Volume 37:15

Camden C, Shikako-Thomas K, Nguyen T, Graham E, Thomas A, Sprung J, Morris C, Russell DJ *Engaging stakeholders in rehabilitation research: a scoping review of strategies used in partnerships and evaluation of impacts* pp1390–1400.

Hulbert S, Ashburn A, Robert L, Verheyden G *A narrative review of turning deficits in people with Parkinson's Disease* pp1382–1389.

Mattar AAG, Hitzig SL, McGillivray CF *A qualitative study on the use of personal information technology by persons with spinal cord injury* pp1362–1371.

Meyer MJ, Pereira S, McClure A, Teasell R, Thind A, Koval J, Richardson M, Speechley M *A systematic review of studies reporting multivariable models to predict functional outcomes after post-stroke inpatient rehabilitation* pp1316–1323.

Winkel A, Langberg H, Ev Wæhrens EE *Reablement in a community setting* pp1347–1352.

Volume 37:16

Armstrong E, Hersh D, Hayward C, Fraser J *Communication disorders after stroke in aboriginal Australians* pp1462–1469.

Colclough C, Copley J, Turpin M, Justins E, De Monte R *Occupational therapists' perceptions of requirements for competent upper limb hypertonicity practice* pp1416–1423.

Fritz HA, Lysack C, Luborsky MR, Messinger SD *Long-term community reintegration: concepts, outcomes and dilemmas in the case of a military service member with a spinal cord injury* pp1501–1507.

Goodridge D, Rogers M, Klassen L, Jeffery B, Knox K, Rohatinsky N, Linassi G *Access to health and support services: perspectives of people living with a long-term traumatic spinal cord injury in rural and urban areas* pp1401–1410.

Miller M, Ziviani J, Ware RS, Boyd RN *Mastery motivation: a way of understanding therapy outcomes for children with unilateral cerebral palsy* pp1439–1445.

Sabari JS, Ortiz D, Pallatto K, Yagerman J, Glazman S, Bodis-Wollner I *Activity engagement and health quality of life in people with Parkinson's Disease* pp1411–1415.

Volume 37:17

Brunner M, Hemsley B, Palmer S, Dann S, Togher L *Review of the literature on the use of social media by people with traumatic brain injury (TBI)* pp1511–1521.

Paterson P, Carpenter C *Using different methods to communicate: how adults with severe acquired communication difficulties make decisions about the communication methods they use and how they experience them* pp1522–1530.

Volume 37:18

Arntzen A, Borg T, Hamran T *Long-term recovery trajectory after stroke: an ongoing negotiation between body, participation and self* pp1626–1634.

Walsh ME, Galvin R, Loughnane C, Macey C, Horgan NF *Factors associated with community reintegration in the first year after stroke: a qualitative meta-synthesis* pp1599–1608.

Volume 37:19

Finis NA, Holland AE, Keating J, Simek J, Bernhardt J *How is physical activity monitored in people following stroke?* pp1717–1731.

Rice LA, Ousley C, Jacob J, Sosnoff JJ *A systematic review of risk factors associated with accidental falls, outcome measures and interventions to manage fall risk in non-ambulatory adults* pp1697–1705.

Satink T, Cup EHC, de Swart BJM, Nijhuis-van der Sanden MWG *Self-management: challenges for allied healthcare professionals in stroke rehabilitation – a focus group study* pp1745–1752.

Thyberg FM, Arvidsson P, Thyberg I, Nordenfelt L *Simplified bipartite concepts of functioning and disability recommended for interdisciplinary use of the IC* pp1783–1792.

Vergauwen K, Huijnen IPJ, Kos D, Van de Velde D, van Eupen I, Meeus M *Assessment of activity limitations and participation restrictions with persons with chronic fatigue syndrome: a systematic review* pp1706–1716.

Physical Therapy

Volume 95:6

Chevan J Haskvitz EM *Reported characteristics of participants in physical therapy-related clinical trials* pp884–890.

Greenfield BH, Jensen GM, Delany CM, Mostrom E, Knab M, Jampel A *Power and promise of narrative for advancing physical therapist education and practice* pp924–933.

Matsuda PN, Taylor C, Shumway-Cook A *Examining the relationship between medical diagnoses and patterns of performance on the Modified Dynamic Gait Index* pp854–863.

Outermans J, van de Port I, Wittink H, de Groot J, Kwakkel G *How strongly is aerobic capacity correlated with walking speed and distance after stroke? Systematic review and meta-analysis* pp835–853.

Richardson J, DePaul V, Officer A, Wilkins S, Letts L, Bosch J, Wishart L *Development and evaluation of Self-Management and Task-Oriented Approach to Rehabilitation Training (START) in the home: case report* pp934–943.

Shumway-Cook A, Matsuda PN, Taylor C *Investigating the validity of the environmental framework underlying the Original and Modified Dynamic Gait Index* pp864–870.

Volume 95:7

Balemans ACJ, van Wely L, Becher JG, Dallmeijer AJ *Longitudinal relationship*

among physical fitness, walking-related physical activity, and fatigue in children with cerebral palsy pp996-1005.

Crisco JJ, Schwartz JB, Wilcox B, Costa L, Kerman K *Design and kinematic evaluation of a novel joint-specific play controller: application for wrist and forearm therapy* pp1061-1066.

Liao LR, Ng GYF, Jones AYM, Pang MYC *Cardiovascular stress induced by whole-body vibration exercise in individuals with chronic stroke* pp966-977.

Mulroy SJ, Hatchett P, Eberly VJ, Lighthall Haubert L, Conners S, Requejo PS *Shoulder strength and physical activity predictors of shoulder pain in people with paraplegia from spinal injury: prospective cohort study* pp1027-1038.

Sottile PD, Nordon-Craft A, Malone D, Luby DM, Schenkman M, Moss M *Physical therapist treatment of patients in the neurological intensive care unit: description of practice* pp1006-1014.

Volume 95:8

Benka Wallén M, Franzén E, Nero H, Hagströmer M *Levels and patterns of physical activity and sedentary behavior in elderly people with mild to moderate Parkinson Disease* pp1135-1141.

Cavanaugh JT, Ellis TD, Earhart GM, Ford MP, Foreman KB, Dibble LE *Toward understanding ambulatory activity decline in Parkinson Disease* pp1142-1150.

Huang YJ, Chen KL, Chou YT, Hsueh IP, Ch Hou CY, Hsieh CL *Comparison of the responsiveness of the Long-Form and Simplified Stroke Rehabilitation Assessment of Movement: group- and individual-level analysis* pp1172-1183.

O'Connell NE, Moseley GL, McAuley JH, Wand BM, Herbert RD *Interpreting effectiveness evidence in pain: short tour of contemporary issues* pp1087-1094.

Stubbs B, Brefka S, Denking MD *What works to prevent falls in community-dwelling older adults? Umbrella review of meta-analyses of randomized controlled trials* pp1095-1110.

Wee SK, Hughes AM, Warner MB, Brown S, Cranny A, Mazomenos EB, Burridge JH *Effect of trunk support on upper extremity function in people with chronic stroke and people who are healthy* pp1163-1171.

Physiotherapy Research International

Volume 20:2

Gatti R, Tettamanti A, Lambiasi S, Rossi P, Comola M *Improving hand functional use in subjects with multiple sclerosis using a musical keyboard: a randomized controlled trial* pp100-107.

Volume 20:3

de Carvalho EV, Hukuda ME, Escorcio R, Voos MC Caromano FA *Development and reliability of the Functional Evaluation Scale for Duchenne muscular dystrophy, gait domain: a pilot study* pp135-146.

Stanton R, Ada L, Dean CM, Preston E *Feedback received while practicing everyday activities during rehabilitation after stroke: an observational study* pp166-173.

Physiotherapy Theory and Practise

Volume 31:4

de Araujo-Barbosa PHF, de Menezes LT, Costa AS, dos Santos Couto Paz CC, Fachin-Martins E *Reliability of the measures of weight-bearing distribution obtained during quiet stance by digital scales in subjects with and without hemiparesis* pp288-292.

Elvén M, Hochwälder J, Dean E, Söderlund A *A clinical reasoning model focused on clients' behaviour change with reference to physiotherapists: its multiphase development and validation* pp231-243.

Kurunsaari M, Piirainen A, Tynjälä P *Physiotherapy students' conceptions of skill at the beginning of their Bachelor studies* pp260-269.

Rizzo J *Patients' mental models and adherence to outpatient physical therapy home exercise programs* pp253-259.

Volume 31:6

Pettersson AF, Laksov KB, Fjellström M *Physiotherapists' stories about professional development* pp396-402.

Youdas JW, Hartman JP, Murphy BA, Rundle AM, Ugorowski JM, Hollman JH *Magnitudes of muscle activation of spine stabilizers, gluteals, and hamstrings during supine bridge to neutral position* pp418-427.

Stroke

Volume 46:6

Barbay S, Plautz EJ, Zoubina E, Frost SB, Cramer SC, Nudo RJ *Effects of Postinfarct Myelin-Associated Glycoprotein Antibody Treatment on motor recovery and motor map plasticity in squirrel monkeys* pp1620-1625.

Howard VJ, McDonnell MN *Physical activity in primary stroke prevention: just do it!* pp1735-1739.

Meyer S, Verheyden G, Brinkmann N, Dejaeger E, De Weerd W, Feys H, Gantenbein AR, Jenni W, Laenen A, Lincoln N, Putman K, Schuback B, Schupp W, Thijs V, De Wit L *Functional and motor outcome five years after stroke is equivalent to outcome at two months: follow-up of the collaborative evaluation of rehabilitation in stroke across Europe* pp1613-1619.

Volume 46:7

Åberg ND, H. Kuhn G, Nyberg J, Waern M, Friberg P, Svensson J, Torén K, Rosengren A, Åberg MAI, Nilsson M *Influence of cardiovascular fitness and muscle strength in early adulthood on long-term risk of stroke in Swedish men* pp1769-1776.

Beyer SE, Hunink MG, Schöberl F, von Baumgarten L, Petersen SE, Dichgans M, Janssen H, Ertl-Wagner B, Reiser MF, Sommer WH *Different imaging strategies in patients with possible basilar artery occlusion: cost-effectiveness analysis* pp1840-1849.

Boden-Albala B, Stillman J, Roberts ET, Quarles LW, Glymour MM, Chong J, Moats H, Torrico V, Parides MC *Comparison of acute stroke preparedness strategies to decrease emergency department arrival time in a multiethnic cohort: The Stroke Warning Information and Faster Treatment Study* pp1806-1812.

Lakkur S, Judd SE *Diet and stroke: recent evidence supporting a Mediterranean-style diet and food in the primary prevention of stroke* pp2007-2011.

Lee M, Ovbiagele B, Hong KS, Wu YL, Lee JE, Rao NM, Feng W, Saver JL *Effect of blood pressure lowering in early ischemic stroke: meta-analysis* pp1883-1889.

Levine DA, Kabeto M, Langa KM, Lisabeth LD, Rogers MAM, Galecki AT *Does stroke contribute to racial differences in cognitive decline?* pp1897-1902.

Piscicelli C, Barra J, Davoine P, Chrispin A, Nadeau S, Pérennou D *Inter- and intra-rater reliability of the visual vertical in subacute stroke* pp1979-1983.

Rangaraju S, Streib C, Aghaebrahim A, Jadhav A, Frankel M, Jovin TG **Relationship between lesion topology and clinical outcome in anterior circulation large vessel occlusions** pp1787-1792.

Tiozzo E, Youbi M, Dave K, Perez-Pinzon M, Rundek T, Sacco RL, Loewenstein D, Lewis JE, Wright CB **Aerobic, resistance, and cognitive exercise training poststroke** pp2012-2016.

Volume 46:8

Boden-Albala B, Carman H, Southwick L, Parikh NS, Roberts E, Waddy S, Edwards D **Examining barriers and practices to recruitment and retention in stroke clinical trials** pp2232-2237.

Di Carlo A, Pezzella FR, Fraser A, Bovis F, Baeza J, McKevitt C, Boaz A, Heuschmann P, Wolfe CDA, Inzitari D on behalf of the European Implementation Score Collaboration Study Group **Methods of implementation of evidence-based stroke care in Europe: European Implementation Score Collaboration** pp2252-2259.

Chaisinankul N, Adeoye O, Lewis RJ, Grotta JC, Broderick J, Jovin TG, Nogueira RG, Elm JJ, Graves T, Berry S, Lees KR, Barreto AD, Saver JL for the DAWN Trial and MOST Trial Steering Committees **Adopting a patient-centered approach to primary outcome analysis of acute stroke trials using a Utility-Weighted Modified Rankin Scale** pp2238-2243.

Dignam J, Copland D, McKinnon E, Burfein P, O'Brien K, Farrell A, Rodriguez AD **Intensive versus distributed aphasia therapy: a nonrandomized, parallel-group, dosage-controlled study** pp2206-2211.

Forster A, Young J, Chapman K, Nixon J, Patel A, Holloway I, Mellish K, Anwar S, Breen R, Knapp M, Murray J, Farrin A **Cluster randomized controlled trial: clinical and cost-effectiveness of a system of longer-term stroke care** pp2212-2219.

Kate MP, Riaz P, Gioia L, Sivakumar L, Jeerakathil T, Buck B, Beaulieu C, Butcher K **Dynamic evolution of diffusion-weighted imaging lesions in patients with minor ischemic stroke** pp2318-2321.

Krueger H, Koot J, Hall RE, O'Callaghan C, Bayley M, Corbett D **Prevalence of individuals experiencing the effects of stroke in Canada: trends and projections** pp2226-2231.

Liebeskind DS, Parsons MW, Wintermark M, Selim M, Molina CA, Lev MH, González RG **Computed tomography perfusion in acute ischemic stroke: is it ready for prime time?** pp2364-2367.

Ramsay AIG, Morris S, Hoffman A, Hunter RM, Boaden R, McKevitt C, Perry C, Pursani N, Rudd AG, Turner SJ, Tyrrell PJ, Wolfe CDA, Fulop NJC **Effects of centralizing acute stroke services on stroke care provision in two large metropolitan areas in England** pp2244-2251.

Volume 46:9

Benedictus MR, van Harten AC, Leeuwis AE, Koene T, Scheltens P, Barkhof F, NPrins ND, van der Flier WM **White matter hyperintensities relate to clinical progression in subjective cognitive decline** pp2661-2664.

Findlay MD, Thomson PC, Fulton RL, Solbu MD, Jardine AG, Patel RK, Stevens KK, Geddes CC, Dawson J, Mark PB **Risk factors of ischemic stroke and subsequent outcome in patients receiving hemodialysis** pp2477-2481.

García-Cordero I, Sedeño L, Fraiman D, Craiem D, de la Fuente LA, Salamone P, Serrano C, Sposato L, Manes F, Ibañez A **Stroke and neurodegeneration induce different connectivity aberrations in the insula** pp2673-2677.

Manning LS, Rothwell PM, Potter JF, Robinson TG **Prognostic significance of short-term blood pressure variability in acute stroke: systematic review** pp2482-2490.

Minet LR, Peterson E, von Koch L, Ytterberg C **Occurrence and predictors of falls in people with stroke: six-year prospective study** pp2688-2690.

Persson J, Holmegaard L, Karlberg I, Redfors P, Jood K, Jern C, Blomstrand C, Forsberg-Wärleby G **Spouses of stroke survivors report reduced health-related quality of life even in long-term follow-up: results from Sahlgrenska Academy Study on ischemic stroke** pp2584-2590.

Webb AIS, Ullman NL, Morgan TC, Muschelli J, Kornbluth J, Awad IA, Mayo S, Rosenblum M, Ziai W, Zuccarello M, Aldrich F, John S, Harnof S, Lopez G, Broadus WC, Wijman C, Vespa P, Bullock R, Haines SJ, Cruz-Flores S, Tuhim S, Hill MD, Narayan R, Hanley DF for the MISTIE and CLEAR Investigators **Accuracy of the ABC/2 Score for intracerebral hemorrhage: systematic review and analysis of MISTIE, CLEAR-IVH, and CLEAR III** pp2470-2476.

Wu O, Cloonan L, Mocking SJT, Bouts MJRJ, Copen WA, Cougo-Pinto PT, Fitzpatrick K, Kanakis A, Schaefer PW, Rosand J, Furie KL, Rost NS **Role of acute lesion topography in initial ischemic stroke severity and long-term functional outcomes** pp2438-2444.

Regional reports

Kent

Natalie Fisher

Kent ACPIN has had an exciting few months. Anna Hargrave stepped down as regional representative but remains an active member of the committee. Nikki Guck continues to be our chair. Lorraine West was elected minutes secretary, Helen Cooke was elected as PRO and Venkat Potamsetti was elected membership secretary. We would also like to welcome new committee members: Penny Bulley, Rowan Turner, Stacey Taylor, Jane Cast and Victoria Wisniewska. Our committee remains strong and membership is healthy in Kent.

We have held some well attended evening lectures since May. A dyspraxia lecture by Sarah Daniels, clinical specialist OT at the National Hospital for Neurology and Neurosurgery; was the best attended evening lecture in Kent ACPIN's history appealing to our colleagues from different professions within the MDT.

In July we held an excellent and thought-provoking evening lecture on functional movement disorders by Dr Coebergh, consultant neurologist. This received excellent feedback and was also very well attended. Janice Champion presented a gymnasium ball course in September and in November we hosted a PNF course with Pam Bagot.

Kent ACPIN are in the process of planning a two-day stroke conference in 2016. It is set to be an exciting event and we hope to see you all there!

I would like to personally thank all the committee members who regularly take time to develop and organise CPD events. If you would like to join the committee please email us, as we would love to have you. Also do contact us if you have any suggestions for courses or lectures. We aim to keep the events relevant for our members.

Oxford

Kim Radford

2015 has been a successful year for Oxford ACPIN so far. We have had consistently high membership numbers and a strong committee. This year, we have welcomed Helen Gaskell back to join us on the committee. We would also all like to thank

Bev Reetham for her hard work and dedication during her time as secretary, as she passes this role on to Sophie Gwilym.

This year we have had a fantastic programme. Our mainstay as ever is our evening lectures which continue to be well attended and received. These have included inspiring lectures on posture management in lying, with Bex Oakley, and LSVT Big for Parkinson's Disease. We also ran a successful course on observational gait analysis in June.

Our programme included an insight from neuropsychologist, Ian Baker in September, an interesting look into epilepsy, in Reading in October and graded exercise in November. We are very excited to be hosting our first evening lecture in Reading and are hoping that this will better serve our members in and near to Berkshire. Please do feel free to give us feedback, offer to host a venue for an evening lecture or join us on the committee!

I would just like to say a big thank you to our members. As ever, keep ideas for lectures and courses coming.

South Trent

Kate Caldwell

Hello to everyone in South Trent! Our regional committee is currently quite small with representation from Nottingham, Mansfield, Leicester and Northampton. We would love to see more members join us to organise and contribute suggestions and ideas for future events.

Since March we have held a couple of events: our AGM was followed by a great lecture on functional disorders by Volker Teweleit (clinical specialist physiotherapist in Nottingham) and we held an observational gait morning with Ben Ellis also in Nottingham. In October we had a locomotion course with Jenny Williams. We appreciate the feedback we had about running a Pilates course and remain unsure if it will be financially viable to run this. We will keep you posted. We are also looking into a MS study day; balance rehabilitation and neurological pain.

If there are any other ideas or topics you wish to have a course or lecture about we are always pleased to hear from our members.

South West

Angie Gibbon and Nicola Doran

Since our last report South West ACPIN have continued to be busy. Our main committee and sub-committees have organised several events and we are working hard at communication between us. We have also been planning courses at a variety of locations across the patch to help foster networking opportunities.

In our last report we mentioned our very successful AGM entitled 'Sharing local expert practice' which included poster presentations and a great opportunity for sharing practice. Since then our other events have included: an MS study day in collaboration with MS Trust (Devon), a two-day Vestibular course (Chippenham), an Ataxia patient demonstration evening (Newton Abbot) and our summer social evening also covering local updates in MS held at the MS Therapy Centre in Bradley Stoke (Bristol).

South West ACPIN in collaboration with Saebo UK had a one-day course in September at the University of Plymouth.

Future events planned include a rock-tape course in conjunction with Hobbs Rehabilitation (Shepton Mallet), a soft splinting course, spinal cord injury, peripheral neuropathy, FES and an evening Pilates lecture.

Thank you all for your ongoing support for ACPIN in your region. Please feel free to contact us with any future course ideas or suggestions at southwest@acpin.net

Sussex

Miria Putkonen

Sussex ACPIN has offered a busy and varied programme this year. The AGM was within a study day presented by Gemma Alder exploring the current clinical evidence and treatments of the wide range of upper limb neurological presentations. This challenged those attending to consider both the advances science has made in neurological understanding and how they can best apply this knowledge for the benefit of their patients.

In May Ann Holland presented a Bobath locomotion study day, which was well

represented and had excellent feedback.

An evening presentation by Gilly Davy entitled 'Neuroplasticity: how to create meaningful change' was held in September and the exploration of this wide and crucial subject was relevant for professionals at all levels of experience.

Later in the month Pam Bagott presented on the use of PNF resulting in stretching the participants handling knowledge and muscle length!

In October we had an evening presentation on Post Polio syndrome at the Conquest Hospital by Clare Hall.

Sussex ACPIN continues to promote its aim of encouraging learning in our field. This year we have continued to subsidise courses for ACPIN members, and have supported a member to attend further training.

Wessex

Alice Wilson

Wessex ACPIN would like to welcome all new members and thank existing members for their continued support. We are pleased by the range of professions attending our events and would like to extend a very warm welcome to them.

We are very happy to welcome Sarah Gibney and Sarah Paterson to our committee. Kat Chambers has stepped down from the committee; thank you to Kat for all of your hard work. Kat has

kindly agreed to act as a link for the Bournemouth/Poole area. Our regional rep, Lindsay O'Connor, is on maternity leave and we look forward to hopefully welcoming her back in the future. Most areas of the region are now represented on the committee, something we are keen to develop as far as possible.

Events have been well attended, with an evening lecture on the ACPIN splinting guidelines by Beth Clarke, a consultant OT in Winchester in April, followed by our AGM. August brought us a very interesting session, Nordic walking in neurology, where delegates particularly enjoyed the practical element of the evening.

In September we had a lecture on carer burden in ESD, with plans for an evening lecture on neurophysiology and study days on cognition, functional neurological disorders and a re-run of our very successful neurological hydrotherapy course by Jacqueline Pattman. We are also hoping to run a course relating to MS, UL management and possibly a Neuro-Pilates study day. We are trying to vary the geographical location of our events in order to try and be as accessible as possible for all members. Please do let us know if you would be able to help with finding a venue, particularly in the far west and east of the region. We are looking into the use of Webex for events in the future to help those who live far from events. We very much welcome any feedback or ideas relating to past and future events.

We are hoping to overhaul our section of the ACPIN website, with profiles of the committee, adverts for upcoming events as well as records of meetings. Again, any feedback on what members would like to see is gratefully received.

We are happy to be involved with the CSP South Central network, which is an exciting new development. In the future we hope to share educational events and help raise the profile of our profession, utilising the great resources available in our region. We will keep you posted! Please see on twitter @CSPsouthcentral

We have a small but active committee and are always on the lookout for new members. Committee membership is a great opportunity to gain new skills and meet people from throughout the region. If you are interested please email us and maybe come to a committee meeting to see what we do.

A repeat plea but please could you make sure that you update your contact details so that we have your correct email and postal addresses. Unfortunately there are always a number of undelivered emails each time we circulate information, so you may be missing out! It is very easy to update details, please visit www.acpin.org where it can be done electronically.

Please do not hesitate to contact us with any queries or suggestions and we look forward to seeing you at future events.

Writing for 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.

Syn'apse is pleased to accept submitted manuscripts from all grades and experience of staff including students. We particularly wish to encourage 'novice' writers considering publication for the first time and ACPIN provides support and guidance as required. All submissions will be acknowledged within two working weeks of receipt.

Examples of articles for submission:

Case Reports

Synapse is pleased to accept case reports that provide information on interesting or unusual patients which may encourage other practitioners to reflect on their own practice and clinical reasoning. It is recognised that case studies are usually written up retrospectively. The maximum length is 3,000 words and the following structure is suggested:

Title – this should be concise and reflect the key content of the case report.

Introduction – this sets the scene giving background to the topic, and why you consider this case to be important; for example, what is new or different about it? A brief overview of the literature or the incorporation of a few references is useful so people can situate the case study against what is already known.

The patient – give a concise description of the patient and condition that shows the key physiotherapeutic, biomedical and psychosocial features. Give the patient a name, but not their own name. Photographs of the patient will need to be accompanied by explicit permission for them to be used. Only relevant information to the patients' problem should be included.

Intervention/method – Describe what you did, how the patient progressed and the outcome. Aims, treatment, outcomes, clinical reasoning and the patient's level of satisfaction should be addressed. Indications of time scales need to be considered.

Implications for practice – Discuss the knowledge gained, linking back to the aims/purpose, and to published research findings. Consider insights for treatment of similar patients, and potential for application to other conditions.

Summary – List the main lessons to be drawn from this example. Limitations should be clearly stated, and suggestions made for clinical practice.

References – the Harvard style of referencing should be followed (please see *Preparation of editorial material* below).

Original research papers

These should not exceed 4,000 words and papers should include the following headings:

- **Abstract** – (maximum of 300 words)
- **Introduction**
- **Method** – to include design, participants, materials and procedure
- **Results**
- **Discussion**
- **Conclusion** – including implications for practice
- **References**

Abstracts of thesis and dissertations

Abstracts from research (undergraduate and postgraduate) projects, presentations or posters will be welcomed. They should be up to 500 words, and broadly follow the conventional format: introduction, purpose, method, result, discussion, conclusion.

Audit report

This is a report which contains examination of the method, results, analysis, conclusions of audit relating to neurology and physiotherapy, using any method or design. This could include a Service Development Quality Assurance report of changes in service delivery aimed at improving quality. These should be up to 2,000 words.

Sharing good practice

This *Syn'apse* feature aims to spread the word amongst ACPIN members about innovative practice or service developments. The original format for this piece started as a question and answer session, covering the salient points of the topic, along with a contact name of the author for readers to pursue if they wish. Questions were loosely framed around the following aspects (this would be for an audit)

- What was the initiating force?
- How did you go about it?
- What measurements did you use?
- What resources did you need?
- What did you learn about the process?
- How has it changed your service?

However, recent editions have moved away from this format, and provide a fuller picture of their topic eg *Introducing a management pack for stroke patients in nursing homes* (Dearlove H Autumn 2007), *An in-service development education programme working across three different hospitals* (Fisher J Spring 2006), *A therapy led bed service at a community hospital* (Ramaswamy B Autumn 2008) and *Establishing an early supported discharge team for stroke* (Dunkerley A Spring 2008).

Product news

This is a short appraisal of up to 500 words, used to bring new or redesigned equipment to the notice of readers. This may include a description of a mechanical or technical device used in assessment, treatment management or education to include specifications and summary evaluation. Please note, ACPIN and *Syn'apse* take no responsibility for these products; it is not an endorsement of the product.

Reviews

Course, book or journal reviews relevant to neurophysiotherapy are always welcome. Word count should be around 500. This section should reflect the wealth of events and lectures held by the ACPIN Regions every year.

OTHER REGULAR FEATURES

Focus on...

This is a flexible space in *Syn'apse* that features a range of topics and serves to offer different perspectives on subjects. Examples have been a stroke survivor's own account, an insight into physiotherapy behind the Paralympics and the topics of research, evidence and clinical measurement.

Five minutes with...

This is the newest feature for *Syn'apse*, where an ACPIN member takes 'five minutes' to interview well-known professionals about their views and influences on topics of interest to neurophysiotherapists. We are always keen to receive suggestions of individuals who would be suitable to feature.

PREPARATION OF EDITORIAL MATERIAL

Copies should be produced in Microsoft Word. Wherever possible diagrams and tables should be produced in electronic form, eg Excel, and the software used clearly identified.

The first page should include:

- The title of the article
- The name of the author(s)
- A complete name and address for correspondence
- Professional and academic qualifications for all authors and their current positions

For original research papers, include a brief note about each author that indicates their contribution and a summary of any funds supporting their work.

All articles should be well organised and written in simple, clear, correct English. The positions of tables and charts or photographs should be appropriately titled and numbered consecutively in the text.

All **photographs or line drawings** should be at least 1,400 x 2,000 pixels at 72dpi.

All **abbreviations** must be explained.

References should be listed alphabetically, in the Harvard style. (see <http://homepages.see.leeds.ac.uk/~chmjbm/mrescas/criteria/Harvard%20Referencing.pdf>) eg:

Pearson MJT et al (2009) *Validity and inter-rater reliability of the Lindop Parkinson's Disease Mobility Assessment: a preliminary study Physiotherapy* (95) pp126-133.

If the article mentions an **outcome measure**, appropriate information about it should be included, describing measuring properties and where it may be obtained.

Permissions and ethical certification; either provide written permission from patients, parents or guardians to publish photographs of recognisable individuals, or obscure facial features. For reports of research involving people, written confirmation of informed consent is required.

SUBMISSION OF ARTICLES

An electronic and hard copy of each article should be sent with a covering letter from the principal author stating the type of article being submitted, releasing copyright, confirming that appropriate permissions have been obtained, or stating what reprinting permissions are needed.

For further information please contact the *Syn'apse* editor **Joe Buttell** at: synapse@acpin.net

The Editorial Board reserves the right to edit all material submitted. Likewise, the views expressed in this journal are not necessarily those of the Editorial Board, nor of ACPIN. Inclusion of any advertising matter in this journal does not necessarily imply endorsement of the advertised product by ACPIN.

Whilst every care is taken to ensure that the data published herein is accurate, neither ACPIN nor the publisher can accept responsibility for any omissions or inaccuracies appearing or for any consequences arising therefrom.

ACPIN and the publisher do not sponsor nor otherwise support any substance, commodity, process, equipment, organisation or service in this publication.

Visit the ACPIN website

to apply for or to renew your membership, find out what is happening in your region, download past presentations from ACPIN conferences and much more!

www.acpin.net

Regional representatives

November 2015

East Anglia

Tabitha Mathers
eastanglia@acpin.net

South West

Angela Gibbon
southwest@acpin.net

Kent

Anna Hargrave
kent@acpin.net

Surrey & Borders

Suneel Kumar
surrey@acpin.net

London

Andrea Shipley
london@acpin.net

Sussex

Miria Putkonen
sussex@acpin.net

Manchester

Cathy Field
manchester@acpin.net

Wales

Adele Griffiths
wales@acpin.net

Merseyside

position vacant
merseyside@acpin.net

Wessex

Lindsay O'Connor
wessex@acpin.net

Northern

Kelly Winter
northern@acpin.net

West Midlands

Cameron Lindsay
wmidlands@acpin.net

Northern Ireland

Jacqueline Crosbie
nireland@acpin.net

Yorkshire

Karen Hull
yorkshire@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

Syn'apse

JOURNAL OF THE ASSOCIATION OF
CHARTERED PHYSIOTHERAPISTS
IN NEUROLOGY

Autumn/Winter 2015
ISSN 1369-958X

Editor

Joseph Buttell
synapse@acpin.net

Editorial

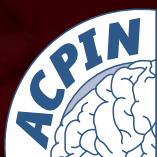
advisory committee
Members of ACPIN
executive and national
committees as required.

Design

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

Printers

Henry Ling Limited
The Dorset Press
Dorchester



Syn'apse

Autumn/Winter 2015

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

www.acpin.net

ISSN 1369-958X