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Constraint-induced movement therapy for the adult hemiplegic upper limb

Feasibility audit of *Saebo*Flex[®] in stroke patients

Sharing good practice: **Putting the European** *Physiotherapy Guideline for Parkinson's Disease* to work



JOURNAL OF THE ASSOCIATION OF CHARTERED PHYSIOTHERAPISTS IN NEUROLOGY





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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 evidenceinformed 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.

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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 real buzz!

Writing this piece for *Syn'apse* is always a good point for reflection on what we have done and where we are with our plans.

At the time of writing this we have just completed a really successful conference which you can read about in this issue. There was a real buzz going around the venue, and feedback from delegates, speakers and exhibitors all indicated that the ACPIN community spirit was palpable during the two days.

In the weeks leading up to the conference, we had already had a few evening meetings about the conference for 2016 and about other ongoing activities and developments. Luckily many of these meetings can be done over the internet through Skype or WebEx which makes it possible to meet briefly and get agreement on the key points for moving forwards.

One daytime physical meeting I was invited to left me really excited. It was a meeting at Cardiff University with Dr Anne Freeman (OBE) who is the Stroke Clinical Lead for Wales and a trustee of the Stroke Association. We were discussing how ACPIN can help with the service improvement agenda for stroke in the UK.

Dr Freeman explained that the Stroke Association is raising its game. It has realised that more needs to be done for the UK to become a world leader in stroke research. Through their collaborative work with universities, opportunities have now arisen to appoint various senior academics with stroke specific roles. These roles are funded by the Stroke Association.

This year, the Stroke Association has launched a UK-wide lectureship programme running over three years which aims to appoint a total of fifteen academics at Lecturer, SL or Reader level. Five posts have recently been appointed across universities in England and Scotland. These opportunities are open to clinical staff in all disciplines (including physiotherapists) either currently working in stroke or looking for an opportunity to start building a research portfolio. Details on how to apply are on the Stroke Association website.

In Wales, there has been an increasing interest in stroke research following the Health Minister's request last year to develop a robust stroke research strategy for Wales. An action plan to achieve this is almost ready to be submitted and ACPIN is looking forward to contributing and playing a role in this plan. Hopefully this collaboration will open doors for us as the ACPIN community get involved elsewhere in the UK when similar strategies are being developed.

At the meeting it was noted that there is already a wide range of research being undertaken in Wales which is now at a point where it must be widely publicised across the stroke community in UK and further afield. Wales has also demonstrated a broad interest from all disciplines involved in the stroke pathway to achieve a world-class stroke research network for Wales. All the major Welsh universities and other professional bodies are keen to collaborate. The ambition of Wales to become a world-class centre will not be realised overnight but the journey to this goal has now started.

Within the Stroke Association funded programme, there is still an opportunity to appoint a post in Wales. This post will be advertised in May and is open to both clinicians and non-clinicians to apply. In addition, there are plans to develop a professorial department in Cardiff.

With some more of these posts being advertised across the UK during the year, these are exciting times for stroke research and for us as neurophysiotherapists.

Hopefully we can invite some of these (to be appointed) post holders to our national or local conferences for firsthand dissemination of their work and get them involved in discussions to influence their research agenda in line with our clinical needs.

In England a neuroscience data group has started and Kirsty Winters represents ACPIN on this group. When meeting with her (online) recently, she indicated that the group is very medically dominated and the data collection plan suggested is very much focused on medical intervention. We discussed a need to get our two pennies in and develop a neurophysiotherapy part to any national data collection initiative. Hopefully, this strand should then be part of, and provide more insight and focus on, the whole rehabilitation process alongside or even away from the medical model.

In our reflection and discussion, we agreed that ideally we would have a group of interested members of the ACPIN community helping Kirsty with developing ideas and supporting her in raising our profile in this influential group. I am sure there are many physiotherapists who are part of our community who are willing to share their ideas. Now is an excellent opportunity to engage.

The transformation of ACPIN from a voluntary-run organisation to one with a dedicated support structure is progressing and will be taking the pressure off some of the roles.

I was really pleased to see the change in our constitution being voted in unanimously during the AGM making it possible to honour those who have done so much for us in the past through a dedicated ACPIN awards structure.

In closing, I hope you will enjoy this issue of *Syn'apse* which is the first one from our new editor Joe Buttell who has taken on this challenge with great energy and I know will do a great job.

Wishing you all a great spring/summer and looking forward to sharing further positive news with you all in the next issue.

Grumpiness and hope

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

Increasingly I think I may be turning into a grumpy old woman. Signs include the fact that I am finding myself noticing that changes are not always for the best and that maybe, just maybe, if we went back to doing things how we used to do them it would all work much better. One of the signs of being a grumpy old woman according to common law is that you say things like 'that shows my age' and people no longer contradict you! Well I am very much hoping that writing this piece for *Syn'apse* will precipitate a flood of people saying 'you are not grumpy or old' but of course that's not my real motive!

Over the last few years I have learned to cope with the fact that everyone seems to be saying phrases like 'moving forward' and that chins are developing as I spend too much time looking down into a phone or tablet. But my real grumpiness at the moment is focused on a couple of things. First is, 'why do we spend quite so much time measuring and assessing?' I know about the need for baseline measurement and being able to justify that physiotherapy is making an impact, but do we ever stop and question ourselves about the sheer volume of assessments that we do, and most importantly who they are for?

Where has this grumpiness come from, you may ask? First of all it's hearing from many great practitioners working in neurorehabilitation teams about the amount of time they are spending assessing before they even get to the point of working with their clients on what it is they want to do. Examples I have heard range from one to two hours of assessing and form filling, sometimes done over the course of two or three therapy sessions. The question (and grumpiness) which comes to mind after hearing about these practices is, 'who does it serve?' Sometimes the battery of assessments or the metrics have beeng requested by those who commission services, and when questioned no one can remember how or why the assessments are being used at all. My question is, 'why are they being used?' and again, 'who do they

serve?' We usually assume that there is a good reason for their inclusion, but often the reasons behind these choices are hazy.

Measuring can be both complex and easy, especially when we are aiming at being person-centred in our practices. But I think we might all benefit from taking a look at the excellent report by Alf Collins (Health Foundation, Clinical Associate) about Measuring what matters and if you get time, the podcast. Both can be found at www.health.org.uk/publications/measuring-what-really-matters/. Obviously we could all do with questioning why we are using so many forms of assessment and outcome tools, but maybe a start is to ask the people who are being measured and get them to rank which ones they think are more relevant to their lives and problems. It sounds radical, but actually it is being done in some areas, and the result is that you then have a more refined list of measurements which includes those of most relevance to the needs of your caseload.

Actually as I write a strange thing is happening: I am getting less grumpy. It's because I am now thinking about some of the teams that have challenged their commissioners, team leaders and historical practices, and slimmed down the battery of measurement so they really do measure what matters. These include practices which focus on tailoring to individual needs, which may seem more time-consuming but probably aren't if, in the end, someone really feels as if their needs are

BBTA CONFERENCE Promoting Adaptive Plasticity

27th and 28th November 2015

THE NATIONAL HOSPITAL FOR NEUROLOGY AND NEUROSURGERY, QUEEN SQUARE, LONDON

BBTA will celebrate its 30th anniversary at this informative two-day conference. The conference aims to bring together like-minded practitioners to review key aspects of motor control and learning to foster skill acquisition and enhance clinical outcomes for patients.

For more information visit **www.bbtauk.org** Early bird registration until 1st September:

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BBTA

BRITISH BOBATH TUTORS ASSOCIATION

Day I Friday 27 November 2015 Dr Mindy F Levin The systems model of motor control and equilibrium point theory in relation to the Bobath Concept

Day 2 Saturday 28 November 2015

Dr Mindy F Levin Sensorimotor integration for functional recovery and the Bobath Concept

Professor Roger Lemon Descending systems in motor control

Professor Jon Marsden The role of adaptive and maladaptive changes in the sensorimotor system after peripheral and central neurological damage

Mary Lynch-Ellerington A patient demonstration

being met. OK that's enough happiness: my second grump is coming now!

'Goal setting' is possibly the largest source of grumpiness for me - probably not too much of a surprise as it has been the focus of my last two President's addresses at national conference. But again what I hear is that we expect people to come up with goals at the start of their rehabilitation, we sometimes think goals are unrealistic unless they fit with our priorities, and woe and betide if any goals are not SMART! Goal setting using GAS has also become a fairly frequent method of assessing whether targets are being met by teams. We know that the impact of goal setting on outcomes of rehabilitation is far from clear, and that there are many different theories and concepts which may be applicable to neurorehabilitation. And I am sure you would agree that using 'goal achieved' as a measure of success is fraught with complexities. Just take a minute and think about being asked about your own goals. We did this recently in a training session run by a colleague of mine which included a group of senior practitioners all pretty confident they could facilitate personcentred goal setting (including me!) - and

guess what happened? Some of us made goals up because we couldn't think of one, some of us just went along with what was suggested and some of us didn't feel like the goal set was 'agreed' or bore any resemblance to our original personal goal. Try it in your teams – have a go at eliciting goals from each other and write down someone else's goal. How do you feel when you look at your goal – does it still feel like yours?

Well these are my two grumps laid out for everyone to see. But trying to hang onto grumpiness can be harder than you think. My colleague has just interrupted me as I am writing this to say that with a bit of luck and a following wind, undergraduate physiotherapy students may no longer be graded according to whether they can set SMART goals – hooray! Too often the ability to set a SMART goal has been prioritised rather than the skilful communication and super listening required to develop a plan, some targets or a list of things to work on – aka a goal!

I have just looked up the definition of grumpy which is crabby, cranky and crotchety. Well I am no longer feeling quite so bad now having written everything down, so what is the opposite of grumpy? It's 'uncomplaining, understanding and tolerant'. Well I wouldn't quite go that far! But I do feel a sense of hope that things will change, or is that an unrealistic goal?

One last thing.- an extra pleasure for me as President is being able to communicate with colleagues like Dr Anna Jones who is my counterpart for AGILE. Anna and I discussed the possibility of simultaneous publication of reports which outline the contribution that physiotherapists have played in the development of national and international guidelines. Well Anna is much better at her deadlines than me, because she has written an excellent piece which appears in this edition of *Syn'apse* about the *European Physiotherapy Guideline for Parkinson's Disease*. Together with Dr Cherry Kilbride and Nicola Hancock, we will be writing a similar publication about the National Stroke Gudelines which will appear in Agility - a great example of collaborative working and shared learning between our two interest groups many thanks, Anna!

5

Constraint-induced movement therapy

for the adult hemiplegic upper limb – a case study

Constraint-induced movement therapy (CIMT) is an evidence-based treatment for hemiplegia, which can significantly increase functional use of an upper limb (Morris *et al* 1997, 2001).

A person with hemiplegia compensates by overusing their unaffected side and develops 'learned non-use' of their affected side (Taub 1980). The representation of an upper limb on the cortex changes according to use (Pons *et al* 1991), and its size reduces when affected by stroke (Liepert *et al* 1998, 2000).

CIMT consists of specific task practice while restraining use of the unaffected side and can increase functional use and cortical representation (Levey *et al* 2001).

Other upper limb interventions have little experimental evidence (de Padero-Cuestro *et al* 1992), but CIMT has produced consistent and significant results for stroke patients (Winstein *et al* 2003). The effects of CIMT have been reviewed in longitudinal studies and significant gains have remained in the long term (Takebayashi *et al* 2015).

The criteria for patients is the amount of movement available in the affected limb. A minimal amount of active movement is required to be successful with CIMT. The level of active movement will determine the level of activity and function achieved at the end of the programme. The minimal active movement requirements are detailed in *Table 1*.

Although the majority of evidence is for stroke, CIMT can also have significant effects for cerebral palsy (Taub 2004), spinal cord injury (Taub 2000), traumatic brain injury (Shaw *et al* 2005) and Multiple Sclerosis (Victor *et al* 2013).

This case study describes the use of CIMT for a sub-acute adult stroke patient following protocols detailed in the evidence.

THE PATIENT

Sarah was 45 years old, and six months post-CVA with right upper and lower limb affected. Sarah reported no movement in her right upper limb for eight weeks and was an inpatient for two months. Sarah was now receiving 30 minutes of physiotherapy twice a week for her upper and lower limb.

Sarah was previously right-hand dominant. Although she now had active movement, the arm was not functional and she felt she had not made any recent significant progress. Sarah's main goals were to use her right hand to feed herself, use a pen, and wash her hair.

The Motor Activity Log (MAL) was used as an outcome measure (see references). The MAL involves a structured interview, asking the patient to score how much they used their hand (Amount) and how well they thought it performed (How well) on a series of 30 tasks. Scores range from 0 to 5. See *Table 2.1* and *2.2* for full breakdown.

On initial assessment, Sarah's mean 'Amount' score was 1.5, and her mean 'How well' score was

	SHOULDER	ELBOW	WRIST	FINGERS
Minimal active	Flexion/abduction	> 20° extension from	Extension 10° (from	Extension of MCP
movement required	30°	90 degrees flexed starting position	any starting position)	and IP by 10° from any starting point. eg able to grasp and release a cloth

TABLE 1 Minimal requirements for CIMT

AUTHOR

Karen Leslie

Bsc (Hons) Physiotherapy Senior Neurological Physiotherapist CIMT

Contact details:

CIMT 3-5 St John Street Manchester M3 4DN karen@cimt.co.uk

0	Did not use my weaker arm (not used)
0.5	
1.0	Occasionally used my weaker arm, but only very rarely (very rarely)
1.5	
2.0	Sometimes used my weaker arm but did the activity most of the time with my stronger arm (rarely)
2.5	
3.0	Used my weaker arm about half as much as before the stroke (half pre-stroke)
3.5	
4.0	Used my weaker arm almost as much as before the stroke (3/4 pre-stroke)
4.5	
5.0	Used my weaker arm as often as before the stroke (normal)
TABLE 2.1	Motor Activity Log Amount scale

0	The weaker arm was not used at all for that activity (never)				
0.5					
1.0	The weaker arm was moved during that activity but was not helpful (very poor)				
1.5					
2.0	The weaker arm was of some use during that activity but needed some help from the stronger arm or moved very slowly or with difficulty (poor)				
2.5					
3.0	The weaker arm was used for the purpose indicated but movements were slow or were made with only some effort (fair)				
3.5					
4.0	The movements made by the weaker arm were almost normal, but were not quite as fast or accurate as normal (almost normal)				
4.5					
5.0	The ability to use the weaker arm for that activity was as good as before the stroke (normal)				
TARIE 2 2	TABLE 2.2 Motor Activity Log How well scale				

2.1. This indicated she used her right arm occasionally, and it was of some use but moved very slowly and with difficulty.

Objectively Sarah could actively move her fingers, wrist and elbow through full range of movement, but shoulder flexion was limited to 20 degrees. Movements were slow and in a gross pattern. Fine motor tasks were awkward due to tonal flexor pattern at fingers. There was reduced sensation in her hand and forearm.

The Fugl-Meyer Assessment of Upper Extremity was used as an objective measure. Her overall motor function score was 42 out of 66 (see *Table 4*).

Functionally Sarah could not reach her mouth, face or hair, and did not have the ability to use cutlery or a pen.

INTERVENTION

Sarah completed a three week CIMT programme. This consisted of:

- three hours a day, five days a week in clinic with guidance from therapist
- 90% of waking hours wearing a constraint mitt, seven days a week
- 'shaping tasks' in clinic
- home task practice

The restraint mitt covered the left hand and wrist, with reinforcement across the palm.

Clinic hours consisted of 'shaping tasks'; a variety of trials that target different aspects of upper limb function, can be completed quickly (within 60–90 seconds), repeated (ten times per task) and measured so that improvements can be monitored. Once performance of a task improves, it is 'shaped' to provide further challenge.

Sarah was also given functional tasks to practice at home, eg wiping tables, unloading washing machine, with each task lasting 15–30 minutes.

The MAL was completed each day for the 'How well' scores, giving a log of progress day-to-day. 'Amount' scores were not taken, as an artificial increase was expected due to the intervention. The MAL served as a tool to open conversations about tasks, identify difficulties, and allow for problem-solving. Any issues were therefore addressed each day.

Videos were used to show progress in terms of quality and speed of movement.

RESULTS

By the end of the three week programme Sarah was able to feed herself with a knife and fork, brush her hair, and use a pen.

On the MAL the overall mean of 'Amount' scores rose from 1.5 to 2.7, and mean 'How well' scores rose from 2.1 to 3. Some tasks made dramatic improvements. Examples are in *Table 3*.

The Fugl-Meyer Assessment of Upper Extremity increased from 42 to 56 (see *Table 4*), showing an objective improvement in motor activity, strength and coordination. A change was also detected in the sensation of her upper limb.

Throughout the programme Sarah practised holding and using a pen with her right hand. Her ability to grip the pen and control it improved significantly over the programme. *Figures 1*

	AMOUNT SCORE (pre CIMT)	AMOUNT SCORE (post CIMT)	HOW WELL SCORE (pre CIMT)	HOW WELL SCORE (Post CIMT)
Turning water on/off at a tap	0	3	0	4
Put on your socks	0	4	0	4
Use a fork or spoon	2	3	1	2.5
Comb your hair	0	3	0	2
Turn on a light with a light switch	1	2.5	2.5	4

TABLE 3Amount and How well scores

	PRE-TREATMENT SCORE	MID-WAY SCORE	POST TREATMENT SCORE
Upper extremity (max 36)	26	28	31
Wrist (max 10)	2	4	7
Hand (max 14)	11	12	14
Coordination/Speed (max 6)	3	3	4
Total Motor Function (sum of above)(max 66)	42	47	56
Sensation (max 12)	10	10	11

TABLE 4 Fugl-Meyer scores pre, mid-way and post CIMT

and 2 shows her ability to use a pen on day 7 and day 14. The total time spent practising writing was no more than ten minutes per day.

IMPLICATIONS FOR PRACTICE

This case study demonstrates the effectiveness of CIMT when evidence-based protocols are followed. It is pertinent to note that no handson treatment was used during the three week period and Sarah received no other intervention. With repetitive practice and verbal guidance alone, movement patterns were refined from compensatory strategies to more efficient movement patterns.

The majority of the evidence for CIMT focusses on chronic stroke patients, some up to ten years post stroke, with significant results. For this subacute patient, cognitive and physical fatigue was a barrier to some of the home-practice. Although she gained significant improvements, it may be a more suitable treatment for a chronic population.

CIMT cannot necessarily restore a limb to its ability pre-CVA, but it does increase the use and quality of movement in daily function. The severity of the initial impairment will often determine what level of activity and function is achieved at the end of the programme. Sarah returned to her ongoing therapy team with an abundance of new activity and function, which could then be incorporated into her general rehabilitation.

The evidence base for CIMT follows the current protocols of no less than three hours per day, five days a week for a minimum of two weeks. This

410W7 12 3 948 7 890 234 5 6 751 12 94 50 890 FIGURE 1 Pen use - day 7 ABCOEF CHINKLMNOPARSTON WEYS The goldk brown, tox jumps over the lazy deg 1234567190 124541590 . 1 FIGURE 2 Pen use - day 14

timeframe may not always be compatible with services. Some research uses the principles of CIMT under different protocols, and results can vary accordingly. Further research is ongoing as to the exact time required for changes to occur.

SUMMARY

Constraint-induced movement therapy is an evidence-based rehabilitation technique for upper limb hemiplegia. This case study highlights the significant gains that can be achieved over a short period of time.

REFERENCES

Levy CE, Nichols DS, Schmalbrock PM, Keller P, Chakers DW (2001) Functional MRI evidence of cortical reorganization in upper-limb stroke hemiplegia treated with Constraint Induced Movement Therapy American Journal of Physical Medicine and Rehabilitation 80 pp4-12.

Liepert J, Bauder H, Miltner WHR, Taub E, Weiller C (2000) Treatment-induced cortical reorganization after stroke in humans **Stroke** 31 pp1210-1216.

Liepert J, Bauder H, Sommer M, Miltner WHR, Dettmers C, Taub E, Weiller C (1998) *Motor cortex plasticity during Constraint Induced Movement Therapy in chronic stroke patients* **Neuroscience Letters** 250 pp5-8.

Mark VW, Taub E, Uswatte G, Bashir K, Cutter GR, Bryson CC, Bishop-McKay S, Bowman MH (2013) *Constraint Induced Movement Therapy for the lower extremities in multiple sclerosis: case series with 4-year follow-up* **Archives of Physical Medicine and Rehabilitation** 94 (4) pp753-760.

Morris D, Taub E (2001) The Constraint Induced Therapy approach to restoring function after neurological injury **Topics in Stroke Rehabilitation** 8 pp16-30.

Morris DM, Crago JE, DeLuca SC, Pidikiti RD, Taub E (1997) Constraint-Induced (CI) Movement Therapy for motor recovery after stoke **Neurorehab** 9 pp29-43.

de Padero-Cuestro J, Widen-Homquist L, Bach-y-Rita P (1992) Evaluation of stroke rehabilitation by randomized controlled studies: A review. Acta Neurologica Scandinavica 86 pp433-439.

Pons TP, Garraghty AK, Ommaya AK, Kaas JH, Taub E, Mishkin M (1991) *Massive cortical reorganization after sensory deafferentation in adult macaques* **Science** 252 pp1857-1860.

Shaw SE, Morris DM, Uswatte G, McKay SB, Meythaler JM, Taub E (2005) *Constraint Induced Movement Therapy for recovery of upper extremity function following traumatic brain injury Journal of rehabilitation Research & Development* 42 (2) pp769-778.

Takebayashi T, Amano S, Hanada K, Umeji A, Takahashi K, Marumoto K, Kodama N, Koyama T, Domen K (2015) *A one-year follow-up after modified Constraint Induced Movement Therapy for chronic stroke patients with paretic arm: a prospective case series study* **Topics in Stroke Rehabilitation** 22 (1) pp18-25.

Taub E, Ramey SL, DeLuca S, Echols K (2004) *Efficacy* of *Constraint Induced Movement Therapy for children* with cerebral palsy with asymmetric motor impairment *Pediatrics* 113 pp305-312.

Taub E, Uswatte G, Mark V, Willcutt C, Pearson S, King DK (2000) *CI therapy extended from stroke to spinal cord injured patients* **Neuroscience Abstracts** 26 pp544.

Taub E, Uswatte G, Morris DM (2003) Improved Motor Recovery after Stroke and Massive Cortical Reorganization Following Constraint Induced Movement Therapy. In Harvey RL (editor) Motor Recovery After Stroke: Physical Medicine and Rehabilitation Clinics of North America WB Saunders Co, Philadelphia, PA.

Taub E (1980) Somatosensory deafferentation research with monkeys: implications for rehabilitation medicine. In Ince LP (editor) **Behavioral Psychology in Rehabilitation Medicine: Clinical Applications** Williams & Wilkins, New York pp371-401.

Winstein CJ, Miller JP, Blanton S, Morris DM, Uswatte G, Taub E, Nichols D, Wolf S (2003) *Methods for a multi-site randomized trial to investigate the effect of constraint-induced movement therapy in improving upper extremity function among adults recovering from a cerebrovascular stroke* **Neurorehabilitation and Neural Repair** 17 pp137-152.

Motor Activity Log available at https://www.uab.edu/ citherapy/images/pdf_files/CIT_Training_MAL_manual. pdf

Feasibility audit of *Saebo*Flex® in stroke patients

Impact on recovery across the patient pathway

This paper describes the introduction of *Saebo*Flex[®] a dynamic hand orthosis (DHO), its implementation, audit of results and changes to practice across a large acute and community stroke pathway.

Arm and hand weakness as a result of stroke occurs in approximately 70% of stroke survivors (Feys *et al* 1998; Jeon *et al* 2012). 30%-66% of patients do not recover functional use of their upper limb (NHS Consultation Improvement paper 2010; Molier *et al* 2011).

Treatment options are limited for patients with moderate to severe upper limb impairment following stroke as they are unable to effectively integrate their hand consistently into functional activities (Winter *et al* 2011, Davenport 2005). Available treatment options for this patient group have had mixed results (Hoffman and Blakey 2011, Jeon *et al* 2012, Winter *et al* 2011). After review of the evidence base and reflection on our current clinical practice at Southend University Hospital and South Essex Partnership Trust (SEPT), the possibility of introducing dynamic hand orthoses (DHO) was explored. DHO such as *Saebo*Flex[®] are not yet routinely used in the NHS (NICE, 2013).

SaeboFlex[®] is suitable for patients with little hand or finger function and provides task specific repetitive training (Jeon et al 2012; Hoffman and Blakey 2011, Barry 2012) guided by but independent of therapists. Repetitive task-specific training improves upper extremity function in individuals suffering from neurological injuries (Oujamma et al 2009, Steinberg et al 1997, Kleim and Jones 2008, Johansson 2000, NICE 2013). Animal studies suggest that 400-600 repetitions are required to achieve cortical changes for a skilled task (Nudo et al 1996, Kleim et al 1998). Lang et al (2009) found averages of 54 repetitions of a task were completed during an average 36 minute therapy session. DHO allows the patient to achieve multiple repetitions in a session to facilitate cortical change independent of the therapist. Following neuroplastic principles, early intervention in upper limb rehabilitation

is recommended to maximise recovery (Winter *et al* 2011, Davenport 2005). *Saebo*Flex[®] allows the participant to complete multiple task-orientated grasp and release repetitions and can be implemented early post-stroke therefore following current evidence-based practice.

AIMS

An audit was completed to assess the feasibility of the introduction and implementation of *Saebo*Flex[®] throughout the acute to community pathway in Southend-on-Sea.

METHODOLOGY

Participants

Twenty-five patients were recruited over an 18 month period with a recent stroke diagnosis. Using *Saebo*Flex® criteria as a guide, the inclusion criteria were: patients' ability to consent; minimum of 15° shoulder movement; 15° elbow movement; 15–35° passive wrist extension; ¹/₄ range finger flexion across the metacarpophalangeal joints and interphalangeal joints.

Exclusion criteria were: patient inability to follow two-step instructions; unable to independently don splint or do not have a partner to don splint successfully and/or guide the execution of the programme; low motivation and low awareness; in residential/nursing home placements. Patients were also excluded if able to maintain maximum shoulder flexion, elbow extension, wrist in neutral and then open and close the hand 10 times, because they are deemed too functionally-able to benefit from *Saebo*Flex[®] and advised to continue with conventional therapy.

Instruments

The *Saebo*Flex[®] is a custom fabricated orthosis that positions the wrist and fingers into extension in preparation for functional activities. The user

AUTHORS

Maryvonne Prosser

Stroke Occupational Therapist, Community Stroke Team, South Essex Partnership Trust.

Nicola Rickards

Stroke Physiotherapist, Community Stroke Team, Southend University Hospital NHS Foundation Trust.

Aarti Sharma

Stroke Physiotherapist, Acute Stroke Unit, Southend University Hospital, NHS Foundation Trust.

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The SaeboFlex* is a custom fabricated orthosis that is non-electrically based and is purely mechanical.

is able to grasp an object by voluntarily flexing the fingers. The extension spring system assists in re-opening the hand to release the object.

Test and procedure

Daily use of *Saebo*Flex[®] for a minimum of 45 minutes per day using repetitive reach and grasp exercises appropriate for the patient's ability were prescribed and reviewed by a Saebo trained therapist (physiotherapist or occupational therapist) once a week or less once established. Exercises followed principles of goal-directed functional movement training.

The majority of patients were included due to their fulfilment of the inclusion criteria of *Saebo*Flex[®]. However some patients were also treated in the acute setting with other treatment adjuncts (Neuromuscular Stimulation, *Saebo*Stretch[®] resting splints and Saebo Mobile Arm Support) in order to maximise their potential. For example if a patient had an indication of accessible muscle activity that may improve with electrical stimulation this was considered as a preparatory treatment to *Saebo*Flex[®] (*Figure 1*).

Outcomes were measured using the Fugl-Meyer upper limb assessment (FM), which is validated for use in the Stroke population and free to use (Fugl-Meyer *et al* 1975). Video analysis was also completed. Subjective comments from patients were requested.

DATA ANALYSIS AND RESULTS

25 patients were identified as meeting the inclusion criteria; of these six declined to continue use for various reasons such as demotivation, cognitive impairment, psychological issues or social factors (See *Appendix 1*). This data was not included in graphical representation; 19 patient results were analysed.

Results

Of the 19 patients treated (see *Table 1*), 18 demonstrated improvements in upper limb function as recorded by the FM (see *Figure 2* and *Appendix 2*). Overall, patients FM score improved by a mean 25.4 points. Patients who started their treatment in the acute trust improved by a mean 25.2 points and those who started their treatment in the community improved by a mean 17.6 points. Page *et al* (2012) suggested an improvement of 4.25-7.25 points as the clinically important minimal difference, so both patient groups achieved a significant change. Length of use ranged from two to 24 weeks, with a mean of 8.6 weeks.

DISCUSSION

18 patients were able to successfully incorporate their upper limb into functional tasks post Saebo, allowing them to continue with traditional therapy. Patients who started their Saebo treatment in the acute setting appeared to need a shorter period of use than patients who started their treatment in community settings. Five patients needed treatment lasting longer than 15 weeks. Three of these patients started their

Age range	44 to 89 years
Mean age	68.3 years
Gender ratio	14 Male, 5 Female
Diagnosis	3 Haemorrhage, 16 Infarct

TABLE 1 Patient demographics

treatment in community settings and two in the acute trust. One patient developed joint pain secondary to stiffness which lowered the overall FM score, but a functional improvement was still obtained. Positive subjective comments were also recorded (*Appendix 3*). Objective improvements included achievement of functional activities of daily living goals such as being able to drink from a cup, eat with a knife and fork and stabilise a jar to be opened.

Data sets for three additional patients were not included in this audit as they demonstrated significant improvement in one week and it was felt traditional therapy could have been utilised. For these patients it was unclear whether the quick recovery was facilitated by *Saebo*Flex[®]. This was taken as a learning point as it helped to refine the therapists' ability to identify patients suitable for *Saebo*Flex[®].

It was observed that patients could be monitored less than once a week and could complete self-practice once they had been set up with the splint. This has implications for effective use of staffing. A cost benefit analysis may be beneficial. It was also noted that patients felt empowered and that the use of *Saebo*Flex[®] improved patient self-management. Future studies may assess potential cost benefits relating to visits to GPs, consultant referrals, medication use and botox in the management of upper limb function.

Overall, *Saebo*Flex[®] must be thought of as part of a 'treatment package' which includes a variety of treatment adjuncts to deliver a multi-system approach of tone management, maintenance of passive range, sensory reintegration and strength training, which facilitates the functional use of the affected hand and in turn facilitates the recovery of more proximal activity.

REFLECTION, LIMITATIONS AND RECOMMENDATIONS FOR PRACTICE

At the onset of the trial a patient pathway was designed to ensure the early identification of the patient in the acute setting and to promote a smooth transition of the patient into the community (*Figure 1*). During the trial this pathway was continually refined as the therapists gained experience selecting appropriate patients.

One year after initial implementation, a peer review meeting was held to discuss the experiences and reflections of Saebo trained therapists across the trusts involved in this project. Initially the uptake and implementation of Saebo appeared difficult and slow mainly due to time



requirements. It could take trained staff members approximately one hour to set up *Saebo*Flex[®]. With experience this reduced to around 15 minutes. Training of junior staff to assist in identifying appropriate patients and assist in treatment sessions also required time. However, once a splint had been set up the patient was able to carry out repetitive task-specific exercises independently. With experience the team could utilise *Saebo*Flex[®] to achieve the 45 minute daily therapy targets recommended by NICE (2013). Video analysis was also useful to refine clinical skills and for commissioning purposes.

On reflection, FM demonstrated changes in impairment based deficits, but it could not measure functional changes in activity and participation. We are now investigating the additional use of Action Research Arm Test (ARAT) to measure functional changes (Lyle 1981).

We saw variations in the type of functional gain from *Saebo*Flex[®]. For example, some patients regained functional use of their hand

but one patient with high levels of spasticity found that it was useful only for managing tone. Future studies may enable us to differentiate between longer-term and shorter-term use of splints to enable efficient use of resources and to reduce average length of use. For example, for chronic patients it may be more appropriate to obtain individual commissioning rather than loan from acute stock due to a longer use period compared to acute patients. Future evaluation will include a review at one year post trial to assess long-term functional neuroplastic changes.

The Saebo trained therapists reflected it was initially difficult to clinically reason when the splint should be discontinued and traditional therapy recommenced. In summary the team concluded that when the patient could incorporate their hand into functional activity without the use of the *Saebo*Flex[®] it should be discontinued.

CONCLUSION

*Saebo*Flex[®] is likely to be a feasible and effective treatment method to improve upper limb impairment and function for moderate to severely impaired acute stroke patients. The results indicated *Saebo*Flex[®] appeared to be most effective when implemented early following stroke, when the patient was highly motivated, was able to adhere to the prescribed programme and was cognitively relatively unaffected or had strong carer support. Patients with severe sensory impairments did not appear to improve as much as those with more intact sensory systems.

Results should be interpreted cautiously due to limitations of the outcome measure used and refinement of the patient pathway utilised in this audit. It is important to note that spontaneous recovery cannot be ruled out (Duncan *et al* 1997, Skilbeck *et al* 1983). Further research trials are warranted to determine exact treatment intensity and frequency. It would also be beneficial to compare SaeboFlex[®] to traditional therapies. Further cost analysis research is needed.

REFERENCES

Barry J et al (2012) Therapy incorporating a dynamic wrist-hand orthosis versus manual assistance in chronic stroke: A pilot study Journal of Neurological Physical Therapy 36 (1) pp17-24.

Davenport S (2005) *Recovery within grasp? A report on a preliminary study investigating the short and medium term effects of the SaeboFlex (Functional Tone Management System) on chronic post stroke patients with residual upper limb deficit Synapse Spring/Summer 2005.pp12-15.*

Duncan P and Lai S (1997) *Stroke recovery* **Topics Stroke** *Rehabilitation* 4 (17) pp51-58.

Farrell J et al (2007) Orthotic aided training of the paretic upper limb in chronic stroke: results of a phase 1 trial **NeuroRehabilitation** 22 pp99-103.

Feys H et al (1998) Effect of a therapeutic intervention for

the hemiplegic upper limb in the acute phase after stroke. *A* single-blind, randomized, controlled multicenter trial **Stroke** 29 pp785-792.

Fugl-Meyer A et al (1975) The post-stroke hemiplegic patient. A method for evaluation of physical performance *Scandinavian Journal of Rehabilitation Medicine* 7 (1) pp13-31.

Heise K et al (2000) Intensive orthosis-based home training of the upper limb leads to pronounced improvements in patients in the chronic stage after brain lesions Poster presentation, World congress of Neurorehabilitation.

Hoffman H and Blakey G (2011) *New design of dynamic orthoses for neurological conditions* Neurological Rehabilitation 28 (1) p55-61.

Intercollegiate Stroke Working Party (2012) *National Clinical Guidelines for Stroke*, 4th Edition London, Royal College Physicians.

Jeon H et al (2012) Effect of intensive training with a spring-assisted hand orthosis on movement smoothness in upper extremity following stroke: A pilot clinical trial **Topics of Stroke Rehabilitation** 19 (4) pp320-328.

Johansson B (2000) Brain plasticity and stroke rehabilitation: the Willis lecture **Stroke** 31 p223-230.

Kleim J and Jones T (2008) *Principles of experiencedependent neural plasticity: implication for rehabilitation after brain damage* **Journal of speech, language and** *hearing research* 51 pp225-239.

Kleim J (1998) Functional reorganisation of the rat motor cortex following motor skill learning Journal of *Neurophysiology* 80 pp3321-3325.

Lang C et al (2009) Observation of Amounts of Movement Practice Provided During Stroke Rehabilitation Archives of Physical Medical Rehabilitation 90 (10) pp1692–1698.

Lyle R (1981) A performance test for assessment of upper limb function in physical rehabilitation treatment and research International. Journal of Rehabilitation 4. pp483-492.

Molier B (2011) Effect of position feedback during task oriented upper limb training after stroke: Five case studies Journal of Rehabilitation Research and Development 48 (9) pp1109-1118.

National Institute of Clinical Excellence (2010) *Stroke Rehabilitation consultation document*.

National Institue of Clinical Excellence (2013) *Long-term* rehab after stroke, Clinical guidelines p162.

Nudo R et al (1996) Use-dependent alterations of movement representations in primary motor cortex of adult squirrel monkeys **Journal of Neuroscience** 16 pp785-807.

Oujamaa L (2009) Rehabilitation of arm function after stroke: Literature review Annuals of physical and rehabilitation medicine 52 (3) pp269-293.

Page S et al (2012) Clinically important differences for the upper extremity Fugl- Meyer scale in people with minimal to moderate impairment due to chronic stroke **Physical** *Therapy* 92 pp791-798.

Skilbeck C et al (1983) *Recovery after stroke* Journal of *Neurology Neurosurgery and Psychiatry* 46 pp5-8.

Steinberg B and Augustine J (1997) *Behavioural, anatomical and physiological aspects of recovery of motor function following stroke* **Brain research reviews** 25 (1) pp125-132. Stuck R and Marshall L (2010) SaeboFlex® upper limb training in acute stroke rehabilitation: Feasibility study. Poster presentation Colchester University Hospital.

Winter J et al (2011) Hands-on therapy interventions for upper limb motor dysfunction following stroke **Cochrane Database Systematic Review** 15 (6) CD006609. doi:10.1002/14651858.CD006609.pub2.

APPENDIX 1

Reasons for discontinuing SaeboFlex®

I don't like the	look of the splint.
------------------	---------------------

I trust God to heal my body.

Psychological/emotional reasons.

I find it too difficult to put it on and take it off.

I am not motivated enough to do this as often as I need to.

Now I am home I do not want to sit out in my chair therefore unable to continue.

APPENDIX 2

Table of results

Age	Gender	Diagnosis	Thrombolysed	Started in Acute (A) or Community (C)	Fugl- Meyer start	Fugl- Meyer end	Fugl- Meyer change	Length of treatment (weeks)
67	М	L PACH	NO	С	59	90	31	20
45	М	L TACI	NO	С	91	106	15	24
54	F	R TACI	YES	С	91	98	7	20
44	М	R TACI	NO	А	48	67	19	17
63	М	L TACI	YES	А	98	91	-7	PS
57	F	L TACH	NO	А	39	75	36	24
77	М	L LACI	NO	А	79	111	32	2
67	F	R PACI	NO	А	110	125	15	4
64	М	R PACI	NO	А	76	105	29	4
61	М	L LACI	NO	А	78	102	24	4
70	М	R PACH	NO	А	78	117	39	2
78	М	POCI	NO	С	62	68	6	13
63	М	L PACI	NO	А	70	93	23	PG
82	М	R PACI	NO	А	110	126	16	4
74	М	L TACI	YES	А	88	110	28	2
83	F	R PACI	NO	А	78	126	48	2
82	М	L PACI	YES	А	62	126	64	2
89	F	POCI	YES	А	57	68	11	6
78	М	POCI	NO	А	57	106	47	1

APPENDIX 3

Patient goals and feedback

Examples of patient goals
I want to be able to use my hand to do cooking
I want to be able to eat with my knife and fork
I want to be able to drive, to hold the steering wheel with both hands
I want to be able to self-propel my wheelchair
I want to be able to hold my handbag
Comments
Without the SaeboFlex® I would not have practised as much as I have done
I don't think my arm would have got better without this
I have stronger wrist and finger movements
This has given me a boost and the motivation I needed to get my arm working again
My hand is less tight now
I can practice on my own whereas without it I would always need help
It's more trouble than it is worth
It's difficult to put on myself
I don't like the look of it

Patient journeys through the orthotics, neurophysiotherapy and combined service

a retrospective review

The purpose of this review was to confirm that a combined approach to rehabilitation of patients with neurological conditions was more beneficial for the patient's experience, the speed of rehabilitation and the effectiveness of the treatment. This would be evidenced through outcome measures.

Until the introduction of the Joint Physiotherapy and Orthotics Clinic (JPOC), patients who required an orthosis would have separate neurophysiotherapy and orthotic appointments. Often there would be little communication, except the initial referral from physiotherapy to orthotics, about the treatment goals and how the orthosis would compliment neurophysiotherapy. Furthermore, before JPOC, patients were often lost to physiotherapy follow-up because they were discharged while they waited for completion of their orthotic treatment plan. This does raise the question whether or not they deteriorated during this period. Before the JPOC clinic started, general orthotics clinics would run weekly. The JPOC now runs on the first, third and fifth week of each month with general orthotics clinics continuing on the second and fourth weeks.

Since the beginning of the JPOC in 2012, patients with both orthotic and physiotherapy needs have a joint assessment with a physiotherapist and an orthotist to establish the best prescription to help meet the patient and physiotherapy goals. Consideration is also given to what the patients can do, in between their JPOC appointments, both at home and in their physiotherapy appointments so they are conditioning for when the orthosis is fitted.

Referral criteria

- Neurological or related spinal condition.
- Ongoing physiotherapy requirement.

- Requirement for orthotic treatment.
- Need for combined physiotherapy and orthotic assessment to achieve specific goals.

Aims of the JPOC

- To provide a joint assessment for a suitable orthosis based on both physiotherapy and orthotic needs.
- To improve communication between the physiotherapy and orthotics service for effective patient care.
- To provide orthotic input earlier and delivery of orthoses quicker in the rehabilitation of patients with neurological conditions.
- To provide access to other services eg spasticity clinic, orthopaedics, oedema control.

METHOD

Patient satisfaction surveys (*Table 1*) were sent out to eight patients who had been seen prior to the set up of JPOC and to a further seven patients who had been seen in the JPOC.

The authors then looked at ten sets of patients' notes, six from before the introduction of JPOC and four after, for the following data:

- Average and median referral to assessment times for both clinics.
- Number of orthotic appointments for both clinics.
- Time from initial assessment to discharge in both clinics.
- Outcome measures used with patients in both clinics.

AUTHORS

Douglas Young Clinical Specialist Orthotist (ABUHB)

Esther van der Hoek

Clinical Specialist Physiotherapist (ABUHB)

RESULTS

QUESTI	ONNAIRE RESULTS		
1	Gender	Male Female	7 3
2	Age group	20-30 41-50 51-60 61-70 70+	1 2 3 2 1
3	Condition	Stroke Neuropathy Other	8 1 1
4	Do you still use your orthosis?	Yes No	8 2
5	Do you know what your orthosis does?	Yes No	10 0
6	Do you feel your orthosis is beneficial to your daily activities?	Yes No Yes/no	8 1 1
7	Were you seen at a joint clinic or separate clinics?	JPOC Separate Both	2 6 2
8	Do you feel the waiting time for your appointment was acceptable?	Yes No	8 2
9	Do you feel your treatment has been effective?	Yes No	9 1
10	Do you feel your rehabilitation has been successful?	Yes No Yes/no Not answered	5 3 1 1
11	Do you feel staff were helpful and polite?	Yes No	10 0
12	Do you feel you had enough privacy when talking to staff?	Yes No	10 0
13	Were you given an opportunity to ask questions?	Yes No	10 0
14	Did you feel staff answered all your questions to your satisfaction?	Yes No	10 0
15	Do you feel staff had time to listen to you?	Yes No	10 0
16	Did you find the clinic easy to get to?	Yes No	10 0
17	Did you feel the distance you had to travel to the clinic was acceptable?	Yes No No answer	8 1 1
TADLE 1			

TABLE 1Questionnaire results

ANALYSIS

Using the responses from the patient satisfaction surveys (6 from the separate, 4 from JPOC, total return 10 (66.6%)) the authors were able to gauge how effective and enjoyable patients found their treatment (*Table 1*).

Patient questionnaire

- 33.3% of the before JPOC clinic patients do not use their orthoses anymore, in opposition to 100% of the joint clinic group who do continue to use their orthoses.
- 20% of patients from the before JPOC group

DATA TAKEN FROM NOTES						
Before JPOC patients						
Code	Date of ref to orthotics	Date of first assessment	Days ref to 1st	Date of d/c	Ref to d/c (days)	No of appts
А	16/02/2011	31/03/2011	43	11/07/2013	876	13
В	28/01/2009	12/03/2009	43	26/07/2012	1275	22
С	06/03/2008	10/04/2008	35	07/08/2008	154	5
D	27/01/2011	23/02/2011	27	11/07/2011	165	5
E	18/02/2011	31/03/2011	41	08/12/2011	293	7
F	01/04/2009	05/05/2009	34	13/09/2011	895	10
JPOC patients						
1	16/09/2011	04/10/2011	18	19/07/2012	307	6
2	07/09/2012	18/10/2012	41	12/05/2013	247	7
3	13/08/2012	16/08/2012	3	03/01/2013	143	5
4	14/08/2012	16/08/2012	2	21/03/2013	219	6

TABLE 2 Data taken from notes to work out the average wait between referral to 1st appointment, average number of appointments and average referral to discharge time.

AVERAGE WAIT (DAYS)			
Before JPOC	37		
JPOC	16		

TABLE 3Average wait between referral and first
appointment (days)

REFERRAL TO DISCHARGE (D	AYS)
Before JPOC	610
JPOC	229
TABLE 4 Average referral to	discharge time (days)

TABLE 4Average referral to discharge time (days)

NUMBER OF APPOINTMENTS	
Before JPOC	10
JPOC	6
TADLE C Automation of	

TABLE 5Average number of appointments

found treatment times unacceptable, one patient stating she had waited 52 weeks.

- One patient from the before JPOC group said treatment was ineffective.
- 30% felt rehabilitation was unsuccessful, two from the before JPOC group and one from JPOC group.
- One patient also found the distance to travel to clinic was unacceptable.

Furthermore the average length between referral to first assessment was quicker in the JPOC clinic by 21 days (*Table 3*), as was the referral to discharge time and the number of appointments required before discharge (*Table 4*). The number of appointments required for a completed episode of care is 40% less in the JPOC (*Table 5*). This coincides with the reduction of time to complete the episode of care. This is illustrated in the graphs (*Figures 1* and 2 on page 18).

The main outcome measure used was the ten metre timed walking test (10mTWT). It is simple to carry out in the clinic setting and allowed the authors to calculate walking speed pre and post application of the orthosis. From the six patients seen before the JPOC clinic three had 10mTWT times and two showed improvement in gait speed with their orthoses. Patient A went from using a Zimmer frame (ZF) to using a custom made ankle foot orthosis (AFO) with walking stick. Patient E FES to AFO with walking stick. From the four patients seen in the JPOC three out of four improved their walking speed and the same number of patients downgraded the type of walking aid required (*Table 6* on page 18).

CONCLUSIONS

The evidence from the patient satisfaction survey has shown that the JPOC does improve the patient experience. The JPOC provides clinically effective care in an efficient manner, allowing patients to have early orthotic intervention alongside continuing neurophysiotherapy treatment. It is the author's suggestion that the combination maximises the outcome of treatment. In addition, improved communication between the physiotherapist and orthotist allows for better patient outcomes and satisfaction. AFO's in both scenarios improve walking speed. However, more people continued to use their AFO if they attended JPOC.







FIGURE 1 Number of days between referral to first appointment (range and average)

FIGURE 2 Number of days between referral to discharge (range and average)

MAIN C	AIN OUTCOME MEASURE : THE TEN METRE TIMED WALKING TEST								
Code	Pre outcome measure	Time	Walking aid	Gait speed (m/s)	Post outcome measure with AFO	Time	Walking aid	Gait speed (m/s)	Change in gait speed
Before	JPOC patients								
A	10mTWT 6/6/11	55.00	RZF	0.18	10mTWT 17/11/11	26.00	1WS & AFO	0.38	0.20
В	?	?	?	?	?	?	AFO	?	?
С	10mTWT 11/4/8	10.00	1WS	1.00	10mTWT 06/12/8	28.00	1WS & AFO	0.36	-0.64
D	?	?	Bilateral E/C's	?	?	?	Bilateral E/C's and AFO	?	?
E	10mTWT 11/3/11	16.00	FES	0.63	10mTWT 20/6/11	15.09	1WS	0.66	0.04
F	?	?	K-Walker	?	?	?	K-Walker and insoles	?	?
JPOC pa	atients								
1	10mTWT 19/1/12	39.00	Quadstick Rollator and two people	0.26	No measure	39.00	1WS & AFO	0.26	0.00
2	10mTWT 18/10/12	12.04	FES	0.83	10mTWT 12/5/13	11.20	AFO	0.89	0.06
3	10mTWT 16/8/12	28.10	2WS	0.36	10mTWT 3/1/13	13.70	1WS and AFO	0.73	0.37
4	10mTWT 15/11/12	46.60	Quadstick	0.21	10MTWT 21/3/12	45.10	1WS and AFO	0.22	0.01

TABLE 6 Ten metre timed walking test

The authors would recommend that in the future access to the service becomes available across the health board. They would also like to establish an outcome measure that includes

walking speed, quality of walking pattern and use of walking aid which would also document a change in walking aid.

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Sharing good practice

Putting the European Physiotherapy Guideline for Parkinson's Disease to work

Dr Anna Jones Honorary President of AGILE, Reader (part-time), Department of Sport, Exercise and Rehabilitation, Faculty of Health and Life Sciences, Northumbria University

The idea for a European Physiotherapy Guideline for Parkinson's Disease was sparked in a workshop at Radboud University Nijmegen Medical Centre in the Netherlands in June 2010. The workshop brought together key researchers in the field, guideline developers and members of the Association of Physiotherapists in Parkinson's Disease Europe (APPDE) who presented their current work and future plans for embedding the Royal Dutch Society for Physical Therapy Guidelines for Physical Therapy in Patients with Parkinson's Disease (Keus et al 2004) in their respective healthcare systems.

Work to adapt the 'Quick Reference Cards', developed as part of the Dutch guidelines process, to the UK health care system (Ramaswamy et al 2009) was presented by members of the UK Guidelines Group, creating interest and initial discussion amongst workshop participants about the potential to translate the cards into other languages. 'How much better it would be,' workshop participants from several countries finally mused, 'if the international evidence base was synthesised at a high level and then recommendations were used to shape physiotherapy practice and service delivery within their individual healthcare systems.' Four-anda-half years and a lot of hard work later that vision of a European Physiotherapy Guideline for Parkinson's Disease (Keus et al 2014) has been realised.

It is always worth taking a little time to understand the methodological steps used to construct a specific guideline. International standards for guideline development; the Appraisal of Guidelines for Research and Evaluation Instrument (AGREE) and Grading of Recommendations Assessment, Development and Evaluation (GRADE) were used for this guideline. An initial phase in the work involved identifying the barriers physiotherapists and people with Parkinson's currently experience when providing or accessing therapy. This was done via a web-based survey of over 3,000 physiotherapists across Europe (facilitated by 20 national physiotherapy associations); focus groups with 50 expert users of the 2004

KNGF guideline; and a literature review. Key questions the guideline sought to address focused on what treatment strategies improved the core areas of physiotherapy practice such as gait, balance, transfers and physical activity. A systematic search, selection and appraisal process identified 70 controlled clinical trials which were classified according to the physiotherapy intervention they evaluated - conventional physiotherapy, treadmill training, cueing, strategies for complex motor sequences, massage, martial arts and dance. 'Critical outcomes', measuring capacity (what someone can do) or performance (what someone does) in relation to domains of the International Classification of Functioning, Disability and Health (ICF) (eg impairment, activity), were identified. Trial data necessary for the grading process was extracted and the quality of the evidence for each question and outcome was graded - high, moderate, low or very low. The intervention effect was estimated by means of a meta-analysis. The final step was the assignment of a grade of recommendation, strong or weak, reflecting risks and burdens of the intervention. When an intervention for a specific outcome is not recommended, the benefits probably do not outweigh the risks and burdens, although these are generally low. In these cases effects largely show a positive trend but the wide confidence intervals, indicating uncertainty, include 0, pointing to no difference between the means of the two

populations. It is important to remember that in a developing field like physiotherapy absence of evidence can mean more data is advisable and does not necessarily equate to absence of benefit.

The European guideline is a decisionsupport tool and like all such tools it needs to be used in the context of professional expertise and patient preference. It is much more than a set of recommendations. It provides a comprehensive background to Parkinson's and its management, and the Guideline Development Group (GDG) has selected a set of recommended measurement tools based on an examination of their psychometric properties. These are highlighted in the 'Quick Reference Cards' covering physical examination, with other cards covering history taking, treatment goals and the GRADE-based recommendations.

We will take a look at two examples of GRADE-based recommendations in relation to core areas of practice: firstly, transfers in and out of a chair at the ICF level of capacity for functional mobility. The recommendation is strong (positive effect, 0 outside confidence interval of effect, evidence quality moderate/high) for strategies for complex movement sequences (CMS) on the critical outcome related to Chair in the Parkinson's Activity Scale (PAS). The GDG suggests this level of recommendation means that most informed people with Parkinson's would choose this intervention. The recommendation is weak for cueing (positive effect, 0 outside confidence interval of effect, evidence quality low or moderate/high, but only small effect or very large confidence interval of effect) in relation to the critical outcome Sit-to-Stand. The GDG suggests that with this level of recommendation the choice of people with Parkinson's regarding this intervention will vary according to values and preferences. Looking at the combined core areas of Gait, Balance and Transfers together, at the same ICF

level (capacity for functional mobility), strategies for CMS again receives a strong grade of recommendation in relation to the critical outcome PAS. Conventional physiotherapy (all physiotherapistsupervised activities targeting gait, balance, transfers or physical capacity, or a combination thereof), dance (tango) and Tai Chi receive a weak for recommendation in relation to improving the capacity for functional mobility in terms of the critical outcome Timed Up and Go (TUG). Cueing receives a weak against (positive effect but 0 outside confidence interval of effect) recommendation against the TUG, and again for 'weak for and weak' against recommendations people's preferences will come into play. Armed with these and other recommendations, physiotherapists have access to a framework within which to deliver evidence-informed assessment, treatment and evaluation, and share and communicate decision-making to people with Parkinson's, their carers and supporters and multi-professional team members.

So what evidence do we have of existing guidelines impacting on physiotherapy practice with people with Parkinson's? Key results from the most recent Parkinson's UK Audit (Parkinson's UK 2012) of quality of care for people with Parkinson's (n=4,079) against standards drawn from national and international guidance (NICE 2006, Keus et al 2004) identified that 97.9% of patients had initial physiotherapy notes that identified areas of intervention eg gait, balance, posture, transfers; with 90.8% recording treatment strategies and techniques which were consistent with guidance. However, regular training in the management of people with Parkinson's was reported by only 28.3% of physiotherapists, and it was evident that physiotherapists were not accessing readily available evidence for assessment and management. The UK 'Quick Reference Cards' (2009) were only used by 46% of physiotherapists, and outcome measures were not used with 14.9% of patients whose care was included in the audit. Half of new physiotherapists reported no access to training in the management of people with Parkinson's, and this is concerning as Band 5 physiotherapists made up 12.7% of physiotherapists providing interventions for people with Parkinson's.

So what steps can we take to try to ensure the European guideline itself underpins our services for people with Parkinson's and their supporters and our training programmes? The GDG "How much better it would be," workshop participants from several countries finally mused, "if the international evidence base was synthesised at a high level and then recommendations were used to shape physiotherapy practice and service delivery within their individual healthcare systems."

recommends that nations implementing the European guideline learn lessons from the Dutch ParkinsonNet model. This would involve: looking strategically at service concentration to help increase the number of people with Parkinson's that individual physiotherapists treat; considering geographical distribution to help ensure the possibility of being seen at home; providing opportunities for training in the guideline using the full range of delivery mechanisms (courses, e-learning, web-based resources); increasing the visibility of expert therapists to potential referrers and people with Parkinson's; and generally increasing communication and collaboration between everyone interested in promoting service improvement and quality service delivery. AGILE and ACPIN, as well as members of the APPDE, are looking forward to linking with new UK Parkinson's Excellence Network (Parkinson's UK 2015), which is open to all health professionals with an interest in Parkinson's, to explore how we can work together to move on the implementation of the European Physiotherapy Guideline for Parkinson's Disease to make a real difference to the lives of people with Parkinson's in the UK, their families and the health and social care professionals supporting them.

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References

Keus SHJ, Hendriks HJM, Bloem BR, Bredero-Cohen AB, de Goede CJT, van Haaren M, Jaspers M, Kamsma YPT, Westra J, de Wolff BY, Munneke M (2004) *Clinical practice guidelines for physical therapy in patients with Parkinson's Disease* Supplement to the **Dutch Journal of Physiotherapy** 114 (3). Available at: www.appde.eu/europeanphysiotherapy-guidelines.asp

Keus SHJ, Munneke M, Graziano M, Paltamaa J, Pelosin E, Domingos J, Bruhlmann S, Ramaswamy B, Prins J, Struiksma C, Rochester L, Nieuwboer A, Bloem B (2014) European Physiotherapy Guideline for Parkinson's Disease KNGF/ ParkinsonNet, the Netherlands. Available at: www.parkinsonnet.info/euguideline

National Institute for Health and Clinical Excellence (NICE) (2006) Parkinson's Disease: Diagnosis and management in primary and secondary care **NICE** clinical guideline 35 Available at: www. nice.org.uk/nicemedia/live/10984/ 30088/30088.pdf

Parkinson's UK (2015) UK Parkinson's Excellence Network www. parkinsons. org.uk/content/uk-parkinsons-excellencenetwork

Parkinson's UK (2012) National Parkinson's Audit 2012 Parkinson's UK, London. Available at: www.parkinsons. org.uk/content/uk-parkinsons-audit

Ramaswamy B, Jones D, Goodwin V, Lindop F, Ashburn A, Keus S, Rochester L, Durrant K (2009) *Quick Reference Cards (UK) and Guidance Notes for physiotherapists working with people with Parkinson's Disease* Parkinson's Disease Society, London. Available at: www. parkinsons.org.uk/content/quick-reference-cards-uk-physiotherapists

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Focus on

The UK's first all-encompassing service directory for stroke survivors and their carers

Sian Brooks Personal trainer, Stroke Of Life

It is becoming a well known fact that the NHS estimates over 150,000 people will have a stroke every year in the UK and over a million people live in the UK with symptoms after surviving a stroke. With the NHS so heavily stretched, it is essential that we use all available sources of help so that stroke survivors can continue rehabilitating themselves once they return home.

A website has been launched to be the UK's first comprehensive online service directory for stroke survivors and their carers. www.strokeoflife.co.uk was created to raise the profile of all the disciplines involved in neurological rehabilitation, improve communication links between the disciplines and, overall, prove to stroke survivors that help is available should they want it.

Due to the sheer complexity and geographical range of the Internet, it is becoming harder to find appropriate services. Stroke survivors do not need any more barriers to contend with. A simple, accessible 'service hub' was required that could encompass all the services and disciplines available to assist rehabilitation after stroke, and not just those available on the NHS or through charities. Sian Brooks, a personal trainer specialisng in exercise after stroke founded 'A Stroke Of Life' because there simply wasn't a fully accessible, simple-to-use, all-encompassing service out there to provide outpatients with the information they need to continue their rehabilitation. 'It's been an eye-opening experience, developing and building this type of database. I have gone at it as if I've had a stroke myself, and designed the site to account for as many disabilities associated with stroke as possible. For example, there is no typing involved whatsoever and therapist details are available with just two clicks of a button. The colours are also appropriate for the visually impaired and style of writing, page layout and pictures are all consistent and still. You would be amazed at how many sites, claiming to provide services for the disabled, have completely inaccessible websites! If I were to offer anyone one piece of advice

it would be - keep it simple and keep it tidy.'

The independent sector offers a vast array of different therapies from the traditional to the more alternative. Whilst to some this may create conflict, to others, it allows people with conditions such as stroke to choose the therapy that best suits them and this cannot be ignored. 'As any professional understands, every stroke is completely individual, so why do we persist on putting stroke survivors in boxes and giving everyone the same course of therapy?'

Perhaps one day a gold standard will exist to which all independent therapists must adhere in order to prove their credibility or benefit to a population. For now though, it is essential that we promote the more traditional therapies: ones which are recognisable and proven in the stroke rehabilitation world.

Bespoke rehabilitation courses and the facilitation of functional redevelopment and independence is key to effective rehabilitation from neurological injury. Self-management is becoming an essential part of life, but, it goes without saying, these people who are expected to 'self-manage' their condition, do they know where or how to look for help?

'A Stroke Of Life' will be a national database of neurologically trained practitioners, therapists and instructors; thereby helping GPs, community support workers, carers and, of course, survivors of stroke to find appropriate assistance in their journey through rehabilitation. It will mean that any stroke survivor in England will be able to see exactly which therapies are available to them relative to their geographical location and to contact them directly, safe in the

knowledge that the person listed is fully qualified, insured and registered with a governing body, and/or, registered with the Health and Care Professions Council. In addition, the site will highlight other disciplines that they may not have otherwise thought of. For example, someone may be looking for a physiotherapist but upon visiting the site realise that an occupational therapist is more appropriate to their needs, or vice versa.

www.strokeoflife.co.uk is a highly accessible and responsive website listing the details of therapists and health practitioners in occupational therapy, physiotherapy, personal training, osteopathy, chiropractic and other sensory specialisms such as ophthalmology.

Alongside the independent sector are listed the details of schemes and groups available in the public sector and useful technology providers. The primary aim is to provide a simple hub of accessible services relative to a person's location.

At the moment, the team needs qualified professionals to get in touch in order to build a comprehensive database of health professionals specialising in stroke.

Once completed, the database will serve as a focal point for all independent therapist searches, not to mention, become a vital tool for GPs and community support workers when advising their patients on appropriate courses of rehabilitation. The site went live in October last year and the process of building the database has begun. Sian and her team are in the process of contacting as many practitioners, therapists and instructors as possible, starting in the South West, and progressing North over the course of the year. It is a mammoth task but a necessary one at that.

'It has been far more challenging than I had ever imagined. The major barrier we have is the fact that, as an independent, brand new social enterprise, we have no big brand name to give us credibility. We end up in junk mail boxes and get ignored if we call! However, the database is growing and everyone who responds or enquires is brimming with positive feedback, so the quest continues to get this up and running as soon as possible.'

As mentioned, the website itself is a 'two-click' website with no typing required at all. The colour scheme and font has been selected to appeal to people with visual difficulties and users can select counties rather than using their postcode to avoid typing errors.

The Stroke Association, the NHS and other related charities provide vast amounts of service based information and support via their websites. However, none of these organisations in the public sector promote the private sector. A website such as this will therefore be able to fulfill this role and raise awareness of independent health professionals.

Stroke rehabilitation shouldn't be a

postcode lottery; there should be opportunities in all areas for people to attend support groups and community schemes. But naturally, these require funding from somewhere. Looking to the future, Team ASOL is a social enterprise and is on a mission to help supply this funding when the site develops into an effective advertising platform for large organisations. This is a major objective for the team. Support groups and exercise classes are a cost effective, safe and organised way for stroke survivors to meet and socialise with other stroke survivors but unfortunately they often end up stopping due to funding cuts or lack of publicising.

If your profession falls into one of the afore-mentioned categories, please contact A Stroke Of Life via the 'advertise with us' form on the website and list your details for free. You will be required to supply certain documentation for proof of qualification purposes but these details are all on the form. In summary, the main objective of the site is to offer a stroke survivor the choice of which therapy or course of rehabilitation to take. At present, this does not exist when they leave hospital. The secondary objective is to promote the site as an effective advertising platform for larger organisations and keep it free of charge, indefinitely, for therapists. It will then provide funding opportunities for vital support and therapy groups.

A Stroke Of Life is a Social Enterprise with big aspirations to use profits to fund such groups. A few volunteers who feel passionately about stroke rehabilitation and the need to promote local stroke services run the site and they need your help! Please, help them to help stroke survivors and carers, by including your details on the site.

Life after a stroke shouldn't just be about surviving; it should be about living.

www.strokeoflife.co.uk sian@strokeoflife.co.uk

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.

Are you there yet?

Are you there yet? Coming towards the end of the PhD journey, this is the most frequent question you will ever get asked, so prepare yourself. The key reason for this question is that people often do a mental calculation of your timeline and conclude that you should be finished. Their reaction is one of disbelief that you are still working on this one document for so long. Surely you should have finished and moved on by now ... hmm ...yes and no ... well, I don't know!

A lecturer at the university I am affiliated with asked me this question about five months ago. What occurred next was a total surprise. Such an innocent question, but at that moment in time when she asked me I almost burst into tears! She never asked me this question again. I felt so bad for her and wanted to reassure her that it is ok to ask that question. I kept meeting her in the corridor but she jumps at the sight of seeing me I politely say 'Hi, how are you?' She quickly answers and moves on. Ohh dear!

I was not fully aware of how intense the last phase of the PhD journey would be. No one really explained this last phase but perhaps it is one of those experiences in life that you just have to go through. So, we know that PhD is hard work, and we know that the thought of adding new knowledge to the existing body of evidence is crucial and also scary during this phase. But the process of getting to the place where you identify this new knowledge in your research is intense. Therefore in this blog I will share what this phase feels like and what you can do to prepare yourself for it should you decide to take on a PhD. I don't think you can avoid it so there is no point telling you how to avoid it but I can share how you can respond to it

What does it feel like?

Everyone will have different experiences of this last phase. I can only describe what it feels like to me. The best way to describe this phase is like swimming in a whirlpool that has a continuous rinse cycle on! This continuous rinse cycle is representative of the continuous drafting and re-drafting of a chapter. So when you think that you have completed a chapter, your supervisors in their great

"Such an innocent question, but at that moment in time when she asked me I almost burst into tears!"

wisdom might ask you to add something, or strengthen an argument. It could be a number of things, but what it means is that you have to do another draft. So you go through a number of emotions during this phase. First is the uncertainty this will bring; for example, you see the days turn into weeks and the slipping away of your planned timeline to finish. Second, the self-doubt and insecurity about knowing when a draft is good enough; after all, you want to make sure that it *is* good enough and that you have addressed all the concerns highlighted in the previous draft. But knowing when to move on is an art. I have heard a number of people say to me; 'It just needs to be good enough.' But how do you know when it *is* good enough ... no one seems to know. Well except your supervisors!

Supervisors become very useful at this stage to say yes that is good enough move on. Actually, the supervisors during this phase hold the key for turning off this continuous rinse cycle on the whirlpool. I have come to realise that they have the experience of supervising PhD students and marking other PhD projects so they should be able to guide you through this phase. Hmm ... or do they?

How to get through this last phase of the PhD

I remember writing in my first blog the importance of your support network, which includes family, friends and supervisorsto help you along this journey. The famous phrase that sticks out for me during this time is 'No man is an island.' We all need each other to accomplish our dreams; and the bigger the dream and goals, the more people you need around you to support you. So my top tips are:

- Have people around you that believe that you are capable of achieving your dreams. It helps to spur you on during times of uncertainty.
- Seek help when you need it. Do not be afraid of asking for help.
- Have a critical friend close to you. By this I mean a person who is able to proofread drafts and tell you whether or not it makes sense. Even though they are critical you know that they have your best interest at heart.
- Get rest when you are tired. Take regular breaks when writing. The Pomodoro technique (25 minutes of focused attention) can be useful. Pomodoro Apps are freely available.
- Exercise or go for daily walks. This helps to clear your mind.
- Keep linked in with your professional network and physiotherapy colleagues to keep you grounded during this phase.
- Remember why you embarked on the PhD in the first place.

In summary, the last phase of the PhD can be filled with uncertainty so do not underestimate it and enjoy it if you can. Have your support networks firmly and securely in place. If you are in the last phase of the PhD journey and someone asks you 'Are you there yet?' ... just smile and say, 'Yes, I am getting there!'

Professional networks and the future

It is a Saturday morning as I sit to write an update to my PhD life. Yesterday, I submitted the first draft of my thesis to my supervisor for review. I feel some relief that I have reached this far but am well aware that there are likely to be many more iterations before the completed final version is ready for submission. This blog always allows a time for reflection – there seem to be two interwoven strands to this blog. One is the importance of professional networks and the other is the future, but I will come back to these after I update you on a couple of events.

In the Autumn/Winter 2014 blog I wrote how I was continuing to analyse the data blinded and that, although we had seen some significant differences between groups, I did not know whether this was in favour of the treatment or placebo group. To remind you, one group received botulinum toxin injections and the other placebo injections to the arm (both in conjunction with electrical stimulation to the wrist extensors). I was finally given the go ahead to unblind in October and identified that there were both statistically, and more importantly clinically, significant differences in favour of the treatment group. This was fantastic after almost nine years of development and research.

The last six months have been spent writing up these results into various reports for publication and chapters for my thesis. These solitary days spent writing have been interspersed with extremely sociable days at conferences. Some of you no doubt heard me at the UK Stroke Forum in Harrogate during December presenting the trial results for the first time. I have also attended other conferences (such as Society of Research in Rehabilitation) which are fantastic opportunities to disseminate findings but also to network with other researchers and interested clinicians.

As the PhD progressed the importance of developing networks became clear and this has already resulted in being invited to become involved in other projects around the country and broadened my research knowledge. While it is a vital part of academia I suspect our patients would greatly benefit from much greater communication between clinicians to share ideas and promote excellence. ACPIN is a really useful way of achieving this within the neurophysio community but we should also think about interdisciplinary networks too. It also became clear that twitter was an excellent resource for networking as well as highlighting your own work and so, much against my better judgement, I joined (you can follow me @cam3lindsay)!

And so to my future. Well, a day after the UKSF, my future employment in the NHS Trust became uncertain. After a phone call from a Band 8b informing me I had no job in January, it took six horrible days to clarify with the Trust that I was on secondment under the NIHR Grant and remained under permanent contract. It was fairly clear from this encounter that the new skills and knowledge gained during my PhD were not particularly wanted in my current NHS Trust. Other people who have completed their PhDs have also found the NHS unwelcoming

"As the PhD progressed the importance of developing networks became clear and this has already resulted in being invited to become involved in other projects around the country and broadened my research knowledge."

which I personally feel is very worrying for the profession.

I had intended on returning to a clinical setting having completed the PhD with the plan to write further grant and fellowship applications over time so that I could develop a proper clinical academic career; however this route appears closed off in my current Trust and perhaps in the wider NHS. I do not wish to lose the extended skills I worked hard to gain clinically but equally feel the important findings from my PhD need further investigation.

As I write this my future is very much undecided. I am just focused on submitting the PhD.

Five minutes with...

Headway has developed the Approved Provider scheme, an accreditation scheme open to residential care settings. This includes NHS and independent hospitals, neuro-rehabilitation units, residential and nursing homes and respite facilities, specialising in acquired brain injury (ABI). ACPIN asked two people to talk about their experience of the scheme.

Barbara Hegarty

Clinical Specialist Speech and Language Therapist, Regional Neurological Rehabilitation Unit, Homerton University Hospital Foundation NHS Trust

Barbara Hegarty became part of the first NHS Specialist Inpatient Rehabilitation unit in the South East of England to achieve Headway Approved Provider status.

So why did you put yourseves through this experience?

Really the idea was to take a long hard look at what we are doing. Like all other NHS and care institutions we are used to CQC inspections, and while these are valuable, they don't really map well on to the specifics of brain injury. We wanted an experienced, neutral, external viewpoint with which to measure ourselves. It allowed us to really take the time needed to analyse gaps, and have a broad knowledge of those gaps across the service. Using the Headway Approved Provider scheme was much more credible than a local 'quick and dirty' benchmarking exercise for all of us on the Unit, and for higher management across the organisation. This senior level buy-in was essential, both because of the direct costs of the scheme, and also the indirect costs of the staff time required to gather the evidence that leads to the assessment decision. The scheme leads to an ongoing system of quality control over the following two years. This governance framework provided useful information for us and for people living with brain injury. It allows us to promote ourselves as an appropriate place for brain injury rehabilitation, and justifies our specialism.

Were you anxious about the project?

Absolutely! It kept me awake at night! Once you sign up for the scheme and pay for the Standards Pack, you are working to a timescale, as submission is six months from the invoice date. There was a huge amount of evidence to gather and collate. In our case, over 130 pieces of evidence had to be gathered, collated and crossreferenced against the six domains and thirty-three standards. I had concerns about gaining and maintaining commitment from the whole team, coordinating the work, maintaining impetus, and keeping everyone on track and on page.

"This governance framework provided useful information for us and for people living with brain injury. It allows us to promote ourselves as an appropriate place for brain injury rehabilitation, and justifies our specialism."

We used a shared electronic file and spreadsheet to help monitor progress and show links between domain areas. As the evidence started to roll in, though, the spreadsheet became reassuring. I have to say it was lovely to realise what high quality work is happening on the RNRU – as therapists and problem solvers, it is typical for us to look at the negative aspects and seek ways to improve, so it was really nice to see the glass more than half full for a change!

The domains of assessment cross professional boundaries and required close MDT working to stand any chance of success. It has been lovely to learn more about other professions, how they work and how they gather evidence. It was a great experience to learn more about what work happens behind closed doors, especially medicine, clinical neuropsychology and social work. My fears didn't materialise – we completed our submission on time, although we were down to the wire! It was especially hard for the smaller professional groups to find the time. At the time we were completing the standards pack we only had one social worker, so you can imagine the pressure on that one person.

Were there any surprises?

Not really. We knew what our weakest areas of performance were already, but the report from Headway has given us new focus and energy. Since the feedback is solutions oriented, it's been very easy to make service changes. Even simple things like remembering to take a register of attendees and offer certificates of attendance to staff coming to our weekly teaching programme. The understanding that there is a second, unannounced visit somewhere in the next two years has been really useful in keeping the areas for development in sharp focus.

I don't know if I would feel this way if we had started the process in a struggling service, as there is additional pressure on the team. It does make you feel vulnerable; however the report generated is a great road map for change.

What will you and the team take away from this experience?

It's made us all really excited again, especially seeing the report and spotting the category 'excellent' against our unit. You so rarely get that kind of feedback from a validated external agency, and how often, as a manager, do you get to tell that to your team? I think it's been wonderful to lift the spirits of the team and their sense of professional pride. Personally I love the fact that I finished it - so many senior management projects roll on over time, without absolute deadlines. Learning about these kinds of processes has been an excellent CPD activity for me. The whole thing has been so positive we are starting to look for other accreditation schemes.

So what are your next steps?

I think we need to continue to develop our links with Headway and other national organisations, integrating their knowledge and resources to improve the service offered at the RNRU. We need to take the opportunity to use this golden time of even closer MDT working and understanding to think creatively to overcome our service limitations. We have dedicated management and team time to action plan and timescale service changes. We have started to use the new confidence we are feeling to think in really novel ways to answer issues from the report. We have started to think about changing the balance of professions across the unit, rewriting and creating new job descriptions and roles, developing inhouse training modules, with a view to marketing these in the future, as well as integrating ready available e-resources into training and development. All of this will help us all deliver a genuine 24-hour rehabilitation experience for our patients, and answer the issues highlighted in the Headway report. I can't wait!

Caroline Prosser

Headway's Approved Provider Lead

Caroline Prosser talks about the development of the Approved Provider scheme and its place in the charity's services.

Why did Headway UK develop the Approved Provider (AP) scheme?

The AP scheme is only one arm of Headway's service provision. It might make sense to understand the history of Headway in order to understand where the AP scheme fits. Back in the late 1970s, brain injury survival rates started increasing, often leaving people with severe disability and little specialist support on leaving hospital. This led to local service development in two broad categories, either health-style provision with therapy input or family support in social settings. These independent groups subsequently formed Headway - the brain injury association, with the aims of improving the life of people with brain injury and their families through campaigning, education and providing services. Smaller, volunteer-run groups operate as part of the UK-wide Headway charity, while the larger affiliated groups have paid staff, offer more services and operate under their own charity numbers. The groups and branches are supported by a dedicated Network Support team and colleagues from all other departments within the national organisation.

Headway provides a range of frontline services to support individuals, families and carers affected by brain injury. These include two Headway Acute Trauma Support (HATS) nurses, operating in the North West of England and the West Midlands; a freephone nurse-led helpline; an award-winning range of booklets and publications designed to help people understand and cope with the effects of brain injury; an emergency fund to assist people dealing with the financial implications in the immediate aftermath of a brain injury; and a comprehensive training programme that includes an acquired brain injury Level 4 NVQ distance learning package accredited by The University of Northampton.

Themes emerged from these services and through queries passed to Headway from its groups and branches as families sought advice when their relatives left hospital care and needed guidance on finding appropriate discharge locations. While Headway was aware of providers around the country, such as nursing homes and rehab centres, it had no direct evidence of service quality. We received feedback about poor care, for instance where hard won, relearned skills were lost, and also reports of excellent services. As with other areas of health and social care, the services provided seemed to be a lottery with variable support available.

How did the AP scheme get off the ground?

In 2009 we put together a business plan, with the specific aims of providing an important and useful service to families, while adding value to residential settings already CQC or equivalent registered, from an acquired brain injury (ABI) perspective. We felt that there was a real opportunity to apply the National Service Framework for Long Term Conditions

"In 2009 we put together a business plan, with the specific aims of providing an important and useful service to families, while adding value to residential settings already CQC or equivalent registered, from an acquired brain injury (ABI) perspective."

standards to ABI by offering an accreditation system. We presented this to the Department of Health as a three-year project with the aim to become selfsupporting by the end of central funding. When this was accepted, we started work with the University of Bangor to create the first version of the standards. After two years we reviewed our progress and included an explicit 'with respect to brain injury' statement in many of our standards, as good care might not be good brain injury care. We worked closely with the units that had been through the process and further developed the scheme to include illustrative examples of the standards being assessed. We looked at both what was done and how it was done - the culture and ways of working being a key focus.

We continue to evolve in response to the demands placed on different services. Since the AP scheme follows the whole pathway, whilst all standards must be met by every applicant, there may be varied types of evidence that will be relevant at different points along the patient journey. Outcome measurement is one example. Specialist regional neuro-rehabilitation settings are required to submit data to the UKROC database. This isn't required in services operating at a far later stage of the care pathway, so whilst we do require such units to evidence their use of outcome measures it wouldn't make sense to expect them to use as full a range as is required by UKROC.

How does the pricing system work?

We are now independent of Department of Health funding, so our fees are to cover our costs. The scheme doesn't currently generate a profit, and it has never been envisaged that this would be core, as the primary aim is to ensure quality of care, in terms of medical, nursing and social inclusion of people affected by ABI, coupled with evidence of communication with and support for families. Overall at present we break even. The fees cover the reviews, the visits, the administration costs of being on the Headway list of accredited units, the reports that are generated and the costs of up to two subsequent visits, with action plans provided in the report which will hopefully enable the unit to improve and achieve the required standards. We incur additional expenses, especially if we have to complete reassessment visits. Our pricing structure operates on a sliding scale based on bed numbers.

How does the assessment process work?

Once we receive the Statement of Compliance and service user feedback questionnaires from the unit due to be assessed, we go out and perform a site visit. Two assessors go, meeting with staff, patients and families, and generally getting a feel for the service on the ground. We're looking to see if the evidence submitted is represented in the day-to-day running of that service. The Lead Assessor is a professional with relevant experience; I myself worked in adult and children's ABI services for more than 30 years as a Speech and Language Therapist. We also have nurses and occupational therapists on the team.

The Lead Assessor is responsible for drafting the report that the service receives at the end of the assessment, although both assessors have equality in making the outcome decision. The second assessor wears a different hat to the Lead; the additional questions they are seeking answers to are 'Would I be happy for my relative to be here if they had an ABI?', 'Would staff be able to answer my questions about ABI?', and 'Would I have support here for me as a family member?' This role is fulfilled by people with direct experience of having a loved one experience an ABI, or by a Lead Assessor in training. This combination of professional and personal assessment is what seems to be most valued by services that have undergone assessment.

Are teams nervous about you coming?

We work really hard to remain professional and approachable throughout, but it's natural to feel some nerves. I think I would if it were the other way around! What I say to people is that the feedback I usually get is that people are more nervous before we arrive than once we're there. Things that add to the anxiety are lack of MDT engagement. If only one person is driving the whole process, then it's possible for other team members to become concerned due to lack of engagement or understanding about why Headway is there. It is possible to invite the AP scheme in to explore what is required before going for accreditation, and this can help with nerves.

How do services respond to feedback?

Teams are almost always positive about the feedback. We frame it in positive way wherever possible, and the criticism is always constructive. People are usually grateful because the feedback is directed at business development, even when services fail to achieve AP status at initial assessment. Currently, 35 units hold AP status, with some of these on their second or even third accreditation period having been reassessed on a bi-annual basis.

Do you offer support during the process?

We are available on the telephone but the services know themselves better than we do so we can't and don't get involved at the grass roots level of preparing the evidence. We also do not offer business set-up support for new services being created for people living with ABI.

Is the AP scheme growing?

Oh yes - we have 15 applications in process. A handful of these are new services and the rest are reapplications as their accreditation period has expired. There has been steadily-growing interest from smaller units and providers, including developing services. NHS ABI services have been slower to take advantage of the AP scheme. It's not clear why this is. There might be some anxiety about standing out as a service, as CQC assesses the entire hospital and may not visit the ABI service, or it may be the direct costs of the scheme. It may be that private services see it as an income-generating opportunity through promotion and are more used to undergoing assessments that are unit specific.

What are the next steps?

We've been operating for some time now. We need to find new ways to engage with those providers at all stages of the care pathway that haven't opted to be assessed. There is a lack of readily-accessible information out there about who is providing high-quality, brain injury-specific services, but we believe that only about 10% of non-NHS residential services that have a clear ABI focus have been accredited. There are also many more mixed caseload services which are hard to engage with. It may well be that they have concerns about compliance such as 'How can you maintain compliance if there is low ABI throughput?', or 'How can a service prioritise ABI accreditation when it might be a small percentage of the work?' Headway also recognises that for some service users they may not wish to be in a facility where everyone has sustained a similar injury - so on a personal level it may not always be best to be in an ABIonly service.

The challenges for families remain the same, but hopefully we are making the difficult decision-making process a little easier, resulting in more brain injury survivors receiving high-quality, appropriate care and support.

STEPPING INTO THE FUTURE ACPIN NATIONAL CONFERENCE & AGM 2015

20-21 MARCH 2015 NORTHAMPTON HILTON

Lecture abstracts

Friday 20 March Lecture 1

Movement science and movement therapy: two sides of the same coin?

Professor Robert van Deursen

Professor of Rehabilitation Science, School of Healthcare Sciences, Cardiff University

Movement science and movement therapy have developed quite separately since the end of the 19th century. However, lately the two fields (or viewpoints) seem to be joining up more and more. Clearly both need each other to develop a good evidence base for our knowledge and practice in neuro-rehabilitation.

The task-oriented approach seems to provide a theoretical framework for such integration. At the same time this process of merging is resulting in new opportunities for therapy. Movement analysis in real-time and body-worn sensors are two examples where rehabilitation can benefit from advances in movement science technology. Both quantity and quality of movement can be measured. This can be used for feedback provided we understand which aspects of movement are most appropriate for this purpose. Using such opportunities for the benefit of patients is the challenge. Is clinical practice ready to welcome these developments?

Prof Robert van Deursen was born in the Netherlands where he obtained a BSc in Physiotherapy (1981); between 1982-1992 he worked in various rehabilitation settings; he obtained an MSc (cum laude) in Movement Science (1994) at the Free University, Amsterdam; and a PhD in Biomechanics and Locomotion Studies (1997) at The Pennsylvania State University.

He joined the School of Healthcare Studies, Cardiff (1998); established the Research Centre for Clinical Kinaesiology (1999); became Director of Physiotherapy (2004); and is now Professor of Rehabilitation Science (2013).

His research interests include the

rehabilitation of joint instability in relation to the development of osteoarthritis; the prevention and rehabilitation of lower limb complications due to diabetic neuropathy; and mobility problems in neurological conditions. Defining functional recovery and determining the effect of exercise on patients in the presence of movement disorders is a common thread in this research. He has recently established a new Gait Real-time Analysis Interactive Lab (GRAIL); a system to provide real-time movement feedback to patients whilst they are exercising. He is currently involved in the Cardiff Arthritis Research UK Centre for Biomechanics and Bioengineering Centre and the Wales Centre for Primary and Emergency Care in Cardiff.



Friday 20 March Lecture 2 Robots and other technologies: physiotherapy of the future?

Professor Jane Burridge

Professor of Restorative Neuroscience, University of Southampton

This talk begins with a discussion about the aims of stroke rehabilitation in the context of recovery, compensation and substitution. It looks at the progress we have made over the last 25 years and the problem of lack of sound evidence for both conventional therapies and novel interventions.

The main focus of the talk is on the use of rehabilitation robotics and telerehabilitation. Evidence from two recent studies, one in which we have combined robot with Functional Electrical Stimulation (FES) to promote motor learning and the second in which we have developed and evaluated a web-based support programme to motivate patients using constraint-induced movement therapy (LifeCIT). The talk concludes with some thoughts about what the rehabilitation centre of the future might look like.

REFERENCES

Demain SH, Burridge JH, Ellis-Hill C, Hughes AM, Yardley L, Tedesco-Triccas L, Swain I (2013) Assistive technologies after stroke: self-management or fending for yourself? A focus group study **BMC Health Services Research** 13 (1) p334 (doi:10.1186/1472-6963-13-334). (PMID:23968362).

Hughes AM, Burridge JH, Demain SH, Ellis-Hill C, Meagher C, Tedesco-Triccas L, Turk R, Swain I (2014) *Translation of evidence-based Assistive Technologies into stroke rehabilitation: users'perceptions of the barriers and opportunities BMC Health Services Research* 14 (doi:10.1186/1472-6963-14-124).

Hughes AM, Meadmore KL, Freeman CT, Cai Z, Tong D, Rogers E, Burridge JH (2012) *SAIL: A 3D rehabilitation system to improve arm function following stroke Progress in Neurology and Psychiatry* 16 (4) pp17-19.

LifeCIT: Methodology and final report will be found via this link https://clinicaltrials.gov/ct2/show/NCT01350453

Lo A et al (2010) *Robot-assisted therapy for long-term upper-limb impairment after stroke* **New England Journal of Medicine** 362 pp1772-1783.

Meadmore KL, Exell T, Hallewell E, Hughes AM, Freeman CT, Kutlu M, Benson

V, Rogers E, Burridge JH (2014) The application of precisely controlled functional electrical stimulation to the shoulder, elbow and wrist for upper limb stroke rehabilitation: a feasibility study Journal of NeuroEngineering and Rehabilitation 11 p105.

Wolf SL, Winstein CJ, Miller JP, Taub E, Uswatte G, Morris D, Giuliani C, Light KE, Nichols-Larsen D, EXCITE Investigators (2006) Effect of constraint-induced movement therapy on upper extremity function three to nine months after stroke: the EXCITE randomized clinical trial JAMA 296 pp2095-2104.

Professor Jane Burridge is Professor of Restorative Neuroscience at the University of Southampton, where she leads the Rehabilitation and Health Technologies Research Group. Jane's research is about improving recovery of movement following damage to the brain, especially as a result of stroke and spinal cord injury. Fundamental to this is understanding the mechanisms associated with normal, loss and recovery of motor function. Jane's work crosses traditional rehabilitation boundaries, collaborating with engineers, neuroscientists and psychologists.

Jane graduated as a physiotherapist, but later changed career and trained as a musician, playing and teaching the flute. Her PhD at the University of Southampton enabled a response to Functional Electrical Stimulation for drop-foot to be better predicted by the accurate measurement of muscle dysfunction.

Jane's current research is with noninvasive brain stimulation, rehabilitation robotics, wearable and remote sensors to measure movement and other emerging technologies and the use of the internet to support home-based rehabilitation. She is also interested in understanding how rehabilitation technologies can translate into clinical practice.

Friday 20 March Lecture 3 Reducing the evidencepractice gap in stroke upper limb rehabilitation: PRACTISE

Dr Louise Connell

Senior Research Fellow, University of Central Lancashire

Around three-quarters of stroke survivors will regain the ability to walk, but regaining function of the affected upper limb is much more problematic.

The evidence suggests that for optimal motor recovery to occur, upper limb rehabilitation should include early, intensive, and repetitive task-specific practice for a prolonged period of time. However, there is a known evidence - practice gap with a need for a clinically feasible method to increase the amount of upper limb exercise prescribed in stroke rehabilitation units. There is recognition that the increased production of randomized controlled trials and journal publications is not sufficient to drive evidence-based practice, with the delay between the translation of evidence into practice being too long.

This session will discuss a programme of work to develop an intervention, building on an existing evidence-based intervention (GRASP) and how GRASP has been implemented in the real clinical setting. Implementation research in Canada demonstrated that an exercise manual alone is insufficient to change clinical practice. This has led to the development of a behaviour change intervention to help support therapists to increase upper limb exercise provision; PRACTISE (Promoting Recovery of the Arm: Clinical Tools for Intensive Stroke Exercise). The practical implications for physiotherapists will be considered.

REFERENCES

Connell L, McMahon N, Eng JJ, Watkins CL (2014) Prescribing upper limb exercises after stroke: a survey of current UK therapy practice **Journal of Rehabilitation Medicine** 46 (3) pp212-218. Connell L, McMahon N, Redfern J, Watkins CL, Eng JJ (2015) *Development* of a behaviour change intervention to increase upper limb exercise in stroke rehabilitation (Revision submitted Feb 2015: *Implementation Science*)

Connell L, McMahon N, Watkins CL, Eng JJ. (2014) *A formative evaluation of the implementation of an upper limb stroke rehabilitation intervention in clinical practice: A qualitative interview study Implementation Science* 12 9 p90.

Connell L, McMahon N, Watkins CL, Eng JJ (2014) Practice implementation in stroke rehabilitation: Adoption of the Graded Repetitive Arm Supplementary Program (GRASP) **Physical Therapy** 94 (5) pp632-634

Damschroder L, Aron D, Keith R, Kirsh S, Alexander J, Lowery J (2009) *Fostering implementation of health services research findings into practice: a consolidated framework for advancing implementation science* Implementation Science 4 (1) p50.

Harris JE, Eng JJ, Miller WC, Dawson AS (2009) *A self-administered Graded Repetitive Arm Supplementary Program* (*GRASP*) improves arm function during inpatient stroke rehabilitation: a multi-site *randomized controlled trial* **Stroke** 40 (6) pp2123-2128.

Kaur G, English C, Hillier S (2012) How physically active are people with stroke in physiotherapy sessions aimed at improving motor function? A systematic review **Stroke Research and Treatment** 2012 article ID 820673. Kwah LK, Harvey LA, Diong J, Herbert RD (2013) Models containing age and NIHSS predict recovery of ambulation and upper limb function six months after stroke: an observational study **Journal of Physiotherapy** 59 pp189-197.

Lang C, MacDonald J, Gnip C (2007) Counting repetitions: an observational study of outpatient therapy for people with hemiparesis post-stroke **Journal of Neurological Physical Therapy** 31 pp3-10.

May C, Finch T (2009) *Implementation, embedding, and integration: an outline of Normalization Process Theory* **Sociology** 43 (3) pp535-534.

Michie S, Atkins L, West R (2014) The Behaviour Change Wheel: a guide to designing interventions www.behaviourchangewheel.com

Nudo RJ, Wise BM, SiFuentes F, Milliken GW (1996) *Neural substrates for the effects of rehabilitative training on motor recovery after ischemic infarct Science* 272 pp1791-1794.

Dr Louise Connell is a clinician-scientist, being both an experienced researcher and physiotherapist in stroke rehabilitation. Research interests include implementation research, sensory impairment, outcome measure development and intensity of practice in rehabilitation. She is currently an NIHR Career Development Fellow working on the implementation of clinically feasible exercise interventions for the upper limb after stroke.



Friday 20 March Lecture 4 Vestibular stimulation in Acquired Brain Injury

Dr David Wilkinson

Reader in Psychology, University of Kent and Director of the NIHR Research Design Service South East

Locked deep inside the bony cavity of the inner ear lie the balance organs; small, finely crafted structures that sense movement and rotation of the head. From primitive sea creatures to humans, the balance system indicates which way is up and in which direction the body is moving. This information feeds basic, unconscious processes in the brain concerned with posture and movement.

Perhaps surprisingly, the balance organs also contribute to a range of higher, cognitive functions involving perception, awareness and memory. Support for this assertion comes from the range of neuropsychological symptoms shown by those who present with injury or disease to the inner ear. Given the loss of cognitive function in patients with underactive balance systems, one possibility is that cognitive function may be enhanced if the balance system is over-activated by extraordinary means.

This can be achieved either by caloric or galvanic vestibular stimulation; simple, painless procedures in which thermal or electrical currents are non-invasively discharged close to the peripheral vestibular organs. These procedures fool the brain into thinking that genuine messages are being received from the balance organs, increasing blood flow to many brain areas. Compellingly, we have shown that vestibular stimulation can relieve a number of neurological conditions that follow from acquired brain injury.

REFERENCES

Wilkinson DT, Ko P, Kilduff P, McGlinchey G, Milberg WP (2005) *Improvement of prosopagnosia via sub-sensory galvanic vestibular stimulation Journal of the International Neuropsychological Society* 11 pp925-929.

Wilkinson DT, Morris R, Milberg W, Sakel M (2013) *Caloric vestibular stimulation in aphasic syndrome Frontiers in Integrative Neuroscience* 7 (99) pp1-9.

Wilkinson DT, Nicholls S, Pattenden C, Milberg WP (2008) *Galvanic Vestibular stimulation speeds visual memory recall* **Experimental Brain Research** 189 pp243-248.

Wilkinson DT, Zubko O, Coulton S, Higgins T, Pullicino P, Sakel M (2014) *Galvanic vestibular stimulation in hemi-spatial neglect Frontiers in Integrative Neuroscience* 29 (8) p4.

Wilkinson DT, Zubko O, DeGutis J, Milberg P, Potter J (2010) *Improvement of a figure copying deficit during sub-sensory galvanic vestibular stimulation* **Journal of** *Neuropsychology* 4 pp107-118.

Dr David Wilkinson graduated with postgraduate degrees in experimental psychology and neurological science from the University of Kent and University College London respectively, before completing post-doctoral fellowships at the University of Oxford and Harvard Medical School.

Since moving back to Kent in 2005, he has continued to investigate the psychological and biological bases of human cognition with a view to developing more effective therapies for individuals with brain injury and other neurological conditions.

His research group focuses on the therapeutic potential of caloric and galvanic vestibular stimulation, relying on a combination of behavioural and physiological measures including EEG, ERP, and heart rate variability to assess efficacy and safety.

He is currently a Reader in Psychology at the University of Kent and Director of the NIHR Research Design Service South East.

Friday 20 March Lecture 5

The electric brain: combining physical therapy with non-invasive brain stimulation to improve gait and balance

Dr Diego Kaski

Clinical Research Fellow, Neuro-otology, Imperial College London and Honorary Specialist Registrar, Charing Cross Hospital and the National Hospital for Neurology and Neurosurgery

Neurological gait disorders are a common cause of falls, morbidity, and mortality, particularly amongst the elderly. Neurological gait and balance impairment has, however, proved notoriously difficult to treat.

In this talk I will discuss some of the first experiments to modulate gait and balance in healthy adults using anodal transcranial direct current stimulation (tDCS) by stimulating both cerebral hemispheres simultaneously. I will review and discuss published data using this novel tDCS approach, in combination with physical therapy, to treat locomotor and balance disorders in patients with small vessel disease (leukoaraiosis) and Parkinson's disease. Finally, I will be reviewing the use of bihemispheric anodal tDCS to treat gait impairment in patients with stroke in the subacute phase.

The findings of these studies suggest that non-invasive electrical stimulation techniques may be a useful adjunct to physical therapy in patients with neurological gait disorders, but further multicentre randomized sham-controlled studies are needed to evaluate whether experimental tDCS use can translate into mainstream clinical practice for the treatment of neurological gait disorders.

REFERENCES

Kaski D, Allum JH, Bronstein AM, Dominguez RO (2014) *Applying anodal tDCS during tango dancing in a patient with Parkinson's disease* **Neuroscience Letters** 7; 568 pp39-43 (doi: 10.1016/j. neulet.2014.03.043. Epub 2014 Mar 28. PubMed PMID: 24686184.)

Kaski D, Dominguez RO, Allum JH, Bronstein AM (2013) Improving gait and balance inpatients with leukoaraiosis using transcranial direct current stimulation and physical training: an exploratory study Neurorehabilitation and Neural Repair 27 (9) pp864-871 (doi: 10.1177/1545968313496328. Epub 2013 Jul 29. PubMed PMID: 23897903.) Kaski D, Dominguez RO, Allum JH, Islam AF, Bronstein AM (2014) *Combining physical training with transcranial direct current stimulation to improve gait in Parkinson's disease: a pilot randomized controlled study Clinical Rehabilitation* 28 (11) pp1115-1124 (doi: 10.1177/0269215514534277. Epub 2014 May 21. PubMed PMID: 24849794.)

Patel M, Kaski D, Bronstein AM (2014) Attention modulates adaptive motor learning in the 'broken escalator' paradigm **Experimental Brain Research**. 232 (7) pp2349-2357 (doi: 10.1007/s00221-014-3931-z. Epub 2014 Apr 9. PubMed PMID: 24715102.)

Tahtis V, Kaski D, Seemungal BM (2014) The effect of single session bi-cephalic transcranial direct current stimulation on gait performance in sub-acute stroke: A pilot study **Restorative Neurology and Neuroscience** 32 (4) pp527-532 (doi: 10.3233/RNN-140393. PubMed PMID: 24906374.)

Dr Diego Kaski is a neurology registrar at the National Hospital for Neurology and Neurosurgery in London, and an honorary clinical research fellow at Imperial College London.

He has a special interest in Neurootology having completed a PhD at Imperial College London investigating the cortical mechanisms underlying human spatial navigation, under the superivision of Professor Bronstein.

He has also undertaken extensive research into the cortical mechanisms of human gait and balance, and the application of non-invasive brain stimulation techniques in the treatment of neurological gait disorders.

Saturday 21 March Lecture 1

Neurophysiology of robot-mediated training and therapy: a perspective for future use in clinical populations

Professor Duncan Turner

Professor of Restorative Neuroscience and Rehabilitation, School of Health, Sport and Bioscience, University of East London

The recovery of functional movements following injury to the central nervous system (CNS) is multifaceted and is accompanied by processes occurring in the injured and non-injured hemispheres of the brain or above or below a spinal cord lesion.

The changes in the CNS are the consequence of functional and structural processes collectively termed neuroplasticity and these may occur spontaneously and/or be induced by movement practice. The neurophysiological mechanisms underlying such brain plasticity may take different forms in different types of injury, for example stroke versus spinal cord injury (SCI). Recovery of movement can be enhanced by intensive, repetitive, variable, and rewarding motor practice.

To this end, robots that enable or facilitate repetitive movements have been developed to assist recovery and rehabilitation. Here, we suggest that some elements of robot-mediated training such as assistance and perturbation may have the potential to enhance neuroplasticity. Together the elemental components for developing integrated robot-mediated training protocols may form part of a neurorehabilitation framework alongside those methods already employed by therapists. Robots could thus open up a wider choice of options for delivering movement rehabilitation grounded on the principles underpinning neuroplasticity in the human CNS.

REFERENCES

Turner DL, Kmetova M, Winterbotham W (2012) Robot-assisted motor rehabilitation for complex upper limb impairments following childhood stroke **Journal of** *Neurological Research* 2 pp65-68.

Turner DL, Ramos A, Birbaumer N, Hoffmann U, Luft A (2013) Neurophysiology of robot-mediated learning and rehabilitation during recovery from brain and spinal cord injury: a perspective Frontiers in Neurology 4 p184.

Turner DL, Tang X, Kmetova M, Winterbotham W (2012) *Recovery of submaximal upper limb force production is correlated with better arm position control and motor impairment early after a stroke Clinical Neurophysiology* 123 pp183-192.

Professor Duncan Turner is currently director of the neurorehabilitation unit based at the University of East London.

The NRU acts as a hub for advanced neuro-technology development and implementation predominantly for stroke rehabilitation. Ongoing trials include phase III RCTs for robot-assisted training after stroke and several smaller feasibility trials for brain-computer interfaces and ambulatory neuroimaging.

Duncan has a wealth of postdoctoral training in both exercise physiology and neuroscience gained from leading universities in the UK, EU and USA.

Most recently he has been vice-chair of an EU commission-funded pan-European network for rehabilitation robotics working with clinicians, engineers and neuroscientists.

Saturday 21 March Lecture 2 Optimising resource management in neurorehabilitation

Dr Richard Wood

Team manager, Capital Models, Principality group

To date, little research has been published regarding the effective and efficient management of resources (beds and staff) in neurorehabilitation, despite being an expensive service in limited supply.

The objective of this study was to demonstrate how mathematical modelling can be used to optimise service delivery, by way of a case study at a major 21-bed neurorehabilitation unit in the UK. An automated computer program for assigning weekly treatment sessions has been developed. Queue modelling is used to construct a mathematical model of the hospital in terms of referral submissions to a waiting list, admission and treatment, and ultimately discharge. This is used to analyse the impact of hypothetical strategic decisions on a variety of performance measures and costs. The project culminates in a hybridised model of these two approaches, since a relationship is found between the number of therapy hours received each week (scheduling output) and length of stay (queuing model input).

The introduction of the treatment scheduling programme has substantially improved timetable quality (meaning a better and fairer service to patients) and has reduced employee time expended in its creation by approximately six hours each week (freeing up time for clinical work). The queuing model has been used to assess the effect of potential strategies, such as increasing the number of beds or employing more therapists. The use of mathematical modelling has not only optimised resources in the short term, but has allowed the optimality of longer-term strategic decisions to be assessed.

REFERENCES

Griffiths JD, Williams JE, Wood RM (2012) Modelling activities at a neurological rehabilitation unit European Journal of Operational Research. Retrieved from http://www.sciencedirect.com/science/ article/pii/S0377221712008028

Griffiths JD, Williams JE, Wood RM (2012) Scheduling physiotherapy treatment in an inpatient setting **Operations Research for Health Care**. Retrieved from http://www. sciencedirect.com/science/article/pii/ S2211692312000379

Wood RM, Griffiths JD, Williams JE, Brouwers J (2014) *Optimising resource management in neurorehabilitation*. *Neurorehabilitation*. Retrieved from http://iospress.metapress.com/content /2140204446172878/?genre=article&i ssn=1053-8135&volume=35&issue=2& spage=171

Dr Richard Wood has had an interest in applied mathematical modelling for many years. Since graduating with a PhD in Operational Research from the School of Mathematics, Cardiff University in 2011 he has worked as a mathematical modeller within the Bioterrorism Analysis Group for the Health Protection Agency at Porton Down, a capital modeller at Lloyds Banking Group in the City of London, and has recently moved back to Cardiff to head up the Credit Risk Analytics Team at Principality Building Society.

However, his interests in applied modelling began when he was a PhD student, given the task of optimising resource management at a major neurological rehabilitation unit. Such research in this area had never been attempted before on this scale and successful implementation of the mathematical decision support tools has led to numerous publications and conference presentations, as well as receiving the award for best PhD of 2011 from the Operational Research Society.

saturday 21 March Lecture 3 Commissioning FES services: a clinician's perspective

Alison Clarke

Clinical specialist physiotherapist, Gait and Movement Analysis Lab, Mobility and Specialised Rehabilitation Centre (M&SRC), Northern General Hospital, Sheffield

The commissioning of services can be problematic in the current climate of the NHS and Functional Electrical Stimulation (FES) provision for patients around the different regions can be very variable.

In Sheffield there is a large and successful regional FES service; however, navigating the commissioning process has been challenging. This presentation will outline the Sheffield experience including:

- the considerations necessary by clinicians undertaking commissioning
- the provision of FES services in this current climate with regards to business case development
- the commissioning process
- engagement of the relevant teams and tips for successful applications.

Alison Clarke is a clinical specialist physiotherapist in movement analysis and research and Manager of the Gait and Movement Analysis Lab, based at the Mobility and Specialised Rehabilitation Centre (M&SRC), Northern General Hospital, Sheffield. She has extensive experience as a clinical physiotherapist with a particular interest in neurological rehabilitation and movement analysis.

Her current post combines:

- Provision of a regional functional electrical stimulation (FES) clinic for gait problems and upper limb rehabilitation
- Working in a multidisciplinary Complex Spasticity Management Clinic
- Neuro-outpatient services
- Providing a clinical gait analysis service from the laboratory in the M&SRC
- Involvement in clinical research studies, both as a principal investigator and collaborator



A challenging journey: defiance in the face of adversity

Giles Hudson

Project Worker, Real Life Options, Hartlepool

My life became a continuous rehabilitation experience following my life-threatening head injury 28¹/₂ years ago. Visibly there is no evidence of the injury I have sustained and the daily challenges I face. Almost every day is a big challenge and, when it isn't, I worry for my future.

The majority of the symptoms related to my brain injuries were/are invisible – many of my skills and abilities that come under the umbrella of 'executive function' are damaged and compromised. These include problem-solving, self-awareness, decision-making and concentration.

It is through my personal rehabilitation, which consisted of the dedicated support, patience and encouragement of my parents, and my inner determination, that I have developed coping strategies to progress and overcome the daily challenges life now presents.

I have made a level of recovery beyond the expectation of medical professionals. I want my achievements to serve as an inspiration for others affected by the trauma of brain damage. I believe everyone should have the opportunity to be everything they are able to be.

But life is never straightforward: recently life through me a 'curve ball'. My lovely wife of seven years has very recently suffered a bleed on the brain resulting in a right side stroke and was twice rushed to hospital.

Giles Hudson suffered from a traumatic brain injury in 1985, at which time Headway provided him with much needed support and help. Now he is working with Headway to provide the support and services greatly needed by people with brain injury as well as their support network of family and carers.

Giles also works as an inspirational speaker delivering presentations using his personal life experience. These focus on developing an ability to overcome challenges, recognising and appreciating personal abilities and learning how to best use them.

SUPPORT STORY

"Coma – endless tears – unbridled joy? My son, my son, I'm losing you."

Those were the words I could not get out of my head that December night in 1985. I was trying to read a book while waiting for my eldest son Giles to come home after being out with his pals. I was weeping. After justifying my thoughts I relaxed a little. I was losing him; he was hoping to go to university, and if he got the sponsorship he was after, we would see very little of him. Less than ten minutes later there was a knock on the door. It was 11:45pm; it was another of Giles's pals and his father saying Giles had had an accident less than a mile from home and that the services had passed them on the road. The last statement did not register in my mind. He'd had a bump and being nervous to tell his Dad he'd sent his friend to break the news.

I thank God to this day for the ambulance man that night, for it was on his decision my son's life hung. He decided Giles be removed from the wreckage first (there was a passenger, badly injured but conscious) and taken without delay to a hospital he knew with neuro facilities, although the accident occurred in the catchment area of another hospital. There, we were taken into the staff room and given coffee while we waited for the scan results and the doctor. The news was grave – COMA – serious head injuries, with only a 25 and then 50% chance of surviving the night! He was 19 years old. He had severe bruising of the brain, a fractured skull, his pelvis was broken back and front, he was paralysed in the legs and had a suspected broken arm and leg. We could not accept what they were saying; he looked perfect. I kept saying to myself, 'he's only sleeping'. All there was to see was a tiny plaster above his right eye. They were wrong! They had to be these things happen to other people!

He was in intensive care and we were allowed to stay with him as the staff went about the task of keeping him alive. For three days things were very critical and then there was a tiny sign of improvement. I was ecstatic, but we could not relax yet as we had been warned that, even if we were to keep him for two weeks, it would be no guarantee of survival. His Dad and I had become ships that passed in the night. I would go home to see our other boy who was four years younger than Giles and Dufus, our eight-year-old bearded collie, and then return to the hospital to take over while Ron rested.

His intensive care nurse explained everything to us and this allowed us to relax a little, as we were allowed to help with the cleaning and the bathing routine. No longer were we asked to leave when the physio came to clean his lungs. We used to talk to him to let him know we were with him, and not to worry and all would be well. I found it difficult at first to talk to this person with his eyes closed, and so I tried to put myself in his position, how I would feel if I couldn't communicate or open my eves. To add a little normality to my conversation with him, when no one was looking, I placed my hand on his forehead and opened his eyes ... it was absolutely fantastic just to see my son again. Did it help him? I don't know but it eased my pain! And so it was that every time anyone came to talk to him I opened his eves.

Music played a big part. We had been told that hearing was the last sense to go and so we played him his favourite tapes. When he became distressed and the monitors showed this, we played him the calming music of Chris Rea and then as he went too low, we were asked to change the music, which we did, to 'Shout, shout let it all out' (Tears for Fears).

After ITU he was transferred to the High Dependency Unit, and here we were with him from 9.30am until 9:30pm, talking and begging him to fight. I made a tape of all the normal home sounds, beginning with his alarm going off, to the normal bedroom sounds, loo etc, to the kettle being filled then whistling, which caused the dog to howl, and finally begging him to wake up and ask for some tea - his favourite drink. His reaction to it was marvellous; as the alarm sounded he raised his hand over his head as though to switch it off. We were so overjoyed; he was coming back to us. He was making progress and when I opened his eyes he turned in the direction of the voices. On Christmas Day we got cuddles and he tweaked his brother's nose; it was fantastic! Days later things went wrong and

we almost lost him. A scan revealed fluid and a blood clot - an operation was performed, but we no longer had a son, just a kinked misshaped body. I freaked out. I could not touch him - with this I could not cope. But he was still in there fighting as he showed when a visitor with a very distinctive voice called, 'Hello, Giles love' and he raised his hand in recognition. We vowed at that moment we would fight to the end to get him back. We were told we must accept that the extent of his injuries meant he would never be the same again. We demanded a second opinion - that was once our son. Following a second operation two days later, he was no longer spastic and kinked, but now like a stroke victim. The left side of his face, his arm and leg – no life – but he could now move his right leg for the first time. Along with more pain had come some joy.

He was in the HD Unit for 5½ weeks, where they did a marvellous job of clearing his lungs as he had at least two lung infections, but during this time his body would have deteriorated under the blankets, if he had not been on pelvic traction. A casual call of 'watch his feet they're dropping' from a nursing officer as she passed his room prompted us to ask a relative who is a nurse and whoses mum had been a sister for years, what it meant. She exclaimed, 'Don't let his feet drop or he will never walk properly again.' It was then we decided while the hospital kept him alive we would become the keepers of our son's body until his brain was capable of taking over. No way was he going to have to face the world with an unnecessarily deformed body if we could prevent it - no extra pain! He would have been through enough by the time he fought his way back to us.

A physio showed us how to work on his feet and so while his Dad worked on his legs and feet, I worked the rest. We began by cuddling him tight, for when he felt safe, his body relaxed and we were able to encourage him to straighten his arms and open his hands. We, friends as well, worked every part of his body beginning with his bed-bath in the morning until 9:30 at night. There was a job to be done. We gave him hell, biting his toes, nipping, tickling, blowing raspberries, kissing and biting everywhere, and using ice water and water pistols. Sometimes you have to be cruel to be kind, but to us every movement he made meant his brain was beginning to function! His eyes began to open slightly after 31/2 weeks.

It was now six weeks since this nightmare had begun. During those weeks, whenever any negatives were said about

him, I immediately held his face and whispered to him, 'don't listen Sunshine, we'll show them.' I would also compare him with that of a baby reborn; he had to learn all over again the skills he had lost or forgotten. And so I did with him all the things I did with him as a baby, to encourage his first words and first movements. I felt if we did everything the way we did it before we would get the same boy back. We held down the strong side and tortured him to make him, to force him to use that left side and he used it! It was cruel but kind as the weak side grew stronger. It was very hard, but we weren't going to let go. The life had been saved - he was to be transferred from the critical to the rehab ward.

Entering the rehab ward was like stepping back into the Victorian times where he was floor nursed for safety, but it was here he made his first animal-like sounds and ate his first food. Speech came slow and clear at first and then turned to babble. I wished we hadn't rewarded all his efforts with chocolates, sweets and coloured drinks; the effects they can have on a healthy brain are terrible, as we found to our cost. He was put back to sleep for a week to slow him down. We also now feel if we had kept his visitors at this reawakening stage to a one-to-one basis, and if the questioners had waited for the answers, his mind would not have been so confused, as the babble was like many answers jumbled together.

Coma has many stages; in the 'coming through' we saw all the extremes of the character - love, hate, calm, anger etc, like Jekyll and Hyde. We weren't afraid. Luckily for us we recognised some of the symptoms, as our other boy was hyper allergic to E-numbers etc. and we could take action, but we should have realised that Giles, having lost so much weight (he was just a skeleton covered with skin), had probably also lost his immunity. Once his diet was changed so did his behaviour. The staff were now encouraging our presence and allowed us to help, although they never thought we would reap the rewards we are now enjoying.

It has been a frightening journey, like the time Giles was under heavy sedation – he forced his way to the surface when I whispered I was with him, and he said before falling unconscious, 'Mum I am dying and they are going to tell you when I'm dead. Please take me home.' Not knowing where he was, or actually 'with us' – suddenly there was a momentary island of normality – more joy with pain – he knew the medication was affecting him. There was quite a panic around his bed that day. Giles 'came through' shouting and, as I said, in the early weeks we played music and one of the tracks we kept playing to him was 'Shout, shout it all out'. Feeling that he may be frustrated thinking he was talking, I pretended to be deaf and begged him to shout – later we had to ask him to stop shouting as it was hurting our ears. He said, 'it's hurting mine too!'

He had terrible speech problems, everything was 99's (from his cash card) or teas (from the tape begging him to ask for a cup of tea), he was very dysphasic, gave very long explanations, had no coordination, terrible balance and no recognition of objects, places or people. He needed and wanted me but could not recognise me. He was at the time seeing through his 'mind's eye', for one day he suddenly said 'where have they been hiding', referring to the everyday things around him. It was the middle of March when his neurosurgeon said he was totally out of coma, and praised us for the work we had done. It was at that time that Giles raised his hand and said, 'Hi Mum,' without me having to tell him who I was. I had waited so long for that moment - I broke - I cried with joy.

He would flip from adult to child doing all the things a child does in the process of learning about life and behaviour the mimicking and the clinging to Mum and panicking when I was missing. His memory retention and concentration span was minutes, but we worked at reading books, writing, playing dominoes to introduce numbers, doing Blockbusters and showing him flash cards - anything to stimulate his mind. During this time the universities were replying - he had been offered four unconditional offers, including Durham, to take an honours degree in Applied Physics and Electronics. He was now in a routine of work and was able to see better when I covered one of his eyes; the left eye following the operation on his brain now had a terrible squint, but if I covered the right eye the left straightened. This was another discovery, and so I began working on his eye and the left side of his face, doing facial exercises.

He was well enough to leave hospital for good the weekend before his birthday, April 1st 1986 (yes he was my little April fool), and returned to his part-time studies at the local Polytechnic in the September to do a rerun of the subjects on his HNC course. Although still not back to his correct level, that stimulation was another part of his ongoing rehabilitation.

The exercises we had done had helped strengthen the eye muscles, but after asking to see an eye specialist, corrective surgery was now the only way. So on December 28th 1986 he saw in the mirror the face he knew. The next day he got the news he'd been waiting for – his licence – he could drive again. It took us six months before we, his parents, had the courage to allow him to go solo!

He has relived and remade many decisions all over again and it has been like turning the pages of a book of his life; never did we try to change history for him. Sometimes it was hard not to, but we wanted 'our son' back as he was before, and making mistakes are part of the lessons that form one's character. Another ex-coma patient advised us never to lie to him, even with good intentions, and so if we couldn't help or answer his questions we found someone who could, as he was storing away and refilling his mind with lost knowledge. He worked like fury trying to catch up and fill the gaps. A stranger who used to teach maths heard of Giles's fight and came to offer help. Giles had kept all his old school books and so she was able to use the same methods to cement yet more pieces of the puzzle.

He has learned to hide or deal with most of his problems, but when he is tired we can detect his dysarthria. He is very much aware of the fight he has, to gain his 'place' in the eves of friends and 'the powers that be' because of all the horrors that head injury implies. We took him to see Professor Neil Brooks up at Glasgow University Hospital in March 1987; we needed to know Giles wasn't aiming for the totally unreachable. After tests the professor felt that, although Giles was going to find it difficult at university, with his determination to succeed, he had everything to gain. He was amazed at Giles's degree of recovery and estimated his post-traumatic amnesia to be close to six months.

October 1987, he entered Durham University (the closest to home). March 1989, he decided he needed a rest from the constant, intense world of studies and after three years of hard work he could go no further. Maybe I was to blame as I was always encouraging him to aim for 150% and then be happy if he achieved half, for only then would people accept, and questioning looks would stop. He left university and went to America for a month to visit a friend.

The years since this have been filled with courses at the local polytechnic, now a university, and short-term work placements when they could be found. The employment climate at the moment is not congenial to those with problems – employers want and need 100% from everyone to survive. Giles always gives his all, sometimes to the cost of his health, but Giles's 'all' has to be subsidised – by interwork, or some other charity or government body, to relieve the stress to succeed.

He would very much like to try again to take his degree at a gentler pace whilst trying to catch up on his lost years to prove he is worth something and gain a position 'to feel worthwhile.' Then maybe 'his journey' will be over and we will again be able to rest and really see him laugh again.

We look back at 1986 as the year we fought for our son and won, against the doctor's prognosis, and say that with God and love anything is possible. We feel that early stimulation is the key to a 'better quality of life' for the head injured, and that no one knows the patient better than their parents. They brought them into the world, they taught them and they helped form their character – let them help. Their dedication is greater, because the bond is blood, the strength is hope and the tie is love.

We fought and won, but even if we hadn't had such rewards, we know that when Giles was lost in that nightmare, he knew we were fighting with him. And so to all others who find themselves in this terrible situation, we beg them to fight; it is hard but don't give up.

The roads may have been altered but the goals can be the same. With God and love all things are possible. The tears of joy are so much sweeter than the tears of pain.

Gwen Hudson (Mum)

Published Christmas 1989 in Headway News

Additional note

Contrary to the medical profession, he has memories - flashbacks of the accident and of an unknown vehicle on his side of the road, which was a series of 's' bends, and his fight to avoid it. These memories were triggered accidentally months after the accident, when he found a tape in my car and during a journey of rehab, he asked, 'what is this one like Mum?' It was the very tape returned from his car and had been playing at the very moment the accident occurred - Go West's 'Go West'. As it played and reached the last lines of the track, 'Good Bye Girl', he screamed, 'My car, my car!' and shook all over. Until that moment he didn't believe he had a car; he thought it must have been a bike accident.

Listening to that whole tape makes me thank God we have him and I've always told Giles I believe he was in the wrong place, at the wrong time and God has given him back to us as best he possibly could.

Gwen Hudson

Saturday 21 March Lecture 5 The splinting guidelines: evidence, process, outcomes and translation into practice

Dr Cherry Kilbride

Senior Lecturer and Department Director (Research) – Physiotherapy, Brunel University, London

Jo Tuckey

Private practitioner, North London Neuro Physio, London

Contractures can limit active function and decrease the ease of care or self-care (passive function). This study was undertaken to develop evidence based national guidelines to support PTs and OTs when splinting adults with neurological dysfunction for the prevention and correction of contractures. In these guidelines, the term splinting describes the process of applying a prolonged stretch through a range of devices such as a splint or cast. Splints and casts can be used as part of an overall goal-directed rehabilitation and management programme.

The guideline development utilised a NICE accredited process and had four key stages including: a cross-sectional online survey to explore contemporary splinting practice; a systematic review of effectiveness of splinting literature; a three-round Delphi Method survey to identify factors influencing decision to undertake splinting and semi-structured interviews to explore the patient experience of splinting.

Results from each of the four phases that were used to inform the development of the guidelines will be briefly presented. An overview of the 19 practice recommendations (divided into lower limb and upper limb categories) will be presented. This is the first guideline to be jointly developed by the respective professions. It has been peer reviewed by stakeholders, professional groups and bodies. It is also hoped that in addition to clinicians, the guideline will also be of use to others such as managers and researchers who may benefit from a greater understanding of the challenges and potential complications where splinting is used. Given the multifaceted nature of splinting as a complex intervention, many factors and questions remain about practice and further research is required.

The practice guideline is free to access online at www.acpin.net or www.cot. org.uk/publications, and hard copies are available to buy from the College of Occupational Therapists. The guideline is accompanied by a number of downloadable implementation tools.

Funding acknowledgement: ACPIN & COTSS-NP Ethical approval reference: 10/05/NEU/06, 13/10/STF/03.

Dr Cherry Kilbride is a senior lecturer and active researcher in physiotherapy at Brunel University, London. Cherry also works one day a week at the Royal Free London NHS Trust as the lead AHP for research and practice development.

Cherry is also a past Chair of ACPIN, a post she shared as the right shoulder pad with Jo Tuckey!

Jo Tuckey has been working in private practice since 2006 and set up her own practice, North London Neuro Physio, in 2012. Her work is mainly clinical although she continues to teach on a variety of postgraduate courses as well as providing clinical supervision to several NHS services.

Jo was on the ACPIN executive committee for ten years and Chair from 2008-2010 - a post she shared with Cherry Kilbride.



AGM 2015

Minutes

The meeting opened at 12.30 pm

1. Tribute and reflection time in honour of Professor Janet Carr who died on November 4th 2014

2. Welcome and introduction to the executive committee

Committee members present: Gita Ramdharry, Jakko Brouwers, Adine Adonis, Jane Petty, Ralph Hammond, Chris Manning, Nikki Guck, Joe Buttell, Lorraine Azam, Fran Brander

3.Apologies

- Jenny Barber, who has stood down as Honorary PRO and ACPIN executive committee member
- Merseyside regional representative

4. Minutes of 2014

Minutes published in the Spring/Summer 2014 edition of *Syn'apse*. Unanimously accepted as an accurate account.

5. President's address

Fiona Jones

6. Chair's address

- Jakko Brouwers
- Achievements
 - Splinting Guidelines; thank you to Cherry Kilbride and Jo Tuckey for their commitment and determination
 - SCI acute management in the humanitarian setting; thank you to Emma Cook and Sue Paddison for all their hard work
 - ARC motion accepted; full details on CSP website; thank you to Hayley Grice from the West Midlands
- Ongoing work
 - Syn'apse; Joe Buttell is the editor.
 ACPIN plan to establish an editorial committee and group. Changes will be presented to the National and Executive Committee for agreement
 - Research; Jane Petty and Gita Ramdharry to lead. Research Bursary uptake by the ACPIN community has reduced. The group plan to explore tjhe different types of bursaries and awards available.
 - Bursaries; Chris Manning to lead. There will be less focus on research and more availability of awards for ongoing CPD for ACPIN members

- Website; Jakko Brouwers to lead (initially). This needs updating. The ACPIN community, including regional representatives, are invited to be involved
- ACPIN Awards; Ralph Hammond to lead. All members have received information re ACPIN awards. It was first discussed November 2013. Formal 'thanks' are given to people within and out of ACPIN who have contributed to ACPIN and/or the neurophysiotherapy profession. A change to the constitution was carried unanimously

• ACPIN national conference

- 2015 conference is the first to have a live streaming programme to our colleagues in Northern Ireland. Welcome Belfast!
- All conferences will be two-day events from now on
- Next year ACPIN are joining forces with INPA to provide a three-day international conference in March 2016
- ACPIN to involve members with the development of the programme and its delivery

Membership

- Steady numbers
- Many benefits, including the cost of membership and events
- Regions Merseyside having difficulty recruiting committee members and have temporarily joined the Manchester region
- Plans to support the ACPIN executive committee in terms of admin (development of ACPIN office) and management in order to reduce the burden, as all roles are voluntary, in the committee's own time
- Dedicated time for ACPIN key roles

• INPA committee

President: Ralph Hammond *ACPIN representative*: Cherry Kilbride All encouraged to get involved.

7. Treasurer's report

Chris Manning Vote to retain the current Accountants (Langers, Cheshire): *Proposer*: Jakko Brouwers *Seconder*: Joe Buttell Carried unanimously. Full copies of the ACPIN accounts are available on request via treasurer@ acpin.net

8.AOB

None

President's address

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

It was almost like it had been planned. My President's address came after the excellent talks given by Dr Louise Connell, and Professor Robert Van Deursen. They had both highlighted the complexities involved with carrying out rehabilitation research through their own programmes of research in upper limb rehabilitation and the use of technology in rehabilitation.

Lucky for me they had both done an excellent job of highlighting the increasing focus and need for implementation research – in other words:

- 1 How to make change happen
- 2 How to make change happen in different settings and contexts
- **3** How to use existing evidence
- **4** How to best understand the barriers to evidence implementation.

These four areas form some of the key aspects which contribute to understanding more about how to 'implement research' into practice and happened to be the topic of my very short talk!

We all know that rehabilitation is complex, and that there are many trials

which show 'no effect' but the interesting questions often come during or after the trial as we try to understand the world according to 'Known knowns; known unknowns; unknown unknowns and the unknowable!' (By the way it wasn't Donald Rumsfeld that came up with that phrase but a brilliant academic called David Snowden.) But what it helps us think about is that an intervention tested in a pilot trial may be done in quite an ordered way, but often when we try and scale up, even under trial conditions, things can get chaotic. This means we need to find ways of studying how people behave, how they make sense of new ideas and how they integrate a

change into their practice, and maybe most importantly sustain this change. So if we ask whether an intervention works or not we should actually be asking three questions:

- **1** Does it work only at my place?
- 2 It what is it?
- 3 Work for who?

These questions can be answered through implementation research, but not only with one method/methodology. The headline I wanted to put across to the audience was that we should have no data without stories and no stories without data; in other words having both sources of evidence can help us navigate through some of our unknowns and understand our own context in which we are trying to implement evidence. Well that was more or less my address, and it was exciting that the implementation theme continued throughout the conference, with excellent talks on both days.

Well done to all the organising committee, in particular Adine Adonis – ACPIN is ahead of the curve (horrible management speak, I know) again!

Chair's address

Jakko Brouwers

ACPIN Honorary Chair, Expert physiotherapist, Morrello Health Ltd

It has been a busy year for ACPIN at a national level and in the regions. Before going into some of the activities and achievements, I would like to stand still at the passing of a celebrated author and leading thinker in neurophysiotherapy.

Professor Janet Carr (1933–2014), who passed away in November 2014, has been a true inspiration to many physiotherapists around the world in her thoughts, words and deeds. She is probably best known for the book *Motor Relearning For Stroke* which she co-wrote with Roberta Shepherd and was first published in 1982. She has published another twelve more books in her career. She has been a leading light in driving the profession to an evidence base for practice. She will be truly missed by the physiotherapy community.

We need to say a big thank you to Dr Cherry Kilbride and Jo Tuckey for their commitment and drive to complete the new **splinting guidance**. This work has been undertaken to the highest standard and has many aspects of support for clinical practice.



ACPIN have of course been continuing their commitment to engage with the NICE guideline development and review process.

Another big piece of work undertaken during the last year has been the development of a Training Programme on Spinal Cord Injury Management for use in humanitarian settings. This work has been undertaken by Sue Paddison and Emma Cook from the RNOH and has been a huge undertaking. Handicap International and UK Aid had commissioned the development and have been guiding the work by reviewing the content as fit for purpose for the humanitarian field. Training has been delivered of the one-day theory refreshment training and the two-day practical programme. With the fully scripted training content now fully tested and approved, the work is now focusing on developing a database of people who are able to deliver this training. With a process of see one - deliver one, we hope to guickly build this database with people who are familiar with the content and happy to answer acute SCI management questions.

Work around the same training on ABI management in humanitarian settings will get underway in May. For that piece of work we will also look to set up a database of people who are willing to deliver the content of the programme to physiotherapists who are going on humanitarian missions.

This Year's CSP ARC was the first time in many years that ACPIN submitted, presented, defended and succeeded with an ARC Motion. This is in a large extent due to the energy and work put in by Hayley Grice from West Midland ACPIN to develop and deliver the motion. Details on the motion can be found on the CSP website under ARC 2015. This year's success means that CSP Council will have to table and debate the CSP's position on Neuro Physiotherapy staffing levels in stroke services.

Ongoing work within the ACPIN organisational structure includes the following areas:

- Syn'apse
- Research
- Bursaries
- Website
- Awards

This is work which the committee have been doing throughout the year alongside the organisation of the conference and other commitments.

Syn'apse has a new editor, Joe Buttell. He brings along fresh energy and a vision to renew the journal of the ACPIN community. The plan is for **Syn'apse** to start working with an editorial group or committee. This is to reduce the burden on the editor and to give members another opportunity to be active in the ACPIN community. The group will peer review submitted articles and help with decisionmaking around the future format and function of *Syn'apse*.

Research funding has in the past been sketchy. We have been working on renewing our efforts to making funding available for members and for the benefit of the membership. The plan here again is to have a dedicated research group who will develop a portfolio of research funding with set timescales for application and a peer reviewed panel who will make recommendation to the committee on projects to fund. Gita Ramdharry is leading this group together with the research officer.

Alongside this piece of work we have setup a **bursaries** group which is much in line with the research group but aims to consider funding applications for CPD activities which may include funding to present a piece of work or travel. Chris Manning is leading this group as Treasurer. Both the bursary and research group will develop a set of criteria which include the need to share the research funded or skills learned with the ACPIN community.

We all know our **website** is dated and struggling with our demands. The website and document store group is due to be set up with a representative from each of the regions. This does not have to be a committee member from the region but rather someone with an interest in website and document sharing. Creating another opportunity for the ACPIN community to engage and chip in where they have skills or interests. This group was led by the PRO but is now facilitated by myself at the moment with Gita Ramdharry helping out as secretary.

The change to the **constitution** with regard to honorary membership and fellowship of ACPIN was voted in favour at the AGM enabling progression with the creation of ACPIN Professional Awards. This now enables members and eminent others to be given recognition and formal thanks for outstanding work undertaken by an individual. The development of the awards structure proposal was already agreed by the ACPIN National Executive Committee at its November 2013 meeting. Such a scheme has required a change to the ACPIN constitution which is now in place. The proposed process will see nominations from members and regions before a deadline at the end of the year. The awards panel, consisting of ACPIN members, will be voted in each year and will review the award nominations and make recommendation to the Executive Committee. The award ceremony will take place annually at the ACPIN National Conference.

Future of ACPIN national conference

ACPIN have a long history of organising a national event over one or two days in alternate years. The plan is to change this to a two-day conference as a rule. This would provide more choice to members and give a greater opportunity to participate. The conference this year has seen live streaming of part of the programme to the Northern Ireland region on the Saturday. This is a test year for ACPIN with this technology and if there is sufficient interest, we may adopt this approach in future for other national events. For next year, we are working with INPA on developing a first ever international neurophysiotherapy conference which may span three rather than two days. For this to become a success we will look at professional conference and event management support and possibly a different venue. The provisional dates for this are 19, 20, 21st March 2016. We will have to wait for INPA to share their ideas around such an event before further planning takes place. Like with other areas

of ACPIN activity, the general idea which should by now be emerging throughout our plans is to involve more of the ACPIN community. With the conference this means sharing ideas for the development of a robust conference programme which interests the membership and provides support of the development neuro physiotherapy profession.

The ACPIN membership has been steady after an initial increase when first introducing Direct Debit payments. The question now is how we consolidate our activities with the current size of membership. We want to focus on what people get from ACPIN and find out if there is anything they would like to get which is not available now. The cost of membership has been the same for some years. ACPIN is a low-cost membership compared to others and this is preferred by committee and members. However, costs of events and ACPIN activity is slowly increasing and therefore it will be necessary to consider increasing the membership fees in 2016. The national and regional committees will keep members informed on further developments so as not to spring this on the ACPIN community.

From time to time, regions are struggling and this is definitively nothing new. Last year the Merseyside region has been one of them and Manchester Region has offered support to develop a new committee who will work under the Manchester committee guidance for a while to get experience. We would like to thank the outgoing committee from Merseyside for their many years of commitment and dedication to ACPIN.

National ACPIN has seen increased pressure over the years and is proposing to look at ways to get a support structure in the form of an ACPIN Admin or ACPIN Office function. Another idea is to set up a formal management team for the association and to go to contract key roles with dedicated paid time for delivering ACPIN activity.

I'd like to close with summarising the opportunities for members to get involved with the ACPIN community. Not only through taking up responsibility in a regional or national committee but also with some of the other group activities like:

- Research
- Bursaries
- Awards
- Website
- Guidelines
- Syn'apse
- Conference and other events

Please contact the secretary if you would like contact details of how to get involved with any of these groups, or check the website in future.

Treasurer's report

Chris Manning

ACPIN Honorary Treasurer

This is a summary of the financial accounts for National ACPIN for the year end 31st December 2014.

The total income (*Figure 1*) was £91,164. This was a decrease on last year's income and was mainly due to a decrease in income from the March conference. However our income was raised because of an increase in membership and sale of the database for research and commercial purposes.

	2014	2013
	£	£
Course fees	10,505	21,148
Membership	70,943	68,160
Capitation	5,480	5,552
Database and Syn'apse	3,061	1,034
Bank interest	75	66
Training	1,100	-
Total	91,164	95,960

FIGURE 1 Income

Expenditure (*Figure 2*) for 2014 was less than 2013. This was mainly because of a decrease in expenses for travel, *Syn'apse* and research bursaries. We have used skype and teleconferencing to avoid

	2014	2013
	£	£
Conference	12,162	37,884
Syn'apse	6,983	11,784
Travel	6,237	7,677
Administration	5,465	6,621
Research	1,650	3,850
Capitation	11,306	11,450
UK Stroke Forum	657	-
Accountants, bank charges, sundry expenses	2,710	3,842
Total	47,770	83,476

FIGURE 2 Expenditure

travel costs and times for some meetings. Other costs have small variations between years, but nothing significant.

Figure 3 divides the course income and expenditure up for the conference that ACPIN held in March 2014. The conference was planned to run at a loss, with low course fees in order to put some money back into the membership. You will see that the course was run at a loss of £2,457.

	Income	Expenditure		
	£	£		
March conference	9,705	12,162		
Total		-2,457		

FIGURE 3 Course expenditure

	£
Reserves brought forward	165,257
Surplus/(deficit)	37,367
Reserves carried forward	202,624

FIGURE 4 Balance sheet

The balance sheet (Figure 4) on the 31st December 2014 showed a surplus of £37,367 and we carry forward reserves of £202,624 into 2015. We have explored and continue to explore ways of feeding this capital back into the growing membership. We subsidised the annual conference again this year and will continue to run our courses at a very low rate, whilst we have the money to do so. Expenditure is expected to increase next year because of changes to the awards and bursary, which we hope will encourage more members to apply, and investment in database support. We are investigating other ideas to allow regions to benefit, and are reviewing the website to update it and provide members only access to certain areas.

Copies of Accounts 2014

Full copies of the ACPIN accounts for 2014 are available on request.

Vote for Accountants

Members at the AGM voted to retain the current accountants for 2015: Langers, 8 – 10 Gatley Road, Cheadle, Cheshire, SK8 1PY.

Conference reports

How a keynote lecture became a key conversation

Professor Robert van Deursen

Professor of Rehabilitation Science, School of Healthcare Sciences, Cardiff University

When I was invited to deliver the keynote lecture for the 2015 ACPIN national conference I was obviously delighted to accept and was very much looking forward to the event.

My roots are in adult rehabilitation where I would have dealt with the various neurological conditions affecting movement. Since that time I wandered off to become a researcher in movement science/rehabilitation, aiming to contribute to our understanding of movement within the physiotherapy context. However, academic life is not always about clinical relevance of your research so preparing for this presentation was a good opportunity to reflect on the link between my clinical and academic persona. At the same time I was curious to see how ACPIN interprets evidence based practice.

I found my time at the conference a great experience. It was very well organised and the number of attendants was the right size to readily feel part of the group. The response to my talk was very positive; always a great thing. More importantly, it led to guite a number of conversations that made it clear to me that there is clinical relevance in the research I do. The ACPIN conference itself demonstrated a lively interest in research and its clinical application. The presentations covered the whole spectrum from basic sciences to clinical practice/service improvement. The fact that this is indeed a two-way conversation was revealed in the workshops that I was asked to lead. I thoroughly enjoyed the wisdom and wit in the discussions that took place. I had hoped to provide a bit of inspiration to those attending the conference but most of all I felt that I was being inspired.



Delegates who participated in the national conference via pre-recorded and live streamed sessions at the Titanic Belfast in Northern Ireland

The view from the Titanic

Shona Pryde

Over the past year ACPIN in Northern Ireland has successfully been using web conferencing to allow members from across Northern Ireland to attend ACPIN presentations, live, from their own homes across the country. We decided to take this one giant futuristic step further and stream ACPIN national conference from one of the world's most iconic buildings, Titanic Belfast.

With maximizing the use of technology as one of the major principles for change in the new model for healthcare under Transforming Your Care, the programme looked particularly relevant for our therapists in Northern Ireland.

So without the need for any planes or trains, thirteen therapists took their seats in Belfast to experience the best of the conference in a one-day event incorporating a selection of pre-recorded and live-streamed sessions.

It was great to be in the audience for such a diverse range of speakers, from Professor Robert van Deursen's talk on movement therapy to the latest research and information we got from the free poster presentations, and to extend our understanding of the patient experience by listening to Giles' story. Even though we weren't actually in the room, it very much felt like we were part of the day and we have all been able to take away what we've learnt first-hand from the presentations, and have shared this with our colleagues.

One of the themes we picked up was the idea of the ACPIN community and we certainly felt a big part of the community, not least through the use of social media throughout the day and the friendliness of the speakers making reference to their being a Belfast audience too.

We were able to link in directly with the organising team in Northampton so that the streaming was clear, timings all ran smoothly and we were able to quickly resolve any issues. We also had the perfect setting which allowed for small group discussion and networking, overlooking the stunning backdrop of a sunny Belfast Lough and the Belfast Hills.

Overall the day exceeded expectations for being a positive and informative learning experience. We'd like to thank national ACPIN for supporting us to successfully bring this exciting CPD opportunity to Northern Ireland and to the Northern Ireland committee (particularly Chair Dawn Harrison), for all their hard work organising the event. We are looking forward to joining everyone again next year.



News

Janet Carr

Colleen Canning and Louise Ada

Professor Janet Carr, one of the profession's leading lights, with a lifelong passion for advancing physiotherapy, died on the 4th November.

Janet grew up on her parent's sheepgrazing property at Kerr's Creek, 25 km from Orange in the Central West of NSW where she walked across paddocks to attend classes in a one-room, one-teacher school before going to Orange as a boarder. Following school, she graduated with distinction from the School of Physiotherapy in Sydney. She travelled abroad, working in hospitals in London, Toronto, Switzerland, and in Sydney and Mt Isa.

Janet joined the staff at the School of Physiotherapy in Sydney as a lecturer in 1973. This was the beginning of her long and illustrious academic career, a career which changed physiotherapy practice globally. Much of her scholarly work has been in collaboration with Roberta Shepherd. Collaboratively, they authored/ edited 13 books from 1976 to 2010 and inspired many more. One book alone sold over 16,000 copies worldwide, and their books have been translated into most European languages and many Asian ones. Janet travelled, taught and presented conference papers in over 30 different countries. One of her many career highlights was a Rockefeller Grant for a sabbatical spent at the Villa Serbelloni, Bellagio on Lake Como, where the work completed resulted in the highly-acclaimed international textbook:

"Neurological Rehabilitation: Optimizing Motor Performance".

Janet never stood still, rather she continually challenged the assumptions underlying neurological physiotherapy practice, and, with Roberta, led the paradigm shift away from pseudoscience toward science-based physiotherapy practice. Together they developed a framework for practice that is fluid and dynamic, and promotes innovation and change as new knowledge emerges. Generations of neurological physiotherapists have now been inspired by the vision and leadership of Janet and Roberta, exemplified by 'Movement Science -Foundations for Physical Therapy in Rehabilitation' with contributions from esteemed international colleagues.

Janet's leadership and mentorship transcended neurological physiotherapy. With Roberta, she commissioned the Foundations for Physiotherapy Practice series: a volume in each of the areas of cardiopulmonary, musculoskeletal and neurological physiotherapy. The editors of these volumes were Janet's junior colleagues at the University of Sydney, all of whom benefited from the mentorship and guidance that was so generously provided.

Janet set very high standards for herself

and expected the same standards of those around her. In clinical settings, she had an amazing ability to observe people moving, to describe her observations precisely and to then train the person to improve their motor performance. Close enough was not good enough for Janet and her attention to detail, scaffolded on a strong knowledgebase, is what made her an excellent physiotherapist and a role model to so many.

In 1983 she was awarded а Fellowship of the Australian College of Physiotherapists for an Original Contribution to Neurological Physiotherapy. She was president of the Australian College of Physiotherapists from 1989-1995, and Chief Censor from 1996-1997. Her longstanding membership and contribution to the Australian Physiotherapy Association saw her awarded Honoured Membership in 2013.

Janet will be remembered as a clinical academic who was a trailblazer and her legacy will be a lasting one. She entered the physiotherapy profession in 1954, at a time when the average working life of a physiotherapist was five years, and went on to devote close to 60 highly productive years to her profession. Janet never retired - until her death she held an honorary position in the Faculty of Health Sciences, The University of Sydney. A longterm colleague reflected: 'Janet was perpetually youthful in intellectual pursuits' and this is how we will remember her.

Janet Carr 1933-2014

Reprinted with permission

Splinting for the prevention and correction of contactures in adults with neurological dysfunction

Practice guidelines for occupational therapists and physiotherapists

Jo Tuckey

The long-awaited splinting guidelines have finally been published!

From the outset, in order to reflect current practice, it was agreed the new guidelines must be a joint document for both physiotherapists and occupational therapists and the results of an online survey supported this view (Kilbride et al 2013).

However, despite both professional groups having produced separate guidelines, there had been no joint undertaking in this area of practice development by the Chartered Society of Physiotherapy (CSP) and the College of Occupational Therapists (COT). As such there was no established pathway to production for the guideline development group, and

new joint working procedures had to be established. It was eventually agreed that the NICE accredited COT guideline process (College of Occupational Therapists (2011) Practice Guidelines development manual 2nd edition, London, COT) would be followed with support from the CSP.

The result is a comprehensive document aimed for use by clinicians, students, service providers and educators

International Neurological Physical Therapy Association

Ralph Hammond

INPA is a subgroup of the World Confederation for Physical Therapy (www.wcpt.org). ACPIN is a founding member of INPA. The ACPIN representatives to INPA are Cherry Kilbride and Ralph Hammond. In 2013 Ralph was elected President.

The INPA executive committee meets every two or three months by Skype. Their focus has been to organise neuro events at the WCPT conference which in 2015 is in Singapore and to prepare for the four-yearly general meeting on Saturday 1st May, which will hold elections to specific posts and agree objectives for 2015 to 2019.

This general meeting coincides with WCPT 2015. This is the world's biggest gathering of physiotherapists. To date it has been every four years. From now on, it will be every two years. The venue changes for each event. It is an exciting place to learn more about how the profession is being practiced around the world, to share your work with the international community, and to meet and make friends within our profession.

INPA will attend WCPT 2015. INPA will be judging the neurology presentations and will make an award to the 'Outstanding Presentation'. INPA will also have a stall in the exhibition hall and will host a series of events and sessions:

- INPA reception An informal networking opportunity for invited representatives of INPA members
- Neuro networking session An opportunity for delegates with an interest in neurophysiotherapy to meet and discuss issues such as: the implications of the trend to move from hospital based

rehabilitation to community/home based rehabilitation; the enablers and barriers in knowledge translation in neurological physical therapy practice; asserting the expertise of physical therapy in international (neurological) health policy programmes.

More info: http://preview.tinyurl.com/p6mtwr9.

• Subgroup seminar: neurology Chaired by INPA, the Association of Physiotherapists in Parkinson's Disease Europe will lead a discussion on how international special interest groups can support neurological physiotherapy practice and continuous professional development in different health systems.

More info: http://preview.tinyurl.com/ pagf9oj

 Subgroup seminar: Developmental disabilities Lessons to be learned: transition from childhood to adulthood for individuals with lifelong disabilities. This joint subgroup seminar (paediatrics and neuro) will address how physiotherapists might amend their service delivery models to meet the increasing number of people with learning disabilities living into older age. More info: http://preview.tinyurl.com/ kvk8shw.

INPA plans for 2015–2019

To be discussed at the general meeting and therefore subject to change.

- **1** Set up INPA bank account (2015).
- 2 Strengthen engagement with national member groups (2015).
 a Communications (Facebook, Twitter, newsletter, web pages)

b Greater involvement in INPA activities c Membership fees

- d External, public-facing voice
- **3** Draft terms of reference for sub-committee and specialist interest group structure (2015).
- **4** Establish three to four sub-committees (2016).

a Education, research, clinical practice; public (health) policy

b Conference engagement (WCPT presence)

- 5 Establish five special interest groups (2017). Subgroup focus could be: brain injury, neuro degenerative conditions, neuro muscular conditions, stroke rehabilitation, vestibular rehabilitation.
- **6** Identify how to ensure ongoing and sustainable INPA engagement with the WCPT conference (2017).
- **7** Strengthen links with other international neuro groups (2019).

ACPIN and INPA

ACPIN is a founding member of INPA and an active contributor. ACPIN has offered to make a small donation to INPA as seed funding; this is to support INPA, establish a website, and develop international resources.

ACPIN has offered to host the first INPA conference (in 2016) which could be attached to the usual annual ACPIN conference. INPA is considering this offer, and ACPIN members will be made aware of the decision via the ACPIN website.

alike. It covers the theoretical underpinning for splinting in the prevention and management of contractures, an up-todate literature review from which recommendations have been made, as well as supporting information from practitioner's and service user's experience. It does not aim to teach you how to splint but aims to support sound clinical reasoning of the use of splints and casts for management of contractures in neurology.

Thanks go to ACPIN and COT Specialist Section Neurological Practice who provided funding for the project as well as to all those who took part in the online surveys, interviews and peer reviews.

The guidelines, including a quick reference guide, audit and feedback forms, can be found on the ACPIN website at www.acpin.net/resources.html

The Guideline Development Group and co-opted members were as follows (in alphabetical order): Dr Stephen Ashford PhD MSc BSc MCSP, Dr Jim Ashworth-Beaumont PhD, Tess Baird MSc BSc, Professor Lorraine De Souza PhD FCSP, Dr Karen Hoffman PhD MRes BA Hons BAOT, Dr Cherry Kilbride PhD MSc MCSP (Project lead), Fabienne Malaprade MSc BSc MCSP, Dr Amir Mohagheghi PhD and Joanne Tuckey MSc MCSP.



Regional reports

East Anglia

Tabitha Matters

The East Anglia committee saw changes to its membership towards the close of last year. Louise Dunthorne, having done many years excellent service as chair, decided to step down. We are grateful to her for her effective work in steering the group. She will continue as a committee member and we now warmly welcome Charlie Dorer to the post. We have also said goodbye to Paul Chapman (secretary) and Will Winterbotham, who both gave a lot of time and effort to the region. The rest of the committee comprises Wendy Hendrie (treasurer), Tabitha Mathers (regional representative), Anna Colbear (secretary) and Sesa Ishaya, Nic Alexander, Kate Goddard, Lucy Baines, Anne Glynn, Rachel Baynes and Katie Bond. As ever, we are keen to gain committee members from areas of the region which are not represented.

We recently undertook a survey of the East Anglia membership, and despite a low response rate, it was helpful in tailoring location, timing and topics for future courses. The programme includes the AGM in Norwich on 19th May and an overview of the role of technology in neurorehabilitation with Val Pomeroy and Lisa Tredesco Triccas. A summer evening lecture is planned for July. Helen Lindfied will return to Ipswich in September and we hope for a focus on Parkinsons Disease in Norwich in November followed by an observational gait course in the New Year.

Recent courses have included Functional Movement Disorder with Dr Mark Edwards in the autumn of 2014 and Motor Relearning with Gemma Alder at the end of January 2015.

Our membership stands at a healthy 160 plus and we hope members manage to have the opportunity to take advantage of the networking and CPD possibilities throughout the year. Please contact the committee on eastanglia@acpin.net. Membership issues need to go through memsec@acpin.net.

Kent

Anna Hargrave

2014 was a very successful year for Kent. Membership numbers have remained high, and the Kent ACPIN committee remains a small but strong core team.

In 2014 we held a course on Pusher Behaviour by Gemma Alder which was well attended and well received. Gemma presented a lot of useful information and research as well as giving time to work in groups.

We also put on a two-day clinical reasoning workshop with Mary Lynch-Ellerington. We aimed this course at clinicians who had been working in the field of neurology for several years or had attended the basic Bobath course. The feedback from the course was excellent and we would like to thank Mary for providing such an informative and useful workshop.

Towards the end of the year we held an evening in which we invited representatives from the voluntary sector (Stroke Association, Parkinson's Disease nurses and Headway) to come and explain their role and how they can support the work we do. Thank you to all those who came along to support the evening.

2015 is shaping up to be an interesting and informative year.

In January, we held an evening lecture on MS at the new Kent Multiple Sclerosis Therapy Centre in Canterbury. Our keynote speaker was Dr Harikrishnan, consultant neurologist in MS, and we also had representative from the MS Centre who talked to us about their role as a third sector provider in the longer-term management of MS.

Still to come in 2015:

- June we are currently looking into the possibility of a Bobath study day.
- September Gym Ball course with Janice Champion.
- November PNF course with Pam Bagot.
- December As in previous years, we will be planning a Christmas evening lecture, although we have not yet decided upon a topic!

Further information and dates will be sent out to all Kent members once details are finalised. If you have an idea for a topic or a speaker for the Christmas evening lecture, please do let us know by emailing us at kent@acpin.net.

We are in the planning phase for a stroke conference/study day in 2016. We are hoping this will be a very well attended and informative day, or possibly two-day course. We really want it to be something that our members find useful, so we would love as much feedback as possible as to the topics and speakers you would be interested in. These can be anything from hands-on to more managerial topics! Please email any thoughts or ideas.

If you would like to join the Kent ACPIN committee, again please email us for the next meeting date; we would love to have you!

London

Andrea Shipley

London ACPIN continues to flourish with a growing membership and on the committee we are delighted to welcome two new members: Sarah Sparkes and Laura Douglas. We have also proposed the addition of a vice-chair role on the committee to help with a smooth succession to the role of chair in future years.

Our study events continue to be well attended and we have frozen the prices for ACPIN members for yet another year. Our first event for 2015 on 4th March was a sell-out with those who did not apply early being disappointed. It was an evening lecture on the theory and practical application of mirror therapy, a subject that obviously attracted a lot of interest.

We know that many of you like to be able to plan ahead for our events and get the dates in your diaries. We therefore published the provisional 2015 dates at the end of last year. Unfortunately we had to replace our February date with the March evening but we are working hard to firm up plans for the scheduled dates for the rest of the year. Those plans include:

- 16th May Management of soft tissue length in people with altered neurology.
- 19th September Physical activity in people with long-term neurological conditions: impact and clinical implications.

• 12th November – our annual evening lecture followed by wine and nibbles.

Please keep an eye on *Frontline* for more details. If you selected us as your local region you should be on our mailing list and will automatically receive the advertising flyers for each event, as soon as they are open on Eventbrite for booking. If you have any questions you can email us on London@acpin.net.

We look forward to seeing you, but please remember to book early to secure your place.

Northern

Kelly Winter

Northern ACPIN would like to welcome Nic Turner, who has joined the committee after relocating to the region. The committee has been working hard to establish a programme of events over the coming months. The first event of 2015 was the Role of the Upper Limb in Sit-to-stand' with Mary Lynch-Ellerington in February. This was followed by Pusher Behaviour in Stroke, led by Gemma Alder at Walkergate Park in March.

We are continuing to seek the views of our members, in order to improve the service that we provide to them. Therefore, we urge all members to complete the survey, which has been recently shared. If you are interested in joining the committee and steering your local ACPIN, please come and talk to us at one of our events, or email northern@ACPIN.net.We look forward to seeing you all in 2015!

Northern Ireland

Jacqueline Crosbie

Northern Ireland's ACPIN programme for 2015 began in February with an evening lecture on sensory integration. This was given by Dr Jacqueline Gracey, lecturer in physiotherapy at the University of Ulster. This session presented how the neurological function of processing and integrating sensory information from the body and the environment can contribute to emotional regulation, learning, behaviour, and participation in daily life. In May 2015 we plan to hold a session to give members some insight into the FACETS six-week, group-based, fatigue management programme. This is the outcome of an MS Society funded research project that took place at Bournemouth University and Poole Hospital NHS Foundation Trust. The

programme has been effective in helping people to increase their self-efficacy and reduce fatigue severity.

The main event for this year was the Webex facilitated streaming of the national ACPIN conference, Stepping Into the Future, from Northampton to Belfast on Saturday 21st March 2015. There was a selection of pre-recorded and live sessions from the two-day national event. The Northern Ireland region had been using Webex to support our evening lecture programme in the previous year. Members have been able to log in from their home and share in the session held remotely. This is our biggest venture in the use of the technology so far. Fingers crossed there are no glitches in the matrix! The event was in the prestigious setting of the Titanic Belfast centre. The conference hall boasts a replica of the famous Titanic staircase - think Rosa and Jack aka Kate Winslet and Leonardo DiCaprio - but hopefully our ship won't sink!

On another note the Northern Ireland Assembly Government Affairs Group circulated an invitation for three CSP members to attend an 'in-camera' reception with the Chair of the Assembly Committee for Health, Social Services and Public Safety on Wednesday 18 February. This may prove to be a useful opportunity to directly communicate with the MLA Assembly representative on the day. The Assembly also held an event on 24 April this year entitled 'Insight into the DHSSPS Health Committee'. This is aimed at providing another opportunity to meet with MLAs and Assembly staff and increase awareness of the work of the Heath Committee in NI, as well as providing advice and information on presenting evidence to the Committee.

Regards and best wishes to all other ACPIN regions.

South Trent

Kate Caldwell

South Trent have held some successful events in the past six months and we have some exciting courses and lectures coming up.

We had an UL focus with an evening on UL biomechanics and assessment with Martin Scott (Clinical specialist, Shoulder Unit at Nottingham) and Scapulothoracic Control by Paul Johnson (Bobath tutor) in October. More recently we held a Pusher Course with Gemma Alder. Coming up we will be running an Observational Gait morning, a lecture on functional disorders and a locomotion course in October with Jenny Williams. We hope to add some workshops on adjuncts such as FES, *Saebo*Flex[®] and ankle biomechancics to our programme.

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.

Our regional committee is keen to have new members join us. If you are interested in coming along please email southtrent@acpin.net for details of time and place. We look forward to hearing from you.

South West

Angie Gibbon and Nicola Doran

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

Since the last report, we have had various events in the South-West, including a Constraint-Induced Movement Therapy course, a Rock-taping course, and our annual summer social at Freeways centre in Bristol with our guest speaker giving a case-study presentation on hydrotherapy. In September we have a Bobath upper limb course, which filledup within only three weeks, proving it to be a very popular course. In November we have a Proprioceptive Neuromuscular Facilitation course, with a physiotherapist coming down from Harrogate.

Our recent AGM was popular and well attended. The theme was 'Sharing local expert practice' and certainly covered lots of different areas of clinical practice, stimulating much discussion. It was also a really good opportunity to network with colleagues. All presenters had produced a poster that was displayed at the event.

We have started planning courses and events for next year, and some in the pipeline include a study day in collaboration with the MS Society, a two-day vestibular rehabilitation workshop, more evening lectures (eg for the summer social), another Bobath weekend course, and perhaps an update on neuroplasticity. We always welcome more ideas for courses, so please contact us if anything comes to mind. We are also interested to hear about any potential venues for future courses. Since the last report we have said farewell to Nic Turner as he has moved to pastures new in North England. We would like to extend our thanks to Nic for his commitment to South West ACPIN including the transition to electing a new regional representative. This role is now to be shared between Angie Gibbon and Nicola Doran.

Thank you all for your on-going support for ACPIN in your region. Please feel free to contact us at southwest@ acpin.net

Wales

Adele Griffiths

In the past six months ACPIN Wales has established a steady pattern of courses and WebEx events. In October a two-day neuro-hydrotherapy course in Camarthen with Jackie Pattman was very well received. In November Wales ACPIN used WebEx to host members from all Welsh Health Boards for a showcase of FES service developments across Wales. The Christmas social event at the University Hospital of Wales was an entertaining evening lecture with Bobath Tutor, Sue Armstrong.

2015 commenced with a WebEx with Gary Morris presenting his fascinating journey to becoming one of Wales' first independent prescribers. Gary explained how this evolution in his skills has impacted his own and his colleagues' practise, and his patients' journeys.

The winter training event was a study day entitled 'Gait - a collaborative

approach'. It was held in Neath Port Talbot hospital and included speakers from across South Wales presenting on joint orthotic-physio clinics, complex gait case studies and practical gait skills workshops.

The programme for the latter part of 2015 is:

- May WebEx topic from conference.
- June 13th one-day normal movement course with Sue Armstrong at Ysbyty Cwm Cynon, Mountain Ash.
- September evening lecture on vestibular rehabilitation with Louisa Haswell at the Royal Gwent Hospital in Newport.
- October facial rehabilitation course with Ann Holland at the Nevill Hall Hospital in Abergavenny.
- November Research Forum at the University Hospital of Wales.
- December evening lecture, mince pies and mulled wine.

For details about any of the courses above or to get involved with ACPIN Wales contact wales@acpin.net

West Midlands

Cameron Lindsay

The most significant change to report was the stepping down of Caroline Graham as Chair of West Midlands ACPIN. The committee would like to take this opportunity to thank Caroline for her long and successful tenure in the position. All the positions on committee are held by people who are willing to do that extra bit in their own spare time for the benefit of the members. However Caroline was willing to do this more than others and was a real inspiration to the rest of the committee. Her position has been taken up by Marianne Hensman and we wish Marianne all the best in her future role.

Our final event in 2014 was our Christmas lecture on 'Psychology of Motivation' given by a researcher in psychology. The lecturer, who has worked mainly in elite sport, gave a fascinating insight into how the principles of motivating athletes can be applied to patients with neurological conditions. There was also some role play as we were encouraged to practice techniques to motivate patients with different personality types. The lecture was very well attended with plenty of ongoing discussion generated.

On the 26th March 2015, there was a 'Sharing good Practice' networking forum postponed from autumn 2014. We have six confirmed presenters and good interest from ACPIN members and others. This will be combined with an interactive AGM, allowing local members to meet the committee and make suggestions for future courses and events.

Other events for 2015 include a lecture by Andrew Clements, a specialist physiotherapist in vestibular rehabilitation. His lecture in September 2014 on the diagnosis of vestibular dysfunction was a popular event and we now plan to follow this up by inviting him to speak on the treatment of vestibular problems.

Later in 2015 we intend on reviewing the local stroke services once the reconfiguration of services is completed, and finally a longer course on spinal cord injury is planned for the winter.

Writing for Syn'apse

• Abstract - (maximum of 300 words)

participants, materials and procedure

• Conclusion - including implications

Abstracts of thesis and dissertations

Abstracts from research (undergraduate

and postgraduate) projects, presenta-

tions or posters will be welcomed. They

should be up to 500 words, and broadly

follow the conventional format: intro-

duction, purpose, method, result, discus-

This is a report which contains examina-

tion of the method, results, analysis, con-

clusions 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

This Syn'apse feature aims to spread the

word amongst ACPIN members about

innovative practice or service devel-

opments. 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

Method – to include design.

• Introduction

• Results

Discussion

for practice

References

sion, conclusion.

Audit report

2,000 words.

Sharing good practice

would be for an audit)

How did you go about it?

• What was the initiating force?

• What resources did you need?

• What measurements did you use?

How has it changed your service?

What did you learn about the process?

However, recent editions have moved

away from this format, and provide a

fuller picture of their topic eq 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

(Ramaswamv B Autumn 2008) and

Establishing an early supported discharge

team for stroke (Dunkerley A Spring 2008).

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:

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%20 Referencing.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

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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

April 2015

East Anglia Tabitha Mathers eastanglia@acpin.net

Angela Gibbon southwest@acpin.net

Kent Anna Hargrave kent@acpin.net

London Andrea Shipley london@acpin.net

Manchester Cathy Field manchester@acpin. net

Merseyside position vacant merseyside@acpin. net

Northern Kelly Winter northern@acpin.net

Northern Ireland Jacqueline Crosbie nireland@acpin.net

North Trent Anna Wilkinson northtrent@acpin.net

Oxford Kim Radford oxford@acpin.net

Scotland **Gillian Crighton**

South Trent Kate Caldwell South West

Surrey & Borders Suneel Kumar surrey@acpin.net

Sussex Miria Putkonen sussex@acpin.net

Wales Adele Griffiths wales@acpin.net

Wessex Lindsay O'Connor wessex@acpin.net

West Midlands **Cameron Lindsay** wmidlands@acpin. net

Yorkshire Karen Hull yorkshire@acpin.net

scotland@acpin.net

southtrent@acpin.net

Syn'apse

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