Autumn/Winter 2006

Syn'apse

- *Improvement in walking speed of a stroke patient by increasing strength and length of plantarflexors*
- *Does the use of the affected upper limb for light touch contact improve postural alignment in sitting? Is any improvement in postural alignment observed in sitting carried over into the functional task of sit to stand?*
- *The emerging population of adults with neuromuscular disorders*

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JOURNAL AND NEWSLETTER OF THE **ASSOCIATION OF CHARTERED PHYSIOTHERAPISTS INTERESTED IN NEUROLOGY**

Syn'apse

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ASSOCIATION OF CHARTERED PHYSIOTHERAPISTS INTERESTED IN NEUROLOGY

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ACPIN'S AIMS

1. To encourage, promote and facilitate the exchange of ideas between ACPIN members within clinical and educational areas.
2. To promote the educational development of ACPIN members by encouraging the use of evidence-based practice and continuing professional development.
3. To encourage members to participate in research activities and the dissemination of information.
4. To develop and maintain a reciprocal communication process with the Chartered Society of Physiotherapy on all issues related to neurology.
5. To promote networking with related organisations and professional groups and improve the public's perception of neurological physiotherapy.
6. To encourage and participate in the setting of guidelines within appropriate areas of practice.
7. To be financially accountable for all ACPIN funds via the Treasurer and the ACPIN committee.

From the Chair

Nicola Hancock BSc (Hons) MCSP SRP
ACPIN Chairperson

Welcome to the Autumn 2006 edition of *Synapse*.

It is heartening to open by assuring you that, as our Silver Jubilee year draws to a close, the work of the Executive and National ACPIN Committees continues at a pace towards our goals of, amongst others, facilitating exchange of ideas, promoting educational development, encouraging research, and communicating closely with the CSP and other organisations in neurology. I am always very proud, on leafing through *Frontline*, to see so many ACPIN-led courses and lectures across the country, particularly in such difficult times for the NHS and educational establishments and as usual I must acknowledge the terrific work of the regional committees in providing the impetus for such events.

On the topic of events, as this goes to press we are looking forward to hosting a one-day conference programme at CSP Congress on Managing Long Term Conditions at the ICC Birmingham. The calibre of the speakers looks really excellent. More of this event on pages 36.

We will also have a presence at the UK Stroke Forum event at the Harrogate International Centre on 7th-8th December this year, a prestigious inaugural multi-disciplinary conference bringing together experts from the fields of stroke medicine, rehabilitation and research from across the country. Our continued thanks to Professor Ann Ashburn for her link work with this group on behalf of ACPIN. I suspect that this event will grow and develop and that we may be able to host our own plenary session in 2007.

We have decided on a change of venue for our AGM and National Conference. On Saturday March 24th 2007 we will meet at the Sheffield Hilton for a day of 'Challenging Balance.' We already have confirmation from Professor Alan Wing, Dr Emma Stack and Dr Marousa Pavlou and look forward to completing the programme soon. Due to the new venue, numbers will be limited to 120, so watch out for adverts for this exclusive event at the end of the year! Please also remember that ALL members are welcome for the AGM, even if you are not attending the whole day, so if you are in the area, please join us and gain an insight into the goings on at ACPIN! Your input will be valued as ever.

I hope that many of you have now logged on to the interactive CSP site and are finding this resource useful. This is an evolving tool and feedback from users is vital in keeping it relevant and manageable. We are sad to announce that Julia MacKenzie, who has been part of this development from the early pilot stage, has had to resign as lead moderator and thank her for her immense commitment in getting it off the ground. The position is to be filled by Chris Manning, and we are currently looking into formalising Chris's links to the Executive to ensure that the site continues to represent ACPIN's interests and works in parallel with our newly-updated website, www.acpin.net.

Membership is thriving at 1,300 and we are continuing with improvements to the membership system for 2007 to make it more user-friendly, both for members and for Diana, our database co-ordinator, who has to turn the sometimes illegible forms into something useful! Keep an eye on the website for further information

Representation on wider groups continues, including CIG liaison at the CSP and the RCP Intercollegiate Stroke Working Party and committee members have consulted on national documents when requested to do so, providing valid and relevant input to ensure that we are represented at all levels in the process. The most recent of these is the early consultation process on the proposed NICE guidelines on acute stroke, more on this next time. Furthermore, please don't forget to tap into the excellent resource which is the ACPIN research bursary- contact Mary Cramp for more details.

Finally, everyone on the committee is very aware , from speaking to members and from personal experience, of the stresses of the current NHS financial situation but please be assured of the full support of your CIG in maintaining the role of neurorehabilitation as a vital service which will not be eroded by short-termism. Keep in touch!

Best wishes as ever,

Nicola

Best Research for Best Health – the new NHS research and development strategy

Sue Mawson MCSP BSC (Hons) PhD
ACPIN President

In the last edition of *Synapse* my Presidential address, delivered at our Jubilee Conference, highlighted the concerns I have about research capacity and capability within the physiotherapy profession. This address describes two potential opportunities that have emerged from the new NHS research and development strategy published earlier this year, opportunities that we must seize if we are to prevent the decline in our research activity.

The new R&D strategy 'Best Research for Best Health' was developed in an attempt to reverse the decline in pharmaceutical investment within UK research and to address the issue of the 'black hole' of NHS R&D funding. Much of the R&D levies going to NHS Trusts has historically never been used for research but rather to undertake clinical activity. The strategy aims to establish the NHS as an internationally recognised centre for research excellence, commissioning clinically based research focused on improving health and social care. Over the transition phase of three years, funding will be withdrawn from NHS providers back to the Department of Health to be managed and distributed by a new National Institute of Health Research (NIHR) (www.nihr.ac.uk) through a variety of funding streams. Whilst this transition of funding is causing major concerns for many Finance Directors in Trusts because of the inevitable impact on their overall budgets, for NHS researchers it does mean that research monies will be ring fenced and used in an appropriate manner.

As part of the new strategy many of the existing R&D programmes are being expanded, the Health Technologies Assessment programme (HTA) going from £13m to £40 m per annum, the Service Development and Organisation programme (SDO) from £6.8m to £15m per annum and there are a number of new funding streams one of which is highly appropriate to the physiotherapy profession. That is the 'Research for Patient Benefit' project scheme (RfPB) that replaces the old regional schemes for individual projects that ceased a number of years ago. This new scheme is also intended to replace 'own account' research funded under the old R&D levy. Whilst many of the larger funding streams are open to national competition the RfPB scheme is administered and allocated at a regional level, in response to local needs. For researchers in less prestigious areas they will not be competing with 'the London Triangle' as it is know but rather their own regional areas where it might be anticipated they could develop relevant collaborative partnerships.

Within this scheme there are small grants of up to £50k and project grants of up to £300k available for research that will directly benefit patients, research that is driven by clinical need to answer research questions that have arisen out of clinical practice. The funding is only available to lead applicants employed by the NHS although it is quite explicit within the guidelines that collaboration with University partners would be very beneficial.

There are three main requirements for these projects. Firstly, as mentioned, the proposal must have a clinical focus arising from clinical practice, secondly the applicant must demonstrate clear evidence of collaborative networks (the National Physiotherapy Research Network NPRN and ACPIN being perfect examples) and thirdly user engagement and involvement within both the research design and the research steering group is an essential element. As a special interest group our close links with the Stroke Association, the Parkinsons Disease Society and the MS Society would be idea partners in any application. Implementation of the new strategy is fast and the first announcement for this stream came out in July with expressions of interests by the 8th September and full proposals by 20th October however there will be two further calls one in November with expressions of interest by the 5th January and a third later in the year. It is anticipated that three calls a year will continue over the next five years.

So what should you do if you have a research idea, research question, an observation that's arisen from a service evaluation or pilot work undertaken as part of an MSc? Firstly seek help from you NHS R&D departments. Trusts are desperate to recoup some of the monies that they will loose during the transition phase even though it will have to be protected for research activity. Also contact you local Research Development Support Unit (RDSU) each have their own web sites and most are running workshops and support sessions for proposal writing. Talk to you academic partners, local Universities are also eager to become involved as they cannot apply directly for this funding (£25m per annum) and frequently don't have the clinical knowledge of research questions that if answered would benefit patients and their carers. Work with your local voluntary organisations, Age Concern, PD Society and make contact with you PRN hub lead. With the right research question, a well design study, collaborators and user group engagement it is my view that a number of physiotherapy colleagues could be successful with this funding stream, one ideally suited to enable the provision of evidence of effective neurological rehabilitation and consequentially patient benefit.

A second aspect of the new strategy that could prove to be a great opportunity for our profession is the development of the new NIHR Faculty. This virtual Faculty will consist of invited Faculty members whose salaries will be paid centrally through reimbursement from the NIHR to the NHS employer. Within the new Faculty there will be three levels of membership, 'Senior Investigators', who would be international leaders of research, 'Investigators' who would be partners and collaborators on research projects and finally 'Clinical Researchers', such as clinical fellows, PhD students, those who would become the next generation of researchers.

Again you might ask how is this relevant to our profession? Faculty members have to be NHS employees or have Honary NHS contracts. They have to be actively involved in research and it is anticipated that they will have to have evidence of publication and or income generation. Whilst the criteria for membership and mechanisms for the governance of Faculty members are being written currently by the Faculty implementation group it is anticipated that invitations for members will occur this autumn. It is my intention, as AHP research lead at Sheffield Teaching Hospitals Foundation NHS Trust, to ensure the nomination of a number of therapy researchers by the R&D department. Colleagues who have research written into their job descriptions either as Extended Scope Practitioners, Clinical Specialists, Consultant Therapists or indeed PhD students. I have worked pro-actively over the last six months since the publication of the Strategy with the R&D

department in the Trust and with Senior Clinical Managers to prepare the way for nomination under the assumption that criteria will include publications income and research activity. Consider the possibility for yourself or for those you manage. This is not about trying to find the money from within your service area: a successful nominee would have their research time paid. These will be prestigious positions and again it is my view that whilst our medical colleagues will be vociferous in the extreme putting themselves forward for nomination it is explicit in the strategy and the Faculty paper that money will be allocated for AHPs and nurses to be members of the Faculty. The current assumption is that the nominations will come from Trust R&D departments so you need to be discussing this with them highlighting staff with an appropriate trust research contract and with evidence of research activity.

Things are changing fast and as I write this address more information may be available about both the RfPB scheme and the NIFR Faculty. I urge you to go to the Department of Health website, contact your R&D departments and turn your clinically driven questions into research activity. Take this last opportunity to develop our research capacity halting the decline that we have seen within our profession over the last few years.

Improvement in walking speed

of a stroke patient by increasing strength and length of plantarflexors – a case report

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INTRODUCTION

Spatiotemporal parameters of gait are different in the stroke population than in healthy adults. Research has found stroke patients have lower than normal values in velocity, cadence, stride length and single limb support time (Trueblood et al 1989).

In able-bodied adults walking at a slow speed (85 steps/min) the largest burst of positive power is performed by the ankle plantarflexors during push-off (power is the product of the net moment and angular velocity at a joint). They are reported to produce half of the positive work (Olney et al 1991). Kameyama et al (1990) identified gastrocnemius to be one of the major contributors of the ankle muscles to push-off from the ground

Ankle plantarflexor activity is reduced in stroke patients. The plantarflexors have difficulty generating a large muscle force concentrically at high velocities (Moseley et al 1993). Positive correlations exist to support the connection between gait speed and plantarflexor weakness (Olney et al 1991).

Gait speed could be reduced by shortened plantarflexors. Animal and human studies have shown length-associated changes with muscles held in immobilised positions. In stroke the plantarflexors may spend long periods of time in a shortened position, perhaps causing similar effects.

Stretch has been shown to be effective in treatment and prevention of contractures. For example, Adam et al (2005) showed the benefit of stretch and positioning on helping to reduce contracture of the shoulder external rotators. Williams (1990) demonstrated that daily half hour stretch periods prevented loss of sarcomeres and connective tissue in the mouse soleus.

Muscle strength training should be task-specific (Rutherford, 1988) and related to movement velocity, muscle length and the position in which it is used (Ng and Shepherd 2000).

Training programmes in patients with stroke which concentrate on aerobic, specific lower limb strengthening exercises and locomotor components have shown improvements in gait speed, endurance and strength specific to training (Dean et al 2000 and Teixeira-Salmela et al 1999).

The purpose of this case study was to assess the effects of ankle plantarflexor stretching and task specific strengthening on improving walking speed. The functional goal will be to improve a woman's ambulation speed and endurance within her home and community.

PROCEDURE

The patient

Mrs L is a 42 year old lady who suffered a stroke following a dissected carotid artery in December 2004. Mrs L presented with a right hemiplegia in the upper and lower limbs.During the project, Mrs L was discharged home and she then attended as an outpatient. Visits were made to Mrs L at home to set up self-monitored practice.

The goals set by Mrs L were to improve her walking inside without a stick and to be able to walk outside over different terrains, for 30 minutes at a time, at a faster pace so she could keep up with her children.

Table 1 (overleaf) shows the gait analysis for Mrs L. Her main problems were identified as tight and weak right ankle plantarflexors. This resulted in no heel strike, poor forward movement of the shank on the foot in stance and a poor push-off at toe-off.

Measurements

Stride length for both feet, base of support, cadence and velocity were measured using the ten metre timed walk. The distance Mrs L could cover over six minutes was also measured. They are both valid and reliable tests (Wade 1992).

Active ankle plantarflexor length was measured in supine with a goniometer. Soleus length was measured in sitting with the hip and knee at 90°. The maximum distance that the heel could be moved back and still be in contact with the floor was measured (*Figures 1* and *2* overleaf) To measure muscle strength, the number of right calf lifts Mrs L could maximally perform (ie as high as she could lift) in 30 seconds with the left leg on the step above was counted. All measurements were taken at the beginning, middle and end of the study.

Intervention

The exercises were practiced as a circuit in the gym and at home and treatment sessions lasted for approximately one hour. During the nine treatment sessions, a combination of exercises were used and progressed

KINEMATIC FEATURES REDUCED OR ABSENT IN STANCE	KINEMATIC FEATURES REDUCED OR ABSENT IN SWING	COMPENSATIONS	CLINICAL PROBLEMS-CAUSES OF ABNORMAL KINEMATICS
• Reduced hip extension late stance • Reduced right knee flexion end stance • No right heel strike (1st rocker) • Poor forward movement of right shank on foot (2nd rocker) • Reduced right plantarflexion at toe-off (3rd rocker) • Reduced lateral pelvic displacement to right	• Reduced right peak hip flexion • Reduced right knee extension prior to heel strike • No active right dorsiflexion throughout swing. Foot held in a plantarflexed position	• Reduced loading of right leg in stance • Reduced stance time on right leg • Reduced stride length bilaterally* • Circumduction and hip-hitching to clear right leg on swing • Left knee flexion to achieve right foot contact with floor • Right knee held in flexion to achieve better right foot contact	• Increase in active tension of right calf muscles • Increased resistance to passive dorsiflexion of right ankle with clonus • Weak dorsi and plantarflexors of right ankle (grade 3 gastrocnemius) • Weak inner range gluts in late stance • Weak right hamstrings and quads (grade 4) • Weak right hip abductors (grade 4) • Shortened gastrocnemius and soleus right ankle (10˚ plantargrade)

*Compared to normal female 18-49 age stride length values (Whittle 2002)

Table 1

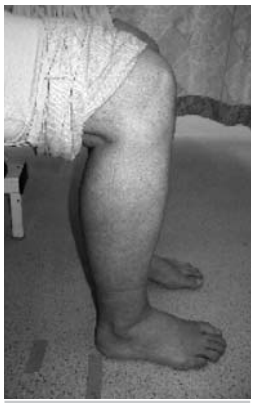

Figure 1

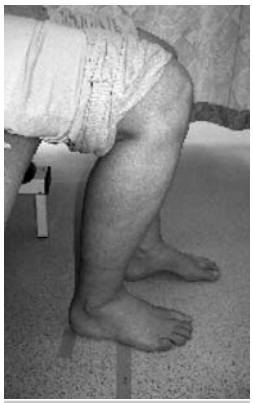

Figure 2

Figure 3

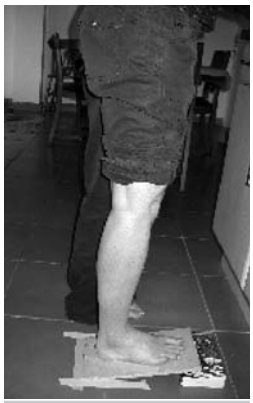

Figure 4

appropriately. Each individual exercise and progression will be explained and have been marked on *Table 2*.

Soleus stretch

Mrs L sat with her hip at 90 degrees. The heel was positioned behind the knee on a book. A belt was placed under the book and attached to itself over the top of the knee (30 minutes stretch daily) (*Figure 3*).This was practised as an out-patient and at home.

Gastrocnemius stretch

Mrs L stood on a 5cm high wedge for 15 minutes daily. The wedge height was increased to 7.5cm as Mrs L gained more range (*Figure 4*)

Calf raises

Mrs L performed right calf raises initially with the left foot on the step above increasing to two steps above with or without hand support, with the heel over-hanging or not. This was performed as an out-patient and at home.

Exercise bike

Mrs L used the exercise bike at every in-patient treatment session starting at four minutes of cycling increasing to 12 minutes by the end of intervention.

Can exercise

Mrs L stood in left step standing facing her kitchen cupboards. She was asked to push five cans towards the back of the cupboard in any order and at varying speeds. This exercise was varied by adjusting the height of the shelf and by placing the left leg on a stool (*Figures 5 and 6*).

TABLE SHOWING EXERCISES

	28.2.05	2.3.05	3.3.05	7.3.05 Home	8.3.05	10.3.05	14.3.05	16.3.05 Home	18.3.05	21.3.05	Home Work
Soleus stretch	Set up			Yes		Yes		Yes			Yes
Gastroc stretch (hospital)	Set up	Yes	Yes		Yes	Yes	Yes		Yes	Yes	
Gastroc stretch (home)				Yes				Yes			Yes
Calf raises											
2 feet on step (10)		2									
L leg 2nd step, hand support (10)		3									
L leg 2nd step, no hands (10)			3								
L leg 3rd step, hand support (10)			4								
L leg 2nd step, R overhang,											
hand support(10)				3	4						Yes
L leg 2nd step, R overhang,											
no hands (10)					4	4	3				Yes
L leg 3rd step, R overhang,											
no hands (10)							5	5	4		Yes
R leg only,hand support(10)									1		Yes
Exercise bike (mins)		4	5		5	6	10		10	12	
Push cans forward											
Shelf 138cm (10)				4				3			Yes
Shelf 163cm (10)				4				5			Yes
Gait indoor (mins)				10		10					
Gait outdoor (mins)					10		12	14	16	20	30
Hook exercise											
Base 30cm (10)						4		4			
Base 34cm (10)								4			

Table 2

Figure 5

Figure 6

Figure 7

Figure 8

Hook touching exercise

Mrs L stood 90cm away from hooks (141cm high) in left step standing with the left leg on a 20cm step, 30cm in front with a base of 30cm. The four hooks were 90, 95, 100 and 105cm away. She was asked to touch the targets in various orders and speeds. This exercise was varied by increasing stride to 34cm. (*Figures 7* and *8*).

Gait re-education

Mrs L was encouraged to mobilise by pushing down and back through her right foot prior to the swing phase at various speeds. She also mobilised outside over different terrains and crossing busy roads.

Self-practice

Mrs L followed a stretch regime and strength training programme at home in the periods of time inbetween treatment sessions. These were practiced three times daily and were recorded.

RESULTS

Following a three week period of training the ankle plantarflexors in a circuit programme, at home and self practise sessions, a number of changes were found in

walking speed, muscle strength and range of movement at the ankle. *Table 3* shows that Mrs L gained many improvements from her three week training period. The table shows an improvement in velocity and cadence over the three week training period. The table also shows that step length increased and consequently the number of steps taken to walk 10m reduced: the distance walked over six minutes improved by 82m; the range of movement of the gastrocnemius improved by 5° towards plantargrade and the soleus length improved as the heel could be moved back by 1cm. The number of maximum heel lifts that were completed improved by nine lifts over the training period suggesting an improvement in ankle plantarflexor strength.

POST-TRAINING GAIT ANALYSIS

Stance phase invariant kinematics

- Improved hip extension late stance
- First rocker present
- Improved 2nd rocker
- Improved 3rd rocker

Swing phase invariant kinematics

- Improved knee extension prior to heel strike
- Ankle dorsiflexion present

Compensations

- No circumduction of foot or hip hitching evident
- Less left knee flexion to achieve floor contact
- Improved loading and stance time on right leg

The post treatment analysis of gait shows an improvement in many aspects of swing, stance and a reduction in the number of compensations needed.

DISCUSSION

The aim of the project was to increase the strength and length of the ankle plantarflexors and to improve walking speed. The results show that these aims were achieved. Furthermore Mrs L's own personal goals were achieved.

During the nine treatment sessions, Mrs L increased her walking velocity by 0.423m/s. Similar findings to Dean et al (2000) showed improvements in velocity ranging between 0.212m/s to 0.32m/s following a circuit programme. The new velocity speed of 0.59m/s was 62% of predicted values for normal healthy women, 18-49 (Whittle, 2002).

Mrs L's final cadence of 91.49(steps/min) is close to Whittle's (2002) observed gait parameter of 98-138(steps/min) and the step length of 41.8cm was also nearer to normal values for a 18-49 adult woman (53-760 (Whittle,2002).

One of the aims of the project was to improve calf strength. Teixera- Salmela et al (1999) used isometric, eccentric and concentric techniques to strengthen lower limb muscles and Dean et al (2000) used heel lifts in standing to improve plantarflexor strength. In the project, Mrs L trained her plantarflexors both eccentrically and concentrically in task-specific positions with various amounts of loading of the muscle. The muscle strength measurement was presumed to be measuring muscle strength of the plantarflexors as it was the maximum height number of heel lifts that could be performed in 30 seconds.

As well as an increase in walking speed, the distance Mrs L was able to walk in 6 minutes increased by 82m. Perry et al (1995) suggested that at this speed Mrs L would be able to function moderately in the community but would not be able to cross a busy road. However, as Mrs L increased her step length and cadence and reduced the number of steps taken it is proposed that she would be able to walk faster and further in the community than pre-treatment and this was confirmed by Mrs L.

The increased ankle plantarflexor length could have

TABLE SHOWING RESULTS OF PLANTARFLEXOR TRAINING

DATE	10M TIMED WALK WITH STICK (SECS)	VELOCITY M/S	NUMBER OF STEPS TAKEN	CADENCE (STEPS/MIN)	6 MINUTE WALK DISTANCE (M)	STEP LENGTH LEFT (CM)	DISTANCE COVERED ON EXERCISE BIKE IN 5 MINS (M)	ROM GASTROC PLANTAR-GRADE (DEGREES)	DISTANCE HEEL MOVED BACK FROM VERTICAL (CM)	NUMBER OF HEEL LIFTS (30 SECS)
25.2.05	48.59	0.167	34	34.1	114	30.3	80	10	9	10
8.3.05	21.42	0.45	27	73.6	162	40.25	88	–	9	15
23.3.05	14.39 13.33*	0.59	26	91.49	196	41.8	113	5	10	19
Improve'nt	34.2	0.423	8	57.39	82	11.5	33	5	1	9

*indicates no stick

Table 3

produced a more effective push-off by achieving a more 'normal' ankle position in pre-swing and therefore the direction of the concentric contraction could have propelled the body forward more effectively although this was not specifically measured. This could have increased walking speed and distance covered.

The design of the experiment was similar to other literature, composing of a circuit programme including aerobic, strengthening and stretching components and it was of similar intensity (three times per week) although Mrs L trained on her own rather than in a group, the exercises were performed at home and in a gym environment and the exercises were concentrated on improving ankle plantarflexor strength. (Dean et al 2000, Teixeira-Salmela et al 1999). The exercises were also task-specific. The exercise bike probably trained endurance more than strength training but it added variety to the programme and may have had some cardio-vascular benefits although this was not measured.

A further development would be to take Mrs L to her local leisure centre and set up an exercise programme. This would utilise local community facilities and establish independence in the community. Having access to a limb-load monitor would have enhanced feedback for the ankle push-off component of gait.

CONCLUSION

The three week training programme improved the ankle plantarflexor mobility and strength, and resulted in nearer normal values of velocity, cadence and step length. It also improved the distance that Mrs L could walk in six minutes.

The pre and post gait analysis showed an improvement in kinematic features and showed a reduction in the compensatory strategies employed. Specifically, the push off of the foot in pre-swing improved and as the gastrocnemius is said to be one of the major contributors of the ankle muscles to push-off from the ground the muscle strength training of the plantarflexors could have helped to normalise gait along with the gain in the plantarflexor length (Kameyama et al 1990).

As positive correlations exist to support the connection between gait speed and plantarflexor weakness (Olney et al 1991) the improvements in gait speed and distance walked over six minutes may have been caused by the increase in plantarflexor strength. The improved ankle plantarflexor strength and speed facilitated faster and longer walks outside.

To conclude, the improvement in strength and length of the ankle plantarflexors helped Mrs L to achieve her personal goals. Subjectively she felt that she could walk with less effort, more confidence and she could keep up with her children.

This case study was submitted in its original version for the Masters level module 'Movement science based approach to stroke rehabilitation', at the University of Nottingham. The module may be taken separately from the Masters course. For further information, contact Julie Corden at: Julie.Corden@nottingham.ac.uk or phone 0115 840 4825.

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Does the use of the affected upper limb

for light touch contact improve postural alignment in sitting? Is any improvement in postural alignment observed in sitting carried over into the functional task of sit to stand?

INTRODUCTION

This article reports on a case study that explored the relationship between the use of an upper limb for light touch (L-T) contact, postural control (PC) and subsequent body alignment in a lady following stroke.

Postural control and light touch

As the focus of this article is treatment the key concepts and theoretical principles of PC are summarised and referenced as a means of introduction:

- Ability to control body position in space for stability and orientation (a requirement of function) is called postural control.
- Two components of postural control are 'postural orientation' and 'postural stability'.
- Knowledge of the body in space, if stationary or in motion (information from visual, vestibular and somatosensory inputs) is essential for accurate force production to control the body's position in space.
- Somatosensory receptors ie joint and muscle proprioceptors, cutaneous and pressure receptors provide information to the CNS regarding a) the body's position in space with reference to the supporting surface and b) the relationship of body segments to one another. (Shumway-Cook and Woollacott 1995)
- Disturbances in sensory information affect processing of PC. Of particular interest to this study, development of an accurate internal representation or postural framework of reference may be prevented. This 'internal representation' or 'body schema' is important in interpreting and coordinating actions that control body position in space (DiFabio and Esmasithi 1997).
- Nashner, (1981, cited in Jeka and Lackner, 1994) report primary sensory inputs to PC as visual, sensory and vestibular. A growing body of evidence suggests touch and pressure information from any body part (particularly the hand) in contact with a stable surface will influence apparent body orientation and therefore PC (Jeka et al 1994 and Jeka 1997).

CASE STUDY INFORMATION

Our patient for this study was Mrs Brown, 61 years old, diagnosed with a right middle cerebral artery infarct on 6th October 2004. Mrs Brown presented with predominately low tone on the left with evidence of increased tone and non-neural changes in her left upper-limb. Due to upper limb changes she was unable to maintain contact with the supporting surface, adopted a habitual flexed posturing of her arm across her body and compensated for lack of postural stability by over using her right side. She 'held on' with her right hand (causing it to become functionally redundant and used to help maintain sitting 'balance') and was over active in her right quadratus laborum (QL), right hip flexors, medial rotators and adductors (*Figures 1* and *2*).

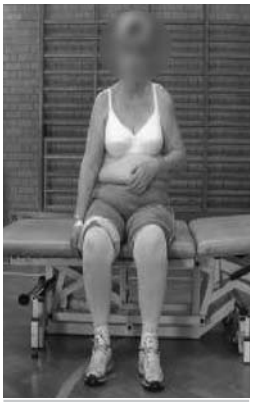


Figure 1

Figure 2

Problem list and goals

Initial assessment findings guided development of the problem list (*Table 1*) and negotiation of patient centered long-term (discharge) goals (*Table 2*).

INTERVENTIONS

The problem list and goals in turn guided treatment aims.

1. To create acceptance of base of support (BOS) in sitting

Clinical reasoning

- To improve alignment in sitting, a precursor to achieving more selective/symmetrical activity.
- To 'dampen-down' over activity throughout right side of trunk/pelvis/lower-limb, to give Mrs Brown's left side the opportunity to become active.
- To increase somatosensory input through left and right buttocks providing Mrs Brown with more body orientation information.

PROBLEM LIST	
NO	**IMPAIRMENT**
1	Reduced tone throughout left side, with developing increased tone in left pectoralis major, biceps, brachioradialis and long finger flexors.
2	Non-functioning left upper-limb (no activity throughout) with intermittent shoulder pain. At high risk of muscle shortening.
3	Reduced length of left brachioradialis and long finger flexors.
4	Reduced selective movement of left lower-limb 2° to hypotonia.
5	Poor selective movement of pelvis and trunk.
6	Reduced cutaneous sensation/proprioception throughout left side.
7	Compensatory over activity throughout right side (UL, QL and LL).
8	Reduced exercise tolerance (?premorbid), therefore fatigues quickly.
9	Poor insight.
10	Distractibility.
11	Impulsivity and reduced safety awareness.
	Activities
12	Dependent on 1 to move in bed.
13	Dependent on 1 to get in/out of bed.
14	Dependent on 1 to ½ stand, crouch transfer to the right in physio (requires assistance of 2 with the nursing staff on the ward).
15	Dependent on 2 to stand.
16	Unable to mobilise.
17	Unable to use left upper-limb for function – habitual posturing in flexion across body.
18	Dependent on 1-2 for all ADL's and PADL's.
	Participation
19	Unable to return home, to previous role of house-wife.
20	Unable to pursue leisure activities.

Table 1

LONG-TERM GOALS	
NO	**DESCRIPTION OF LONG-TERM (DISCHARGE) GOAL**
1	Mrs Brown will walk on level ground in her own home, safely and independently using an appropriate aid from room to room by D/C.
2	Mrs Brown will complete a shopping outing of her choice (including all planning etc) with staff assistance by D/C.
3	Mrs Brown will return home and complete PADL's with minimal assistance of one and be independent for self medication, by D/C.
4	Mrs Brown will complete the family's evening meal preparation with assistance of one by D/C.

Table 2

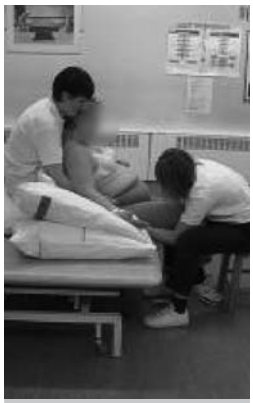


Figure 3

Figure 4

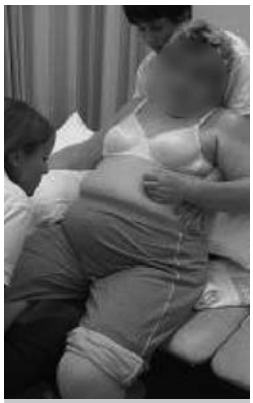


Figure 5

Figure 6

Intervention

- Facilitated into reclined position. Therapist in front addressed right femur/pelvis alignment by adding distraction at the hip joint and lateral rotation of femur (*Figures 3* and *4*). This progressed to active assisted hip movement, with emphasis on gaining a 'light leg' and active 'let go' of hip flexors, medial rotators and adductors so Mrs Brown could let her right lower-limb rest on the plinth and foot on the floor (*Figure 5*).
- Trunk on pelvis re-alignment and decreasing over activity in right QL. Therapist in front placed hand on Mrs Brown's right buttock and gave instruction 'drop your buttock down into my hand'. This was to encourage active 'let go' of right QL and increased acceptance of BOS on the right (*Figure 6*).
- Left femur/pelvic alignment was addressed. A towel was placed under left buttock. Better alignment was achieved to increase sensory input and acceptance of BOS.

- Trunk rotation to right was facilitated to encourage dissociation of central key point from proximal key point (pelvis) and a more dynamic acceptance of BOS on right buttock (*Figure 7*).

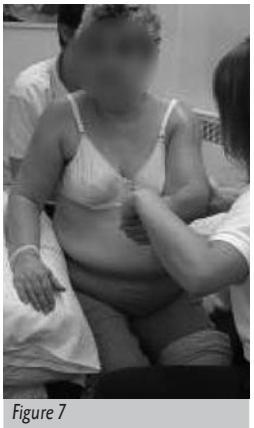
2. Placement of bilateral upper limbs to achieve light-touch contact

Clinical reasoning

- To achieve L-T contact of affected upper-limb soft tissue mobilization to posterior gleno-humeral joint and elbow muscles was necessary to address the non-neural changes in the upper-limb and increase range.
- Stimulation of hand areas with highest density of receptors: thenar and hyperthenar eminence and finger tips (Kandel et al, 1991) and activation of lumbricals was carried out to:
  - Increase and maintain cortical representation influencing development of body schema.
  - Increase somatosensory inputs thereby influencing PC.
  - Achieve an 'active' hand which can orientate to its surface – 'Contactual hand orientated response' (Lynch Ellerington 2004).

Intervention

- Soft tissue mobilisation and re-alignment to brachio-radialis and migrated triceps (*Figure 8*).
- Soft tissue mobilisation to tight posterior gleno-humeral muscles (latissimus dorsi, teres major and minor) and triceps for maximal elbow extension and placement of upper-limb onto plinth in front (*Figure 9*).
- Upper limb treatment progressed to specific sensory stimulation of hyperthenar eminence. Once Mrs Brown could feel area on her hand being stimulated with the pen, stimulation was stopped. Mrs Brown was asked to identify (exactly) with eyes closed where she had been stimulated. If very inaccurate the procedure was repeated until she improved (*Figure 10*).



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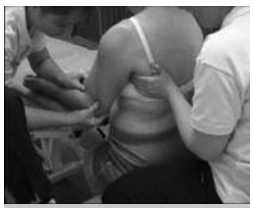

Figure 8

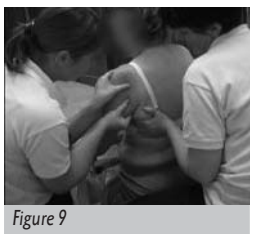

Figure 9

Figure 10

Figure 12

Figure 11

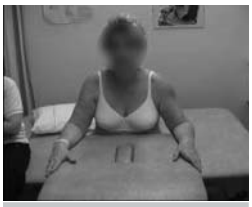

Figure 13

- Activation of the hyperthenar eminence was facilitated through compression (*Figure 11*).
- Once lateral border of the hand was more active, movement over this was facilitated to achieve acceptance with BOS (*Figure 12*).
- Steps demonstrated in *Figures 10* and *11* were repeated on thenar eminence of left hand together with individual digit and lumbrical activation to achieve placement of left upper-limb and L-T contact of left hand (*Figure 13*).

3. To create extension and increased activity through the left side

Clinical reasoning

- Rotation to left to increase interplay of right and left trunk.
- Rotation to left to encourage selective activity of trunk away from lower-limbs.
- Head rotation stimulates vestibular apparatus and evokes highly organized balance response involving trunk's postural muscles, to maintain body centre of mass within safe limits (Fitzpatrick and Day 2004). Trunk rotation encourages increased recruitment of extensor activity on side towards which rotation occurs.
- Carrying out functional task of reaching to pick up a cup (context based and relevant therefore motivating), to fill glass with orange juice (brightly coloured and a favourite drink) to stimulate limbic system (which links with reticular system), resulting in increased motivation, concentration and arousal (BBTA 2004).
- Selective trunk extension and pelvic mobility are necessary precursors for forward weight translation in preparation for sit to stand.

Intervention

- Reaching right upper limb across body facilitated trunk rotation to promote increased extension/


Figure 14


Figure 15


Figure 16

activity through Mrs Brown's left pelvis/trunk (*Figure 14* and *15*).
- Facilitation of selective pelvic tilting to encourage bilateral and symmetrical linear trunk extension with upper-limbs placed on plinth in front. Therapist in front maintained upper-limb alignment with light pressure, therapist behind facilitated AP/PA pelvic tilt at pelvis (*Figure 16*).

4. Facilitation of sit to stand (STS) and stepping with light-touch contact of bilateral upper-limbs

Clinical reasoning
- Reticulospinal and vestibular systems are stimulated by activities against gravity and respond by increasing PC/anti-gravity activity (BBTA 2004).
- Standing increases somatosensory input (through foot contact with floor) providing Mrs Brown with information regarding her postural orientation, one component of PC.
- Maintaining L-T contact of bilateral upper-limbs further increases somatosensory input.
- Working in postural set of standing, and facilitating preparatory stepping, was necessary to activate left gluteal and inner range quads required for effective left lower-limb stance and walking.
- Strengthening of lower-limbs.

Intervention
- Progressed to facilitation of STS with bilateral upper-limb L-T contact, from different height plinths (*Figure 17* and *18*).
- Stepping followed by gait re-education facilitated by three: third person manoeuvred the plinth, whilst therapist 1 and 2 facilitated Mrs Brown (*Figure 19*).


Figure 17


Figure 18

OUTCOMES

Outcome measures used:
1. Base of support
2. Postural alignment measurements
3. Graph of traced hand contact
4. Sitting posture – anterior and posterior views
5. Sitting posture – lateral views
6. Sit to stand
7. Hand contact

To improve reliability of this study, variables were standardized where possible ie plinth heights, amount of thigh in contact with plinth when sitting, distance and environment of pictures taken.

1. Base of support

First outcome measure used was patient selected BOS during sit to stand, based on clinical assumption that if PC improves (due to improved alignment and stability), BOS would reduce (*Table 3*).

BASE OF SUPPORT MEASUREMENTS	
INITIAL ASSESSMENT	**FINAL ASSESSMENT**
22cm (right foot behind left by 10cm)	20cm (level feet)

Table 3

2. Postural alignment measurements

Quantitative information regarding alignment was recorded by placing markers on specific bony landmarks (Taylor et al 1995) (see *Table 4 overleaf*). Taylor looked at reliability of this outcome measure and concluded that postural alignment was a reliable way of measuring tone in hemiplegic patients. 'When tone is high, bony points move close together and when it is low, they move apart' (Taylor et al 1995 pp486).

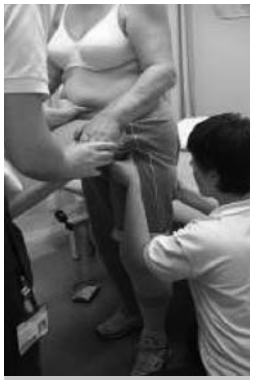
Figure 19

POSTURAL ALIGNMENT MEASUREMENTS				
TIME FRAME	**MEASUREMENT**	**RIGHT**	**LEFT**	**DIFFERENCE**
Initial treatment	M1	9.0	9.5	0.5
	M2	10.5	12.5	2.0
	M3	41.5	47.0	5.5
	M4	18.5	15.5	3.0
	M5	52.0	40.5	11.5
Final treatment	M1	7.0	7.7	0.7
	M2	11.5	10.5	1.0
	M3	45.5	49.5	4.0
	M4	17.0	16.5	0.5
	M5	51.5	47.0	4.5

All measurements in cms

Key

M1 Tip of inner border of spine of scapula to spinous process of second thoracic vertebra.

M2 Tip to lower angle of the scapula to spinous process of eighth thoracic vertebra.

M3 Tip of acromium process to top of iliac crest ipsilaterally, measured equi-distantly from spinous process of fifth lumbar vertebra.

M4 Tip of acromion process to tip of mastoid process ipsilaterally.

M5 Tip of acromium process to tip of radial styloid ipsilaterally.

Table 4

3. Graph of traced hand contact

Although not standardised, a graph tracing of the patient's affected hand was taken to reflect hand contact with BOS. The hand's acceptance of BOS was also captured pictorially. Both proved to be simple, yet effective measures specific to treatment aims and hypothesis (*Figure 20* and *21*).

4. Sitting posture – anterior and posterior views

Pre and post treatment pictures were taken to illustrate changes in postural alignment statically (sitting) and dynamically (sit to stand).

Before treatment

- Over activity throughout right side, demonstrated by holding on to plinth with right upper-limb, right side trunk flexion due to over active QL, right foot placement (further back than left), right femur medially rotated, slightly adducted and compacted up into acetabulum, giving appearance of shorter leg and poor acceptance of BOS on right (*Figure 22* and *23*).
- Decreased tone throughout left side of trunk and pelvis plus gluteal wasting (*Figure 23*).
- Left shoulder elevated due to overactivity in upper trapezius, gleno-humeral joint medially rotated and adducted, forearm rests in flexion due to neural changes (increased tone in biceps) and non-neural changes (soft tissue shortening of biceps and brachioradialis from habitual flexed posturing of right upper-limb across body)

Figure 20

Figure 21

Figure 22

Figure 23

After four weeks of treatment

- Maintaining more symmetrical sitting posture, with marked decrease in over-activity throughout right side (*Figure 24* and *25*).
- Increased activity throughout left side of trunk and pelvis (*Figure 25*).
- Improved symmetry between upper quadrants and resting position of left upper-limb due to improved soft tissue length and reduction in tone (*Figure 24* and *25*).

5. Sitting posture – lateral views

Before treatment

- Weight displaced backwards in relation to midline, central key point flexed and pelvis in posterior tilt (*Figure 26* and *27*).

Figure 24

Figure 25

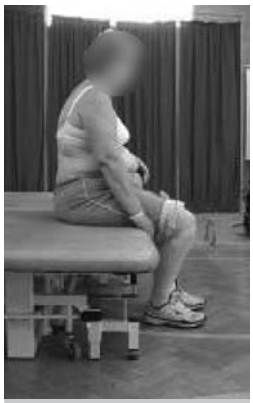
Figure 26


Figure 27

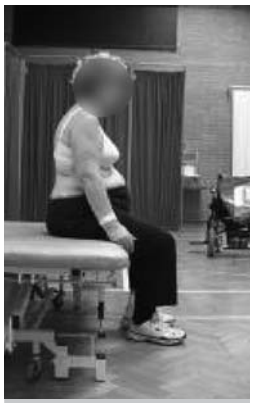
Figure 28

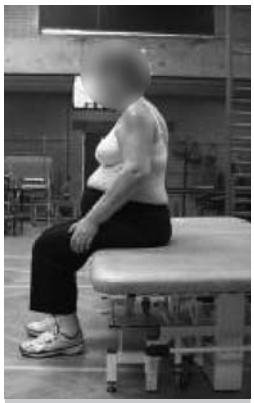
Figure 29


Figure 30


Figure 31


Figure 32


Figure 33

After four weeks of treatment

- Maintaining a more upright and extended posture (*Figure 28* and *29*).

6. Sit to Stand

Before treatment

- Largely dominated and achieved by use of Mrs Brown's right (non-hemiplegic) side. Weight displaced to right with right lower limb brought further back than left to contribute (along with right upper-limb) to 'push off' (*Figure 30*).
- Towards terminal phase of sit to stand, Mrs Brown compensates for lack of stability and extension on her left by holding onto plinth with her right hand, fixing further with right side of trunk and right lower limb into forced extension. Required assistance of one to steady her when standing (*Figure 31*).
- Associated reaction in left upper-limb (*Figure 30* and *31*).

After four weeks of treatment

- More symmetrical weight distribution demonstrated by level foot placement and less displacement of weight to right side. Does not require use of her right upper-limb to assist with 'push off' (*Figure 32*).
- Towards terminal phase of sit to stand and once standing Mrs Brown does not require use of right upper-limb, or someone to stabilise and there is less over use of right Q.L causing right side trunk flexion (*Figure 32* and *33*).
- An associated reaction still present in left upper-limb, but significantly decreased, indicating more PC and improved sit to stand (*Figure 32* and *33*).

7. Hand contact

Before treatment

- Mrs Brown's hand had minimal contact with BOS – only the tips of fingers, base of thumb and forearm make contact with plinth (*Figure 34*).
- Difficulty maintaining upper-limb contact with plinth, strong adductor pull at gleno-humeral and elbow joints respectively, attempts to overcome by shifting weight to the left (*Figure 35*).

After four weeks of treatment

- Improved right hand contact with plinth and increased acceptance of BOS (*Figure 36*).


Figure 34

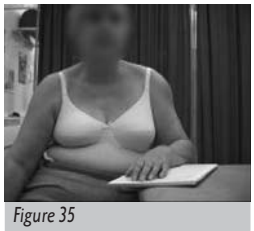
Figure 35


Figure 36

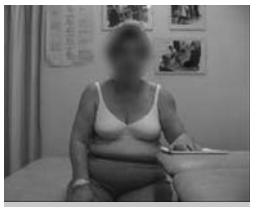
Figure 37

- Left upper-limb easily remains in contact with plinth and evidence of less adductor and flexor pull at gleno-humeral and elbow joints respectively, resulting in less trunk displacement (*Figure 37*).

DISCUSSION

After four weeks of treatment, Mrs Brown demonstrated visible improvements in her postural orientation and PC, when sitting and during sit to stand.

Improvements in postural orientation are demonstrated in alignment measurements and pictorially. For example, M4/M5 pre and post treatment measurements show most significant improvements (see *Table 4*). Also *Figures 1* and *24* show the most marked improvements in left upper-limb resting position. With improved postural orientation an improvement in PC is expected (Shumway-Cook & Woollacott 1995).

Improvements in Mrs Brown's PC are demonstrated through the reduction in BOS measurements (see *Table 3*), a reduction in compensations (over activity of non-affected side, particularly QL) and a reduction in effort required during sit to stand. Leonard (1998) highlights that alignment of body segments over BOS relates directly to effort required to support the body against gravity. Mrs Brown reported the task of sit to stand to be less effortful after four weeks of treatment. An effort rating score before and after treatment would have been a good outcome measure to formally assess and demonstrate effort levels.

Few left upper-limb interventions were implemented in Mrs Brown's treatment prior to this case study, and she reported her arm to 'feel like a redundant spare part'. Due to the loss of afferent input through Mrs Brown's left upper-limb, she had developed a distorted body schema.

Cutaneous stimulation combined with knowledge of arm configuration is necessary to provide information regarding body orientation (Burgess et al 1982 and Matthews 1981 cited in Jeka and Lackner 1994). Furthermore, Jeka and Lackner (1994) and Jeka (1997) concluded (from their work on the affect of L-T contact of fingertips on postural sway) that L-T contact of the fingertips provides information regarding pressure, arm configuration and body orientation. This information supplied by cutaneous receptors at the skin surface and proprioceptive receptors embedded in muscles, joints and tendons, results in activation of postural muscles and reduces postural sway.

An improvement in Mrs Brown's general alignment was seen and PC was achieved on commencement of specific soft tissue mobilisations of her left upper-limb structures, specific sensory stimulation and involvement of upper-limb to achieve L-T contact. She demonstrated an improved body schema and post treatment reported her arm 'felt like it belonged to her body'.

Mrs Brown found it difficult to understand the relationship between her affected upper-limb and ability to stand or walk. She expressed frustration on the time spent treating her upper-limb when she felt she could be working on her leg or walking. Time spent discussing links between treatment and achievement of goals was vital to maintain patient motivation.

To assist with daily carry over and to reduce time spent treating her upper-limb in physiotherapy sessions, a management programme was implemented. Mrs Brown was supplied with an upper-limb resting splint, and nursing staff and relatives were involved in handling and positioning of her upper-limb.

Mrs Brown achieved both long-term goals (3 and 4 – see *Table 2*) regarding personal care, independent self-medication and evening meal preparation. She partially achieved goals 1 and 2, due to cognitive deficits resulting in impulsivity and poor safety awareness. She required supervision to mobilise with a tripod stick and assistance of one to plan/execute a shopping outing.

CONCLUSION

Postural alignment in sitting improved with the use of the affected upper-limb for L-T contact and carried over into the functional task of sit to stand.

Through learning about the Bobath concept and studying the work by Jeka et al (1994) and Jeka (1997), it is noted that the hand serves an invaluable function of providing somatosensory information, assisting in the development of an accurate body schema and PC. On completion of this article and learning more about the Bobath concept, the author's practice has significantly changed. The author has a heightened awareness of the significant affects and ways to manipulate afferent inputs received by patients. This may be through handling or environmental factors aimed at increasing somatosensory input and development of a more accurate body schema (to improve postural orientation), crucial in the development of PC.

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The emerging population
of adults with neuromuscular disorders (NMD)

INTRODUCTION

Over the last decade there have been steady advances in technologies that have increased our ability to diagnose and treat people with neuromuscular disorders (NMDs). Improvements in diagnoses have led to a better understanding of the complications associated with individual disorders, which in turn can facilitate the prediction and management of future problems. Understanding the individual disorder is vital, and having this knowledge enables clinicians and families to take advantage of the treatments that are now more readily available and to plan for the future.

Only a decade ago the muscular dystrophies and myopathies were poorly defined conditions with unclear pathology, aetiology, prognosis and treatment options. Today, the number of patients without a precise diagnosis is rapidly declining as new genes and gene products are identified by ever more sophisticated mutation analysis and immunohistocytochemistry

This article will briefly describe the most common NMDs and discusses the various treatment options that have made an enormous difference to life expectancy and quality of life in many of these conditions. To give some perspective on how these advances have changed prognosis for individuals with NMD, Duchenne muscular dystrophy (DMD) in particular will be discussed. DMD has many complications that are common in other conditions and lessons learnt here can be just as easily applied to other neuromuscular disorders.

CLASSIFICATION OF NEUROMUSCULAR DISORDERS

The term 'neuromuscular disorders' covers a group of conditions which may affect any part of the neuromuscular system from the lower motor neurone onwards. They may involve the anterior horn cell, the nerve, the neuromuscular junction or the muscle itself. The classification of NMDs can be complex. The following list (*Table 1*) is *not* exhaustive, but includes some of the more common conditions. An excellent website for reference to these and other neuromuscular conditions is at www.neuro.wustl.edu/neuromuscular/index.html

Over the years the nomenclature used to describe these disorders has changed and continues to change as more precise diagnoses are made. Classification is based on the phenotype, the clinical features of affected individuals together with the identification of the genotype, the genetic and biochemical defects.

As can be seen from *Table 1*, many disorders are still referred to by the original name given to them by the physician who first described them. Duchenne muscular dystrophy, so called after Guillaume Benjamin Amand Duchenne who first published his description of this condition in the 1860's is a typical example. Other disorders are named by their clinical manifestation such as fascio-scapulo-humeral muscular dystrophy or limb-girdle muscular dystrophy. In the case of the former this has led to a misunderstanding of the condition especially by patients who find increasing problems with lower limb weakness. In the latter case, some limb-girdle muscular dystrophies may also have distal involvement and furthermore have been shown not to be a single disorder but a very diverse group of different conditions. Classification and understanding of conditions in this group of disorders is continually evolving.

SO WHAT IMPACT DOES THIS HAVE FOR THERAPISTS TRADITIONALLY INVOLVED WITH ADULT NEUROLOGICAL PATIENTS?

Firstly for therapists currently working with adults, the neuromuscular adult population is more clearly defined. It is possible now, given a precise diagnosis, to at least have an understanding of what the potential problems might be and to deliver therapeutic interventions to delay or manage those problems. Although there are several potential therapeutic treatments under way, currently none of these offer a complete cure. Management of the physical signs and symptoms of NMDs, as and when they occur, therefore continues to play a key role in the treatment of these conditions. In the future it is likely that the severity of the disorder will be reduced and the progression may slow down. For the paediatric therapist in 10 or 20 years time this may mean a reduced caseload or less intense intervention to the neuromuscular population but for therapists who look after adults it is highly likely that there will be many more patients with NMDs due to improved longevity.

Secondly, there is also a growing population of patients who previously never reached adulthood. The few who did tended to be 'held onto' by paediatric teams unwilling to let the families go when reaching adulthood was an unlikely proposition. The changing pattern of clinical referral now seen, reflects the dramatically improved management of these children that has

TABLE OF CONDITIONS

NAME OF CONDITION	GENE SYMBOL (PROTEIN)	INHERITANCE	PHENOTYPE	RESPIRATORY WEAKNESS	CARDIAC COMPLICATION
Duchenne Muscular Dystrophy DMD	Dystrophin	x-linked 1:3500 live male births	Rapidly progressive muscle weakness. Untreated will die by age 19years. Associated with learning difficulties and an increased frequency of autistic tendencies though intelligence can be normal. With currently available treatments life expectancy can reach 30+.	Usually require non-invasive ventilation by late teens.	Annual cardiac monitoring from 8 to 10 years. Teatment with ACR inhibitors and Beta blockers.
Becker MD BMD	Dystrophin	x-linked	A milder and more variable form of DMD with similar complications.	Evidence of respiratory weakness.	Requires similar cardiac evaluations and treatment to DMD.
Charcot Marie Tooth Disorder CMT Type 1-IV	Multiple disease causing genes and proteins	Dominantly inherited	Sensory loss in hands and feet. Muscle weakness and foot deformities are common.		Risk of cardiac complication but not common.
Merocin deficient Congenital MD MDC1A	LAMA2 Laminin alpha 2 chain of merocin	Recessive inheritance	Severe muscle weakness and contractures. Some patients may be able to walk initially but this ability is not sustainable.	Respiratory failure common.	Cardiac failure uncommon.
Ullrich syndrome UCMD	Coll6A	Recessive inheritance	Characterised by contractures and distal hyper-mobility scoliosis is common. Most lose independent ambulation in childhood.	Respiratory failure common.	Cardiac failure uncommon.
Emery Dreyfuss MD EDMD	LMNA Lamin A/C	x-linked or dominantly inherited	Contractures are a problem in this type of MD.		Conduction defects of the heart require pacing or implantable defibrillator.
Fascio-Scapulo-humeral MD	FSHD Unknown protein abnormality	Dominant inheritance	Variable presentation and age of onset although the earlier the diagnosis the greater the severity. Foot drop is common as well as facial and UL weakness.	Respiratory failure rare.	Cardiac complications rare.
Limb girdle MD LDMD Type 1 A-E LGMD Type 2A-J	CAV3 Caveolin CAPN3 Calpain DYSF Dysferlin LGMD2C-F Sarcoglycan FKRP Fukutin related protein	Type 1 Dominant inheritance Type 2 recessive inheritance	Presentation can vary from the teenage years into adulthood. Although limb girdle weakness is characteristic distal involvement may also be present.	May have respiratory weakness.	May have cardiac complications.

Table 1 (continued on page 21)

enabled them to achieve adulthood. This has also had an effect on hospice provision where a place may have been offered to a young person who is unlikely to live beyond the age of eighteen years. The welcome changes in life expectancy are leading to confusion in the area of respite care and hospice provision as, despite having a life threatening condition, the improvement in management of these young people has changed the predicted outcome for those who comply with medical and therapeutic intervention.

WHAT CLINICAL INTERVENTIONS HAVE MADE THE DIFFERENCE IN IMPROVING LONGEVITY AND QUALITY OF LIFE IN PATIENTS WITH NEUROMUSCULAR DISORDER?

The most significant advance to date has been the use of nocturnal ventilation and other methods of respiratory support. In the 1960s the average life expectancy of children with DMD was 14 years of age. Death was mainly due to respiratory failure (90%) and cardiomyopathy (10%)[1]. Due to the development of specialist clinics during the 70s, 80s and 90s the average survival increased to 19 years of age. However the introduction of nocturnal ventilation during the 1990s dramatically improved life expectancy to the mid twenties.[2-3] Now patients with DMD can be expected to live even longer. In Denmark, where ventilation was introduced during the 1980s, there are many patients in their 30s and 40s.[4] All of these older patients have tracheostomy ventilation, which in Denmark is introduced once daytime ventilation is required. Here in the UK, those people with DMD who have had spinal surgery, who use respiratory support at night (and sometimes during the day) are increasingly surviving to 30 years of age. It is thought that the additive impact of ventilation and a stable spine further improve longevity.

The management of respiratory weakness is one example of how the physiotherapist must keep up to date with current literature principally where the use of physiotherapy techniques make a huge difference to life expectancy and quality of life. Those of us working in specialist centres have a particular responsibility to disseminate this knowledge where there is new evidence to support therapeutic interventions. New treatments are still being evaluated to help with the effects of weak inspiration and an ineffective cough. For example the cough assist machine (mechanical in-exsufflator) provides the therapist and the family with a simple way of managing ineffective coughing [5-10].

The same principles that are used in DMD can also be applied to many other conditions including spinal muscular atrophy, LGMD 2I, congenital muscular dystrophy 1A, sarcoglycan deficiency, multicore myopathy and rigid spine muscular dystrophy 1 (RSMD1 or SEPN1).

In the case of people with multicore myopathy or SEPN1, ventilatory failure occurs whilst they are still ambulant, highlighting the importance of specific understanding of individual conditions. The introduction of ventilation has evolved gradually but there are now published guidelines for respiratory management in DMD and in other neuromuscular disorders [11-12]. Regular assessment of respiratory function is recommended with trigger points to stimulate further evaluation and to indicate when ventilation is required. When nocturnal ventilation first began to be used in the management of DMD, most patients were ventilated following an acute emergency admission but now regular assessment and careful monitoring of clinical symptoms can enable the clinician to anticipate the onset of respiratory problems and introduce effective treatment before a crisis occurs [13].

There have also been significant advances in the management of cardiomyopathy. Death from severe progressive cardiomyopathy used to occur around age 16 in boys with DMD. By the age of 18, all young people with DMD are likely to have developed a cardiomyopathy that will progress over time [14]. However, the treatment for heart problems has also moved forwards significantly [15]. Previously, treatment tended to be given to patients with DMD who were in severe heart failure and exhibiting symptoms such as ankle swelling and shortness of breath. Now, there is a systematic approach to the management of cardiomyopathy. Guidelines have recommended the regular evaluation of cardiac function yearly over the age of 10 and treatment with ACE inhibitors and beta blockers is offered if there is deterioration from one assessment to the next, even within a normal range [16-17]. This demonstrates how knowledge of the potential complications can influence management and how today the emphasis is much more about prevention of complications and prophylaxis than crisis management. As with ventilation, lessons have been learnt about the management of cardiomyopathy in other diseases. For example patients with LGMD 2I may experience cardiac failure so these patients also have regular echocardiography. Treatment will be recommended before cardiac failure is debilitating, knowing the diagnosis can pre-empt a crisis by early intervention.

Other NMDs have different cardiac complications. For example patients with myotonic dystrophy may die suddenly. For this reason regular cardiac evaluation is recommended so that should there be evidence of arrhythmia, a pacemaker can be inserted. Similarly, patients with Emery Dreyfuss MD almost inevitably have conduction defects of the heart, which require pacing and possibly implantable defibrillators.

Physiotherapy has a vital role to play in the treatment and management of these conditions throughout every stage of the condition. For growing children with progressive conditions stretches, passive movements and orthoses when used together can make a difference in the prevention of deformity [18-19]. The role of exercise is controversial for both adults and children. Clearly there is a risk of disuse atrophy but also there is concern regarding the effect of exercise particularly resisted or eccentric exercise on fragile muscle membranes although in the mouse at least voluntary exercise was found to be beneficial. [20-23]. In FSHD, there is weak evidence for overwork atrophy but more recently

TABLE OF CONDITIONS (CONTINUED)

NAME OF CONDITION	GENE SYMBOL (PROTEIN)	INHERITANCE	PHENOTYPE	RESPIRATORY WEAKNESS	CARDIAC COMPLICATION
Myopathies	Many diseases with multiple genes and proteins	Dominant or recessive inheritance	Variable presentation, progression and severity.	May have respiratory weakness.	May have cardiac complications.
Multicore myopathy	SEPN1 selenoprotein	Recessive inheritance	Distal laxity, proximal and generalised weakness. Spinal rigidity with typical 'side sliding' spinal deformity which develops whilst ambulant. Atrophic phenotype.	Respiratory failure develops whilst ambulant.	
Bethlem myopathy	COL6A1-COL6A3	Dominant inheritance	Contractural phenotype. Variable age at onset and disease severity. Slowly progressive.	Occasional respiratory failure.	Cardiac involvement uncommon.
Myotonic Dystrophy DM1 DM2/PROMM	DMPK Myotonin protein kinase	Dominant inheritance	Congenital type (babies born to affected mothers) is severe with severe learning difficulties and motor delay. Adults have very variable phenotypes with multi-system involvement, cataracts, frontal balding, facial weakness, myotonia, increasing weakness with age.	NIV may be required.	Cardiac complications are frequent with sudden death common.
Spinal Muscular Atrophy Types 1-111 reflect a disease spectrum rather than separate entities	Type I SMN1 Survival motor neurone protein	Recessive inheritance	Type 1 SMA. Very severe, diagnosed in infancy. Increasing respiratory and bulbar weakness leads to death usually around the age of 18 months to 2 years. These children are never able to sit or stand independently.	Some are ventilated invasively.	
	Type II SMN1 Survival motor neurone protein	Recessive	Severe muscle weakness. Unable to walk independently but may walk or stand with orthotic intervention. Life expectancy is increasing now that nocturnal ventilation is available. Intelligence is at least normal.	NIV commonly required in early childhood or teenage years but also in later adult life.	Occasional cardiac problems.
	Type III SMN1 Survival motor neurone protein	Recessive	Walk independently but may lose ambulation in time especially if diagnosed in childhood. Others with milder disease may walk into adulthood.	Respiratory failure may occur in adulthood years after ambulation is lost.	Cardiac problems uncommon.

Table 1 (continued from page 19)

moderate exercise has been encouraged [24-25]. Individually tailored advice and exercise programmes are required. Respiratory muscle training is another controversial topic. The quality of evidence is generally poor in adult neuromuscular populations but is more robust in DMD. Overall it is thought that stronger muscles are more likely to respond to training and endurance is more likely to improve than strength [26-31]. However the long term benefits are uncertain. A Cochrane review is planned on this topic.

Assessment of 24 hour postural management with appropriate intervention taking account of lying, sitting and standing postures is an essential aspect of physiotherapy intervention. Ensuring movement is facilitated using appropriate wheelchair provision for those who are unable to independently alleviate static postures is imperative and the correct advice with regard to when and when not to exercise is a fundamental part of the physiotherapists work. The increased availability of tilt in space and recline wheelchairs has dramatically improved postural management. However our ability to influence funding sources was severely hampered by the lack of quality evidence for benefits. We should learn from this experience and actively promote quality clinical research.

Our expertise is essential in assessment of function, strength and changes over time as well as providers of treatment, advice and support. Our assessment and evaluation skills will become even more important as new treatments are developed and we must evaluate

change to determine the outcome of new interventions and treatments. Already physiotherapists are developing new roles as members of international clinical trials teams.

Quality of life however must surely be the most important outcome. Medical professionals severely underestimate the quality of life experienced by ventilated people with progressive neuromuscular disease [32]. Recently [33] Rahbek reported observations from an adult population of people with DMD which confirmed that quality of life was good but there were some important areas, which could be improved, for example most people did not have paid employment, or experience a good education and most did not have an intimate relationship with a loving partner. This was a cause of concern and regret to the participants in the study. Significant changes in our expectations and improvements in services promoting independence must be sought to improve life long outcomes.

These brief examples give an idea of how longevity has improved in the population of patients currently in adulthood or approaching adulthood. However, daily treatment with corticosteroids has become the gold standard for ambulant patients with DMD [34-36]. Steroid treatment (either prednisone or deflazacort) has been shown to prolong ambulation up to age 13 or more (when ambulation is usually lost at a mean age of 9 years), the requirement for spinal surgery is greatly reduced, the heart remains stronger than boys not taking steroids and the FVC is hugely improved so that at age 18 the FVC is 80% of the predicted value for age and height compared with 10-20% for those not treated. The average age for ventilation is around 17-18 years but in those treated with steroids none have yet required ventilation having reached their early 20s [37-39]. The population of steroid treated boys in the UK is still young, most are under the age of 11 years, and only recently has it become a widespread treatment but in the future we would expect an even greater population of adults with DMD.

New treatments do not mean that there will be no problems and it is likely that there will be unexpected new problems as we see an emerging population of patients entering a phase of their condition that has never before been experienced.

There are several international Phase 1 and Phase 2 trials underway. Currently a trial of myostatin inhibition in adult patients with limb-girdle muscular dystrophies, Becker muscular dystrophy and fascioscapulohumeral muscular dystrophy is approaching completion. Several trials are in progress for children with SMA and in DMD there are several trials pending including a Phase 1/2 trial of antisense oligonucleotide therapy and a trial of a compound called PTC 124 which would be applicable for patients with a point mutation. Interestingly this compound is also being tested in patients with cystic fibrosis. We wait in anticipation for a cure but at the moment all of these treatments are likely to require repeated treatments and are unlikely to cure but hopefully will significantly reduce the severity of the disease [40-42].

CONCLUSION

These patients are now expected to live into adulthood, and as therapists we have to prepare for this and develop new networks that can ease the transition into adult services. It may be helpful to prepare ourselves to expect the unexpected, to research the literature for new developments in management and treatment and as physiotherapists we have to help each other across the child/adult boundary. We will have to learn from each other as never before. Many neuromuscular conditions are no longer just childhood disorders. Those of us with an interest in NMDs affecting both children and adults have much to learn in this exciting time [43-44].

Specialist muscle centres have a role to play in the education of professionals who are involved in the treatment and management of NMDs but have a generic caseload. The muscle centres which increasingly provide services for both children and adults can provide a platform for the transition from paediatric to adult services whilst working with charities such as the Muscular Dystrophy Campaign to raise awareness of the changing face of neuromuscular disorders. Professionals also have a responsibility to generate evidence and take up research challenges to ensure momentum within the progression of treatment and management strategies is maintained. If this is undertaken within multidisciplinary teams, a multifaceted approach must surely be fostered which can only be beneficial to young people and adults with a neuromuscular disorder. For example, the specialist genetics nurse, care advisors, speech and language therapists, occupational therapists all have important roles to play. No one profession can assume responsibility for such clinically complex conditions and maintaining strong trans-disciplinary links will continue to encourage an all encompassing approach to treatment and management.

THE NEUROMUSCULAR PHYSIOTHERAPY GROUP

The Neuromuscular Physiotherapy Group is a subgroup of the Association of Paediatric Chartered Physiotherapists (APCP). Our inaugural meeting took place in May 2005 at CSP Headquarters in London. The group was formed to address an increasing need for physiotherapists working with these rare conditions to share expertise and information, in an area which is rapidly changing.

This group seeks to involve active participation from therapists working with patients through the transition

stages and beyond from child to adult services (often at critical clinical times for patients) in order to facilitate a better understanding of the emerging difficulties that many of these young patients and their families will face.

This APCP sub-group provides therapists with a medium to work together to develop current management programmes. It is a forum where ideas can be discussed and research can be supported.

The main aims of this group are:

1. To promote the role of physiotherapy for children and adults in this specialist area.
2. To provide a forum for clinical networking, peer support, review and information on specific clinical issues.
3. To provide an expert body of skills and knowledge in the field of neuromuscular disorders.
4. To develop and promote the use of evidence based practice within this specialised clinical area of paediatric (and adult) conditions.
5. To promote and ensure a national standard of best practice by members working in this specialist field.
6. To develop and promote access to continuing professional development (CPD) opportunities through conferences, study days and courses.

We would very much like to hear from any ACPIN members who would also like to be involved with the Neuromuscular Group. You do not need to be a member of the APCP to join. Our next general meeting will be in March 2007.

For further information, or to join this group, please contact: Elaine Scott (Secretary) *t* 07795 227170 *e* e_scott@btopenworld.com **or** Marina Morrow (Chair) *t* 0141 774 3428 *e* marina.m@ntlworld.com

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FOCUS ON
'Saint or Sinner'
The randomised controlled trial

Sue Mawson MCSP
Bsc (Hon) PhD
President of ACPIN

There has been considerable debate over the last decade about the small proportion of medical treatments that are based on sound scientific evidence (Smith 1991, Grayson 1997) and about the wisdom of basing clinical decisions and practice solely on the findings of quantitative research (Mant 1999, Rolf 1999).

> *"… external clinical evidence can inform, but can never replace, individual clinical expertise, and it is this expertise that decides whether the external (formal) evidence applies to the individual patient at all and, if so, how it should be integrated into clinical decisions."* Sackett et al 1996

It is interesting that Sackett uses the term 'individual patient' whilst many clinical guidelines are based on the hierarchy of evidence published by NICE (NICE 2004) where the gold standard for evidence is the Randomised Controlled Trial (RCT), a research methodology that does not provide any information about the individual patient in the trial.

EVIDENCE HIERARCHY	
1A	Evidence obtained from systematic review or meta-analysis of Randomised Controlled Trials (RCT's)
1B	Evidence obtained from at least one RCT
2A	Evidence obtained from at least one well-designed controlled study without randomisation
2B	Evidence obtained from at least one other type of well-designed quasi-experimental study
3	Evidence obtained from well-designed non-experimental descriptive studies, such as comparative studies, correlation studies and case studies
4	Evidence obtained from expert committee reports or opinions and/ or clinical experiences of respected authorities

Table 1

In this article I will propose that we need to consider two concepts when designing research studies, one the need for evidence about populations (central tendency) and one about individuals (variance). These two concepts will dictate not only the research design but also the measurement tools used and the consequent methods of analysis.

In order to understand some of the problems associated with the current hierarchy one must consider the history of the RCT. This experimental design was first used within the agricultural industry where new products such as fertilizers were being developed and tested to establish which produced the best results. All factors could be controlled, the nutrients, sunlight, hydration ensuring that the resulting difference in growth could be attributed, with high levels of confidence, to the chemicals applied. However during the middle of the 20th century this model of investigation became adopted by the pharmaceutical industries in the testing of drugs on human subjects.

Herein lay the inherent problem that variables could not be controlled in the same way and that the interaction between variables and body systems are fundamental to the intervention and indeed the outcome. Furthermore, in complex interventions, it will always be difficult to identify the 'active ingredient' as defined by the Medical Research Council in their enlightened publication *A framework for development and evaluation of RCTs for complex interventions to improve health* (MRC 2000). Wade (2005) supports this issue of interactive processes suggesting that research will be flawed and unable to answer the research questions if the investigator tries to establish the effects of one aspect of the rehabilitation process rather than the package as a whole.

> *"It is probably impossible to isolate the effects of one profession within the team. More importantly, it is also probably both scientifically invalid and politically inappropriate."* Wade 2000

A further problem with the RCT lies in the need for randomisation and controlling if the researcher is to use probability and inferential statistics. These are the processes undertaken that ensure equal chance of the subject being in the study itself (randomisation from a population) and equal chance of being in the treatment or the control group (randomisation into the different arms of the study where one group does not receive the intervention being tested). In this way the researcher can establish the probability (the p value) of the difference between group outcomes being attributable to the intervention and further more it enables the researcher

to establish the likelyhood of these results being the same if a second or third random sample from the population were selected. This is the essence of the drug trial and one of the pre-requisites for the use of the t-test for group differences.

With human subjects (people rather than seeds) randomisation may be problematic. Some years ago Toynbee (1996) published an interesting article in *The Independent* about the problems of medical research stating that;

> *"randomised clinical trials of new medicines presents a dilemma for doctors who want results and patients who want to be cured."*

In the article Toynbee suggests that Professor David Machin, then Chief statistician for the Medical Research Council, believed that trials were collapsing as patients didn't want to be randomised into control groups particularly where knowledge already exists about the potential benefits of the drug to be tested. With the advent of the Internet many patients are fully aware of early phase drug trials and don't want to risk the possibility of not receiving the intervention.

Whilst pragmatic randomised controlled trials, as described by the MRC in their guidelines (2000), may compare new interventions with 'current best practice' so overcoming the problems of no treatment, there are times when the control group may not receive intervention. In our own current RCT at Sheffield Teaching Hospitals, NHS Foundation Trust (Mawson et al 2006) where one group receives physiotherapy and Botulinum Toxin A (BTA) and the other stretching advice and BTA we have encountered this problem on a number of occasions. The patients who are randomly allocated to no physiotherapy are very unhappy at the end of the trial despite careful informed consent prior to allocation. We have overcome this difficulty by using funding to provide subsequent physiotherapy where requested. This method of RCT design has been recommended by a number of authors in an attempt at overcoming the problem.

Inclusion and exclusion criteria present their own problems with the RCT design. By defining the population to be studied it might be suggested that the evidence cannot be then inferred to patients with more complex associated health problems. Indeed by selecting in this way and then subsequently undertaking an informed consent process the sample will be inherently biased, paradoxically, one of the fundamental research problems the RCT tries to overcome.

Perhaps of more interest is the method of analysis used in the RCT where the individual scores are aggregated into a group mean or median value. The before and after intervention values between groups, is tested for a statistical significance by the t-test or non-parametric equivalent. Herein lies a fundamental problem particularly when one considers the potentially small sample sizes seen in physiotherapy research (usually the result of small funding streams as multi-centre trials are extremely costly and the lack of critical mass when researching conditions such as MS, head injury, spinal cord injury).

Consider the following scenario where a study with a sample size of 30 is analysed before and after physiotherapy intervention. The flat distribution in *Figure 1* below representing the before intervention data (high level of variance) and the after intervention distribution having a low variance.

MEAN VALUE RELATIVE TO AMOUNT OF VARIANCE

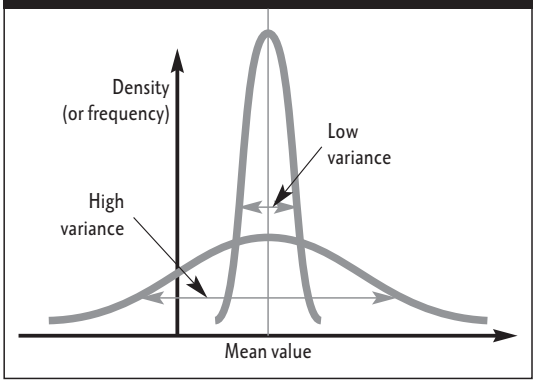


Figure 1

Whilst the mean value has not changed and certainly wouldn't be significantly different the distribution of the values has changed. Some patients may be walking faster and some slower for example, some patients improving and some deteriorating. This is the problem Mant (1999) reports in his article about the use of randomised trials to inform clinical decisions about individual patients;

> *"The paradox of the clinical trial is that it is the best way to assess whether an intervention works, but arguably the worst way to assess who will benefit from it."* Mant 1999

This use of aggregated group means rather than changes in variance has been identified by Stephen Gould a palaeontologist and fascinating writer who made the following comment based on his own experience of illness:

> *"central tendency is an abstaction, variation reality……I am not a measure of central tendency, either mean or median. I am one single human being with mesothelioma……..I must not simply assume that my personal fate will correspond to some measure of central tendency"*

- Median survival figures post diagnosis = 8 months
- Gould survival = 20 years

In summary one might consider the table on the right (*Table 2*), which suggests that we need to consider both concepts if we are to undertake truly valuable research activities.

There are in fact a number of different ways of collecting and presenting information about an individual patient, however they are not without their own set of limitations.

- The case study
- The case report
- The single case experimental design (SCED)

The case study focuses on the circumstances, dynamics and complexity of a single case that is extensively explored. This method usually involves both quantitative and qualitative observations through fieldwork, interviews and notes/records. There is no controlling of the environment or the input given and no standardisation of outcome measures. Because of the above there can be no attribution of cause and effect rather a development of experiential knowledge valuable when considering very specific patient conditions or scenarios. (Yin RK 1994).

The case report describes the treatment given and the outcome achieved for one patient or individual. This usually contains a theoretical explanation for changes observed and a rational for the treatment given. Again there can be no attribution of cause and effect simply an increase in the body of knowledge about a specific condition of area of practice.

The Single Case Experimental Design (SCED) This design uses repeated measures under controlled conditions in order to try and investigate the relationship between intervention and outcomes. The individual acting as their own control. There are a number of different methods but the most common are the AB, ABA (withdrawal) designs and the ABACA involving two different interventions (B and C), A being the non intervention phase, (www.education.man.ac.uk/rgsweb/MS6521_sess11_lec.pdf) (Ottenbacher KJ 1986, Backman et al 1997). See *Figure 2* and *3*.

One of the problems of the SCED is in the analysis, which is usually simply a visual display of the data points. Values are plotted on a graph over time and divided into the A (base line time period) and B (the intervention time period), in an ABA design the treatment is withdrawn. Values may be the patient's functional state as measured on an ordinal scale, that is non-parametric, or walk speed, blood pressure, heart rate which are parametric units of measurement. When using ordinal data ie no true unit of measure the median or mode values can be calculated for the different phases. When using interval or ratio data ie a true unit of measure the mean value can be calculated for each phase.

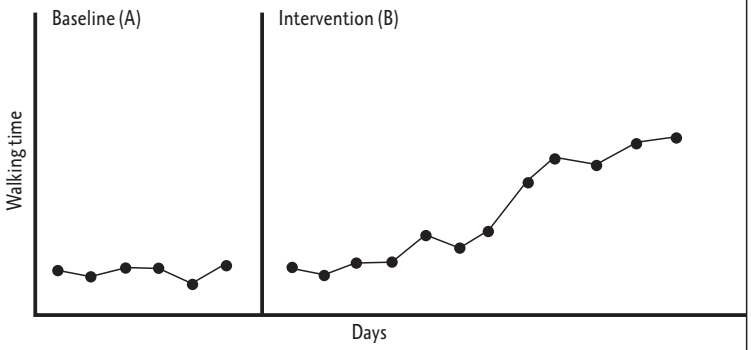
Initially the investigator would look at the variability in the data as this may indicate that the data is unstable such that no meaningful conclusions can be draw (Tawney & Gast 1984) Secondly the investigator can draw lines of 'celeration' from either individual values

THE INDIVIDUAL VERSUS THE GROUP

	CENTRAL TENDENCY	VARIANCE
Outcome measures	Dichotomous Uni-dimentional Context free Gold standard	Continuous Multi-dimentional Context specific Patient centred
Theory	General causality and attribution	Associations and relationships between variable
Statistical analysis	Hypothesis testing t-test, evidence of effect Mean or median	Interactive effects, evidence of individual change
Generalisation	Attributable to whole population	To individual

Table 2

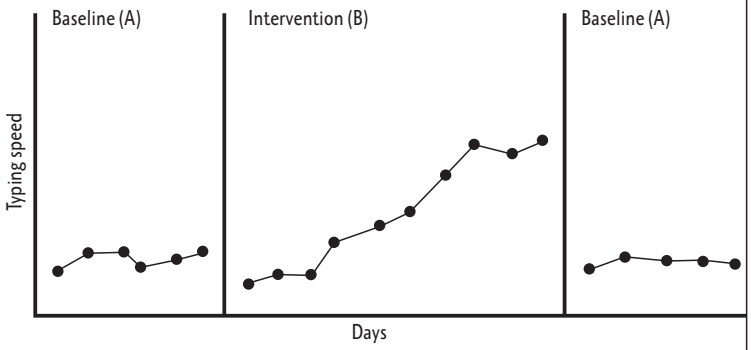
GRAPHICAL DISPLAY OF A SCED SHOWING THE AB DESIGN



Data from a hypothetical example of an AB design. After a baseline phase (A) the independent variable of strength training is introduced in the intervention phase (B), and the dependent variable (walking time) is measured throughout.

Figure 2 (taken from Backman et al 1997)

GRAPHICAL DISPLAY OF A SCED SHOWING THE ABA DESIGN



Data from a hypothetical example of a withdrawal design. The independent variable, an adapted computer keyboard, is introduced during the intervention pase (B) and subsequently withdrawn.

Figure 3 (taken from Backman et al 1997)

or the median and mean values. This is known as an estimation of trend (Ottennbacher 1986)

Much controversy exists as to whether you should statistically analyse individual performance (Kazdin, 1982). This is mainly for two reasons: firstly it is difficult to aggregate ordinal data as the individual values have no true mathematical meaning and secondly the values lack statistical independence (there is an inherent relationship between the dependent variables values). Whilst the researcher might wish to use the A phase as the control in the same way as the RCT uses a control the issue about independence, mathematic properties and the lack of randomisation make both probability and inferential statistics impossible.

However one method of evaluation based on the individual response to treatment that can be analysed statistically is the TELER Method (Le Roux 2004, Grocott & Cowley 2001, Mawson 1993). This method can be used in a single case design and more importantly it can be used as the outcome measure in a RCT. Combining this measuring tool with the experimental design of the RCT would give the researcher the ultimate level of knowledge about the individual response to intervention and the attribution of causality so important when trying to provide evidence of effective intervention. I wonder what Steven Gould would have thought about that idea!

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ACPIN National Conference and AGM 2007
Saturday 24th March, Sheffield Hilton

Challenging balance

This one-day conference will explore the physiology, measurement and treatment of **complex balance disorders**, a topic which challenges therapists across the broad spectrum of neurorehabilitation. We will be welcoming innovative and exciting speakers, some of whom are familiar and others new to the ACPIN conference programme. It promises to be a thought-provoking and stimulating day and will provide a fantastic opportunity for networking in a wonderful setting.

Watch Frontline or go to www.acpin.net for further details

THE ASSOCIATION OF CHARTERED PHYSIOTHERAPISTS INTERESTED IN NEUROLOGY

ACPIN news

INTERACTIVECSP

EXCITING NEW SERVICE FOR ACPIN MEMBERS

A new service has recently been launched across the UK that enables physiotherapists to share their knowledge and experience with each other based around their interests, irrespective of where they live or work.

ACPIN are partners in this initiative, running the ACPIN network on the service. We are involved because we believe it will greatly improve communications and knowledge sharing across neurological physiotherapy. It will also help ACPIN to improve its services to you and its communication with you.

The service is based around a web-site developed by CSP called interactiveCSP (iCSP). We want to emphasise, however, that the service is about physiotherapy not technology. Also, the site is easy and intuitive to use so that you really can focus on the content, not the means of accessing it!

The overall responsibility for the ACPIN network on the site will rest with the executive committee but the network will be managed on a day to day basis by members of the committee who volunteered and have been trained for this role. This will help to ensure it is authentic and reflects your voice, needs and issues. **However, the only real guarantee of this will be for you to register to the site, join the network and then use it.**

The network will give you access to discussions, news, events, documents, useful web-sites and practice initiatives, all related to neurological physiotherapy. Furthermore, you and all other users can contribute content to any part of the network. So you can ask questions of your peers, promote events you are running, share documents that you have created and much more. In addition, you will receive a regular email summarising all the new content that has been added to the network. So you can keep up with developments even if you don't regularly visit the network. For some more of the benefits see below or refer to the supplement recently distributed with CSP's *Frontline* magazine.

This is a significant undertaking for ACPIN as it is for many of our sister interest groups. We are involved because it offers the profession the chance to transform its communications and knowledge sharing capacity. We are delighted that some of your peers have volunteered to help us with this by becoming moderators. Now they and we need your support. We need you to join up and join in.

To use the service and join the network you need to register to interactiveCSP by going to www.interactivecsp.org.uk and then clicking on 'Register'.

You need your CSP membership number and an email address to complete the registration process, which will take 5-8 minutes. On the last part of the registration process you will see the list of available networks, including ACPIN. Once you have registered you can login and use the service.

So please register and sign up to the network. If you have any problems registering or using the site please get in touch with icsp team on icsp@csp.org.uk or call 020 7314 7870.

The network is also available to ACPIN members who are not CSP members. However you will only have access to the network not the rest of the site. Non-CSP members should have received a letter from CSP with details of how to register to the network. If you have not received a letter please email the iCSP team at CSP on icsp@csp.org.uk with the subject 'icsp ciog access' and in the main body of the email include your full name and the name of the CIOG.

10 Key features of iCSP

1. Free, easy and effective
2. Fully searchable
3. Users contribute content
4. Password protected.
5. Content is personal to your interests
6. Email bulletins highlight new content.
7. Users can change interests at any time.
8. Single account for iCSP & CSP web-site
9. Users can track interesting discussions
10. Latest content brought to users' attention

REPORT FROM ACPIN MODERATOR

Chris Manning
Neurology Network Moderator

InteractiveCSP (iCSP), the CSP's online information network has been available nationwide since March 2006 and is well publicised in Frontline and on the CSP website. InteractiveCSP is designed to connect people with shared interests irrespective of location or situation and allow sharing of knowledge and expertise. However the role of ACPIN in interactiveCSP may not be so well known.

InteractiveCSP is managed in partnership by the CSP, clinical interest and occupational groups and regions. ACPIN 'owns' the neurology network. In practice this means that ACPIN manages the neurology network. All content submitted to interactiveCSP is examined by a team of moderators to ensure that the content is relevant and does not breach the terms of service agreed on registration. All the moderators of the neurology network are ACPIN members and responsible to the ACPIN executive committee via a link moderator. The ACPIN executive sets the agenda for iCSP in that they have determined aims for the network and decides on themes for content, which connect with other ACPIN activities, such as CSP Congress. iCSP also offers ACPIN the opportunity to; communicate quickly and efficiently with its constituency, listen and learn from members, promote its work, resources, events and membership, become more proactive with members and to develop new services or rethink the current package.

Since national rollout on 30th March 2006 the neurology network has registered 2,362 users and they have submitted 2,179 content items. iCSP can be used to make unpublished resources available for the first time, for example protocols and local guidelines, as well as drawing attention to published documents. The discussion topics allow exchange of ideas and views as well as requests for information. Courses and other events can be publicised on iCSP

The current theme is 'long term conditions', the topic of the 2006 CSP Congress. Future themes will connect with the First UK Stroke Forum in December 2006 and the ACPIN Conference in March 2007 'Challenging Balance'. Although content on these topics is particularly relevant, contributions in any area are welcome.

If you have any problems there is excellent guidance available on iCSP or if that fails use the 'contact the moderator' link in the menu at the top left of the neurology network homepage.

Keep up the good work; carry on submitting content and encourage your colleagues to register with the neurology network at: www.interactivecsp.org.uk

PRACTICE BASED COMMISSIONING

WHAT IS IT AND WHAT EFFECT WILL IT HAVE?

Louise Rogerson
ACPIN Honorary Minutes Secretary

Primary care trusts are now operating as commissioners and providers in very separate roles. When working as commissioners, the aim is to ensure that services that are purchased are good value for money, and appropriate to the needs of the population. As providers, the aim is to provide high quality services to a population, making maximal use of resources.

Commissioning

Up and down the country there are different methods of delivering this requirement, but they are all based at a practice level. Practice based commissioning is aiming to give the primary care physicians the ability to purchase services that meet their local needs. In some areas, practices are working individually to purchase services, in others there are commissioning groups coming together to share the financial risk and the workload. There is a nationwide project that is bringing pilot PBC sites together to share ideas, and develop the best practice for this new role.

Providers

As providers of local services, groups will need to define their services very clearly in order for them to be commissioned. In most areas, the service specifications will be used to establish the need and impact, the quality and governance, and the cost effectiveness. The rate at which these services are reviewed will vary from area to area, and will be prioritised by the PBC and PCT commissioners jointly.

What does this mean for our patients?

Services provided for patients will be commissioned by the PBC in your area, this could be from a variety of sources including Foundation trusts. As ever, the client group will need to fit a commissioning agenda in order for changes to happen, but patient involvement is high on the list for the Department of Health and commissioners.

What does this mean for physiotherapy services?

Obviously, each locality will be different, but each service needs to become business focused. Be aware of local needs and keep in contact with your PBC leads to gain an insight into their targets and aspirations. It may well be worth finding a local GP to work with your service development and be your champion at a commissioning level. Your service may come under scrutiny at any time, and may be compared to an alternative provider. The time to act is now. Re-design services with outcome measures that relate to impact, as well as quality, this will stand you in good stead for the future. The services that do this will attract investment, and ensure continued support for the patients.

CLINICAL PRACTICE AND AUDIT SUB-GROUP

Louise Dunthorne

This group continues to promote submissions for *Synapse's* 'Sharing Good Practice' feature. If you have any examples of inivitive practice, or have recently run an audit that has shown some interesting results, then please consider writing it up (however briefly!) and sharing it with ACPIN members. Please send, as a Word document attachment to louise@peterdunthorne.com

The group are also looking at the issue of carer training, as possible ARC motions in order to bring this into the wider physiotherapy arena, potentially linking it to the 'Skills for Health' programme. If you have any comments on this topic then please contact the aforementioned e-mail.

COMMUNICATION SUB GROUP

Emma Forbes
PRO Communication Sub-Group

Our aims for this year were to promote ACPIN nationally through the media and to the physiotherapy population.

An article appeared in *Frontline* to promote the benefits of being a member of and participating in the work of a special interest group.

Prior to our Silver Jubilee Conference a press release promoting this was issued by the CSP of our behalf. Following this, an article was published in the May issue of Scottish Primary Care. The article gave an overview of the conference and highlighted the issue of rehabilitation being given in the appropriate geographical location and correct time to give most benefit to patients.

ARC is going ahead in 2007. It is to be held in Oxford on 1st and 2nd of March. We had resubmitted the motion that was accepted last year. It dealt with the issue of tariffs for rehabilitation and the consequences this could have on the decision making of a patient's journey.

Again we will have four places available for members to attend ARC. We already have a volunteer to talk on our motion so it would be a great opportunity to attend as an observer without the pressure of speaking. Please contact me if you are interested.

The communication group plan for November is to improve links nationally and internationally with other similar interest groups.

EVENTS SUBGROUP

ACPIN hosted a single day event at the CSP Congress in Birmingham on Friday 13th October 2006. We contributed to the Congress theme of 'Managing Long Term Conditions' and drew together leading clinical and scientific speakers working in the areas of Multiple Sclerosis, Motor Neurone Disease and Parkinson's Disease to evidence the therapeutic management of these conditions and discuss the challenges facing neurophysiotherapists today.

Representatives from the ACPIN committee will be attending the UK Stroke Forum which will be held on the 7th and 8th December 2006 at the Harrogate International Centre. The ACPIN stand will be there and we are hoping to host a plenary session for physiotherapists attending the event.

Plans are well underway for our Spring 2007 Conference and AGM entitled 'Challenging Balance'. After some very successful years hosting our Spring conference in Northampton, we felt a change in venue was now due. This event will take place on Saturday 24th March 2007 at the Hilton Hotel in Sheffield. Visit www.acpin.net for more information.

There will be no CSP Congress in 2007 so our next project is to plan our own event for that Autumn. The ACPIN committee always welcomes suggestions for future conference topics and speakers so if you have any thoughts or ideas please do get in touch with a member of the executive committee.

SHARING GOOD PRACTICE

A multi-disciplinary ward round

focusing on rehabilitation in an acute neurosurgical unit in Newcastle upon Tyne

The **Clinical Practice and Audit Group** have facilitated the idea of a new regular feature to appear in *Synapse*. Entitled **SHARING GOOD PRACTICE** it aims to help spread the word amongst like-minded ACPIN members about either innovative practice, service developments or successful audits. The format is roughly a question and answer session, covering the salient points of the topic, with a contact name for readers to persue if they wish.

As with all articles in *Synapse*, we are totally reliant on our members contributing material that they feel is of interest to others. So if you have something that has been very successful in your area, and that you are happy to share, then contact Louise Dunthorne at *louise@peterdunthorne.com*

Here **Julia Williamson** talks about the 'Rehab round' on an acute neurosurgical unit.

Who attends?
The 'Rehab Round' is attended by the Multi Disciplinary Team based within the Regional Neurosurgical Unit in Newcastle and staff from the Regional Rehabilitation Unit and local stroke unit. From the Neurosciences Unit, consultant neurosurgeons, registrars and senior house officers, head injury liaison sister, nurses, occupational therapist, physiotherapists, psychologist, speech and language therapist attend as well as consultants in rehabilitation and psychologists from the Regional Neuro-Rehabilitation Unit, a consultant in elderly health and rehabilitation and a representative from a privately run neuro-rehabilitation unit.

How often does it take place?
Once weekly on Tuesday mornings, except the first Tuesday of each month.

What is the main goal of the scheme?
- To assess, discuss and plan ongoing rehabilitation needs and facilitate the best location for their ongoing treatment or care.
- To input into the management of spasticity and complex behavioural problems in the acute setting.
- To advise on the management of underlying medical conditions, that may predispose to cerebral haemorrhage.
- To educate and share best practice among participants and develop expertise in the management of the sequelae of acquired brain injury.

Who selects patients?
Anyone can highlight patients to be seen. This usually falls to the nurse in charge of a ward, the head injury liaison nurse, the physiotherapist or the consultant.

How many patients are seen?
This depends, usually about five or six. They can be in ITU, HDU or any of the wards. They may be anywhere on the continuum from still intubated to independently mobile.

What resources are required?
Little, apart from time. A drug company is currently providing support for an educational programme to run alongside the round.

What are the benefits?
Both patients and staff benefit. Patients have access to botulinum toxin and experts in the management of behavioural problems. Their transition from acute ward to rehabilitation is carefully managed and they and their relatives are aware of the planned course.

All staff are able to learn from each other. Insight is gained into the clinical reasoning behind decisions taken in the first hours after admission, current practice is discussed in the management of complications such as hypertension and cerebral salt wasting. Therapists can share their assessments and knowledge with the whole team and the exchange of information is always two-way.

How can you demonstrate these benefits?
It is difficult to quantify the benefits of this round. Prior to its inception (by one of our neurosurgeons) accessing botulinum toxin injections was haphazard and transfer planning depended on the knowledge of local services held by the nursing staff at the time. Frequently a patient would be assessed for rehabilitation without the knowledge of the RNCN staff. This has now stopped and communication between the two units is much stronger. This cannot be solely attributed to the round but also to the efforts of staff on both sides

Are there any problems with the scheme?
Such a diverse group of attendees can be intimidating to patients and the discussions may become hypothetical at times. While this can lead to stimulating and robust debate, it can be confusing for patients trying to follow the thread.

For further information contact Liz Walker at: *lizwalkerseventy7@yahoo.co.uk*

How could it be developed?
We are hoping to link up (via the internet/web cameras) with a sister hospital in Mumbai India. This will lead to an international exchange of ideas and treatment techniques. Goal setting (such as the weaning of tracheostomies) could be made more formal and measurable.

Other news

UK ADULT SPASTICITY PHYSIOTHERAPY FORUM

Steve Ashford Clinical Specialist & Research Physiotherapist (On behalf of the UK Adult Spasticity Physiotherapy Forum)

BOTULINUM TOXIN (BTX) PHYSIOTHERAPY SPECIFIC GUIDELINE

The guideline has now been produced. Work took place in conjunction with a firm of medical writers 'Connect Medical'. This work was supported by a grant from Allergan (manufactures of BOTOXâ). A consensus meeting took place in Leeds, which involved a number of representatives from the UK Adult Spasticity Physiotherapy Forum, rehabilitation consultant, head pharmacist, leading paediatric physiotherapists from Glasgow and London, a clinical specialist occupational therapist and a senior lecturer from Ripon and St Johns University College at York. From this meeting a draft guideline was produced, which then went through a number of revisions by all who attended the meeting in Leeds. The resulting document covers key areas of practice for physiotherapists in managing spasticity with botulinum toxin. The core content of the guideline is very positive and provides a good basis for future development. Future development, particularly an external review of the document, will continue with the medical writers to refine the guideline.

Discussions have continued with the Royal College of Physicians (RCP) regarding a re-write of the existing multi-disciplinary botulinum toxin guidelines to include physiotherapy specific aspects. There has been agreement to move forward with this and both Allergan (manufactures of BOTOXâ) and Ipsen (Manufactures of Dysportâ) would provide support. An initial 'scoping' meeting is planned for mid October to develop a plan for the production of these guidelines.

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Managing long term conditions

neurology

LECTURE 1

The evolution and progression of the NSF for long term conditions

Professor Lynne Turner-Stokes DM FRCP

The *National Service Framework for Long Term (neurological) Conditions* was published in April 2005. A 'new style' NSF with no money and no targets, it presented considerable challenges to implementation from the start. At almost the same time, the Chronic Disease agenda, was renamed the 'Long Term Conditions' agenda and the NSF quickly became submerged in the drive to keep patients out of hospital at all costs. At a time when the NHS has reached arguably the biggest crisis point in its history, can the NSF still win through? What are its strengths and what can professionals do to keep alive the hard-won principles of user–focused care and joined-up service provision that patients with complex neurological conditions so desperately need.

Biography

Director of the Regional Rehabilitation Unit, Northwick Park. The RRU provides an in-patient and community outreach service for younger adults with severe complex disabilities, and also provides the central focus for the network of services for this group within NW Thames.

Herbert Dunhill Chair of Rehabilitation, King's College London. The academic department of rehabilitation is a two-site department linking the NW Thames regional network of specialist rehabilitation services with academic rehabilitation within the Department of Palliative care, Policy and Rehabilitation at King's College London.

Deputy Chair of the External Reference Group of the National Service Framework for Long-term neurological conditions.

Professor Turner-Stokes was the deputy chair and Clinical lead for the NSF External Reference Group. She also chaired the Research and Evidence group which collated and reviewed the evidence which underpins the NSF.

LECTURE 2

MS and physiotherapy – the perfect partnership

Mrs Jane Petty MCSP SRP

The MS Society has recently set up a physiotherapy programme to promote physiotherapy for people affected by Multiple Sclerosis. The programme aims to work in partnership with existing groups like ACPIN and the NPRN to promote evidence based practice and research into physiotherapy that will best serve this population.

The society has a budget to develop physiotherapy posts to make a difference in a particular area.

It is also working with society branches to use their fund more innovatively to fund physiotherapy posts in partnership with their local providers.

They are also hoping to fund next year the first sponsored doctorate in physiotherapy in conjunction with Brighton University

Biography

Jane Petty is the MS Society's Regional Development Manager for the North of England and the National Lead for Physiotherapy for the MS Society. She took up the post in November 2005 following ten years as Clinical Lead Physiotherapist in Neurology at Sheffield Teaching Hospital Foundation Trust. Jane was responsible for developing a multidisciplinary Team to support people with Long Term Conditions with in the North Trent area. She has worked as a neurological Physiotherapist for 27 years and is on the DOH Advisory panel for the NSF for Long Term Neurological Conditions as the physiotherapy representative.

LECTURE 3

Walking endurance and proximal compensation for distal weakness in Charcot Marie Tooth disease.

Ms Gita Ramdharry

People with Charcot Marie Tooth (CMT) present with multiple impairments including distal muscle weakness. This study aims to investigate the factors that limit walking and the role of proximal muscle activity in compensating for distal weakness.

Method Study 1: Subjects with CMT walked on a treadmill until they reached level 17 on the Borg perceived exertion scale. Gait was analysed using 3D motion analysis. The maximum voluntary contraction (MVC) of the hip flexors was recorded before and after the walking task. Matched controls walked at an identical speed, cadence and total time. Study 2: CMT subjects undertook a sub-maximal fatigue task to reduce hip flexor MVC by 20%. Walking was assessed prior to and after the fatigue task and the time taken to reach Borg level 17 determined.

Results CMT subjects (n=8) have plantarflexor weakness (p=0.011) but relatively preserved strength in the hip flexors (p=0.5) compared to controls (n=5). CMT subjects show differences in ankle (p=0.032) and knee kinematics (p=0.039) due to distal weakness but also demonstrate proximal adjustments of hip abduction (p=0.032) and trunk side flexion (p=0.025) as compensatory strategies. Study 1: After walking CMT subjects significantly reduced hip flexor MVC (p=0.016). Controls reached a median Borg level of 7 compared to 17 in the patient group. In 50% of people with CMT, proximal leg weakness was reported as the main factor that limited walking. There was a decrease in the hip abduction strategy (p=0.015) with increases in trunk side flexion with fatigue (p=0.033). Study 2: Following isolated fatigue of the hip flexors time the walking time in the CMT group was significantly reduced (P=0.032).

Conclusion These results show that in CMT subjects, the hip flexor muscles fatigue during prolonged walking compared to controls suggesting these muscles are more active where there is distal weakness. It appears that subjects use primary and secondary strategies to compensate for their impairments.

Biography

Based at the Institute of Neurology, University College London

LECTURE 4

Scientific development in the management of MND

Professor Nigel Leigh PhR MB BS FRCP FMedSci

Although MND remains an incurable and progressive condition leading to death (usually due respiratory muscle weakness leading to respiratory failure), riluzole has been shown to slow disease progression, and the introduction of gastrostomy feeding and, (particularly) non-invasive ventilation, and the widespread provision of multidisciplinary and palliative care have extended life and almost certainly improved quality of life. The challenge now is to translate advances from the laboratory into more effective treatments with the aim of arresting the disease in its early stages. New biomarkers may facilitate early diagnosis, a pre-requisite of early treatment.

Biography

Nigel Leigh is Professor of Clinical Neurology in the Department of Clinical Neuroscience at King's College London. He is Deputy Head of the MRC Centre for Neurodegeneration Research and Head of the MND Care and Research Centre. Formerly he was Senior Lecturer and Consultant Neurologist at St George's Hospital, and at the Wessex Neurological Centre.

LECTURE 5

Physiotherapy for MND

Ulrike Hammerbeck BPhysT (Pretoria, South Africa)

The NSF for long-term conditions, 2005, emphasises the importance of rehabilitation aimed at maintenance of optimal function, independence and quality of life. Due to the underlying pathology of the disease, physiotherapy for patients with MND is aimed at a wide variety of signs and symptoms.

Historically controversy has surrounded the use and effectiveness of exercise in this client group and patients are still given contradicting advice on this matter. Recent research into the effect of exercises and the respiratory management for patients with progressive neurological conditions, have provided us with better evidence into the effectiveness of these interventions.

The presentation reviewed recent literature relevant to the management of the patient with MND.

Biography

After schooling in South Africa Ulrike attended the University of Pretoria to obtain her degree in physiotherapy in 1995. She worked in South Africa before coming to Europe to work in various neurological settings in the United Kingdom and Germany. For the past four years Ulrike has been a senior physiotherapist at King's College Hospital where she has been heavily involved with the MND clientele and clinic. She has extensive experience of presenting about MND to a variety of audiences and has written a chapter in the 2nd edition of *Palliative care in ALS* which is scheduled to be published in November 2006. Ulrike is in the process of obtaining her MSc in advanced physiotherapy through UCL.

LECTURE 6

From science to practice: evidence-based rehabilitation in Parkinson's disease.

Dr Lynn Rochester PhD Grad Dip Phys

Impaired walking is a typical problem in Parkinson's disease (PD) associated with an increased risk of falls and loss of independence. Medication and surgery are aimed at managing these symptoms, however, gait and balance deficits still persist. Development of novel rehabilitation approaches in conjunction with current treatment is therefore important to manage these problems. Recent Cochrane reviews concluded that there was insufficient evidence to support or refute the efficacy of physiotherapy in PD, however, reviewers did comment that the efficacy of physiotherapy was improved by the addition of cueing techniques. The therapeutic approach is underpinned by scientific evidence from studies of neurobehavioural control of movements. This presentation highlighted the development of the evidence base from laboratory studies through to randomised clinical trials and development of clinical guidelines.

Biography

Lynn is a Reader in Neurorehabilitation at Northumbria University. She leads the Rehabilitation and Long-term Conditions Research Group within the School of Health at Northumbria University. She acted as the principal scientist on a European multi-centre research trial, evaluating the effects of physiotherapy using cueing strategies on walking in Parkinson's disease (The RESCUE project). In addition, she has a number of research projects evaluating the effects of attention and cognition on gait and function, involving both PD and stroke subjects and has collaborative links with universities in the UK and internationally. These include development of rehabilitation techniques, outcome measures, and investigation of mechanisms of movement control which underpin rehabilitation and assessment.

LECTURE 7

Clinical implications of the NICE guidelines for Parkinson's Disease

Ms Bhanu Ramaswamy MCSP PGCert

Guidance provided by the National Institute of Clinical Effectiveness aims:

"to ensure that the promotion of good health and patient care in local health communities is in line with the best available evidence of effectiveness and cost effectiveness."

As we all know, affecting change to established practice can be challenging, both in terms of personal commitment, and in a climate of financial restriction.

Bhanu's session looked at the guidelines for Parkinson's Îisease: diagnosis, management and treatment of adults with Parkinson's Disease in primary and secondary care published by NICE earlier this year in relation to physiotherapy clinical practice and the implications to ensure the guidance is implemented.

Biography

Bhanu Ramaswamy is the Therapy Consultant for Chesterfield PCT; a joint practitioner-lecturer post with Sheffield Hallam University where she is Route leader for the Neurological Physiotherapy Masters programme.

Bhanu qualified at The University of Wales in 1988. Having completed clinical rotations in Britain and USA, she focused her attention on the specialty of older people, particularly Parkinson's Disease. Joining appropriate clinical interest groups she participated in local, regional and national projects, to promote sharing of good practice amongst other therapists. One such project was representing ACPIN and AGILE through the Chartered Society of Physiotherapy on the Development Group for the NICE PD Guideline.

Delegate report

The International Convention Centre in Birmingham once again hosted the CSP Congress 2006. This year ACPIN held a one-day programme, due to a change in format imposed by the CSP. The topic was 'Long Term Conditions' and the day began with Professor Lynne Turner-Stokes guiding through the development of the National Service Framework for LTC.

Her experience as clinical lead in this development enabled her to clarify some of the issues relating to 'Payment by Results' which therapists have to contend with. For example the concept of 'complexity' poses a challenge to therapists to ensure it is accurately reflected in the funding business.

The programme then moved to Jane Petty, National Lead for the MS Physiotherapy Programme who gave us insight into her role, and gave an opportunity to gain access to some funds aimed at improving quality of life for MS patients.

A range of pathologies were covered including CMT, MND and PD, giving an excellent balance of overall management issues with that of clinical ideas to implement.

Overall, the programme was well put together to blend the wider picture of management for LTC, with some practical ideas to apply in the clinical setting.

The venue was comfortable and as in previous years there was a host of stalls to browse around in the exhibition hall, not least the ACPIN stall that had ample supply of chocolates to encourage visits!

Rumour has it that the format of congress is being reviewed so there won't be an event next year. Keep your ears to the ground for what will emerge in 2008!

Reviews
articles, books, courses

Reviews of research articles, books and courses in Synapse are offered by Regional ACPIN groups or individuals in response to requests from the ACPIN committee. In the spirit of an extension of the ERA (Evaluating research articles) project they are offered as information for members and as an opportunity for some members to hone their reviewing skills. Editing is kept to a minimum and the reviews reflect the opinions of the authors only. We give the authors of the original book or paper the opportunity to respond. We hope these reviews will encourage members to read the original article and not simply take the views of the reviewers at face value.

PERIPHERAL NEUROMUSCULAR CONDITIONS

London ACPIN Study Morning
Saturday 13 May 2006
The National Hospital for Neurology and Neurosurgery, London
Speakers: Jo Reffin MCSP, Karen Baker MSc MCSP, Gita Ramdharry MSc MCSP.

Review by **Aretha Monique Morgan-Jones** MCSP

'Peripheral Neuromuscular Conditions' covers a myriad of conditions. This study morning focused on muscle disorders, channelopathies, and peripheral nerve disorders.

Jo Reffin opened with a clear, detailed overview of three muscle disorders: facioscapulohumeral deficiency (FSH), myotonic dystrophy Type 1 (DM1) and inclusion body myositis. Therapeutic intervention was then discussed, including the importance of assessment and treatment of functional tasks. Video footage illustrated well the presentation and treatment of FSH and DM1, and highlighted that in some cases, stretches and orthoses should be given with caution. The importance of an MDT approach, general lifestyle advice and of balancing energy conservation with sufficient exercise to become and maintain fitness was also emphasised. The lecture concluded well with an excellent review of two recent research articles and three reviews. The presentation handout included an extensive reference list and a useful Muscular Dystrophy Campaign myotonia information leaflet.

Karen Baker's lecture 'Channelopathies. A trip into the unknown; crossing channels', began by explaining what a channelopathy is and stressing that the term is very broad. These conditions are genetic, rare, have a complex presentation and can therefore be easily missed. In fact the Channelopathy Anderson-Tawil Syndrome has only been described in the last five years. Three channelopathies: periodic paralysis, episodic ataxia and non-dystrophic myotonia were discussed in detail. Patient quotations were used well to illustrate the nature and complexity of symptoms. The role of physiotherapy 'is presently unknown' but may involve advice and symptom specific exercise. Finally, the intention of CINCH (The Consortium for Clinical Investigation of Neurological Channelopathies) to carry out three five year multi-centred trials into the natural history of these three Channelopathies was briefly discussed. The National Hospital for Neurology and Neurosurgery (NHNN) will be one of five centres for the non-dystrophic myotonia study, which hopes to recruit 75 participants; a figure that highlights the condition's rarity. The presentation handout included a useful list of internet resources.

Gita Ramdharry started the topic 'Management of Peripheral Nerve Disorders' with a concise overview. The incidence, symptoms and management of diabetes, chronic inflammatory demyelinating polyradiculopathy and Charcot-Marie-Tooth Disease (CMT), the commonest causes of peripheral neuropathy were then discussed. The physical management of the latter was focused on highlighting the issues of fatigue, balance, muscle length, gait and upper limb function. The use of orthoses was well illustrated using video footage and graphical results of a patient. The importance of an interdisciplinary approach was highlighted using the NHNN Genetic Peripheral Nerve Clinic as an example. The clinic there has previously had no physiotherapy involvement, however a trial of physiotherapy input is currently taking place and the number of patients seen or referred on etc. being audited, with a view to putting a therapist in place. The presentation handout included internet resources and a comprehensive reference list.

Overall this study morning was very well presented. Each speaker clearly and succinctly discussed their topics in an interesting, and evidence-based manner. This was reflected in the panel discussion which included: the potential use of FES to treat muscle disorders; the potential for channelopathies to be misdiagnosed as conversion disorder and research into the affects of vitamin C on myelin as a possible treatment for CMT.

As Cherry Kilbride, Honorary Secretary of the ACPIN Executive Committee, said, this course was definitely 'worth getting out of bed on a Saturday morning for!'

HYDROTHERAPY IN NEUROLOGY (including application of Halliwick techniques)

Greenpark Healthcare Trust, Belfast, Northern Ireland
Tutors: Chris Washbrock MCSP, Nikki Vigor MCSP, Royal National Hospital for Rheumatic Diseases

Review by **Siobhan MacAuley** Clinical Specialist, Belfast City Hospital

The hydrotherapy in neurology course was a two-day course, held on a Friday afternoon (1.00 to 6.00pm) and Saturday(9.00am to 5.00pm) at the Mitre Centre, Greenpark Healthcare Trust, using their new state of the art hydrotherapy pool. The tutors were not only specialist hydrotherapy physiotherapists but also very experienced in the treatment of neurological conditions and therefore all the course content was specific to the complexities of the neurological patient.

This course achieved a good balance between the theoretical aspects of hydrotherapy ,the clever use of case studies to relate the theory to clinical practice and plenty of opportunities to practice the techniques in the water.

Course programme:

- Hydrotherapy – theoretical benefits
- Physiological effects of immersion
- Contraindications and precautions
- Understanding Halliwick concepts
- Case studies
- Practical sessions
- Lots of fun!

The course was also supported by comprehensive handouts and a pictorial description of the techniques used. This is particularly beneficial as note taking in the water is very difficult!

The cost of the course £160 was justified as there were only 12 delegates on the course and therefore allowed the tutors plenty of time for advice, clinical reasoning and supervision. The handouts were well presented and informative.

On a personal note I found the course extremely enjoyable, thought provoking and most importantly gave me the confidence to use hydrotherapy effectively with this complex neurological caseload. The timing of the course although late on the Friday was a good compromise of work/personal time allowing a day off at the weekend. The only downside was that we all left Greenpark with a severe dose of 'pool envy' at their fantastic facilities.

Regional reports

KENT

Janice Champion
Regional Representative

We have had another good year with membership numbers staying high for Kent and therefore our committee has been strongly supported. This March Nikki Guck stood down from the Chairpersons role after many years of service, and although will remain on the committee we would like to thank her for her enthusiasm and leadership through the last few years. Cathy Kelly-Jones was elected our new Chairperson.

Our programme for 2006 started with a study day in February titled 'Cerebral Palsy in Adult Life' led by Christine Barber, Director of Therapy Services at the Bobath Centre, London. This was very well received and the feedback identified many therapists would now like to attend a longer course on the subject.

The AGM was be held in March at the Kent and Canterbury Hospital and Craig Hayle, Orthopaedic ESP reviewed 'Current concepts of spinal management in physiotherapy'. As usual, with the enticement of a buffet supper, this evening lecture was well attended.

Our next planned day course will be in September in Gillingham and will complete the trilogy – we reviewed the upper limb in 2004, the lower limb in 2005 and now the Dynamic Trunk is the theme for 2006!

The programme for 2007 is still in the planning stage but any ideas from members for future courses are always welcome.

MANCHESTER

Louise Rogerson
Regional Representative

This year has seen changes for the Manchester Regional Group. We have new committee members finding their feet, and taking on new roles. In addition, we have opted for six evening lectures rather than ten, and this has had good results. The attendance has been good for all the lectures so far, and the feedback has also been good. Nick McKie's presentation on the shoulder provided an excellent insight into how our musculoskeletal colleagues deal with a shoulder, and it showed how there is a real meeting of minds between them and us!

Coming up in October is the course – Challenging Your Patient – Challenging Assumptions – this is running at Withington Community Hospital. In November we have a lecture in the north of the region on musculoskeletal techniques for neurophysiotherapists.

We are currently putting the programme together for 2007, but we will follow the same format. As always, we would love to hear ideas from our membership, and we will be using the feedback from lecture attendances. If you have any ideas or suggestions for the committee, do not hesitate to contact us.

NORTH TRENT

Emma Procter
Regional Representative

In the last six months we have run a few evening sessions with varying attendance.

In April Bhanu Rhamaswamy and Carol Keen led an innovative interactive evening on neuro anatomy. Although this is often considered a dry topic they managed to make it very relevant to every day practice – I also think the cutting out and sticking meant that we all felt that we could make a contribution!

In June Sue Mawson and Alison Clarke updated us on the North Trent research hub and the initial results of the Botox trial. It is fantastic to know that so much research is going on locally. We had a surprisingly good turnout considering it was the first hot evening of the summer.

In September we had the biggest attendance of the year to hear Tom Wilkins talk about his Masters dissertation on the relationship between shoulder movement and the trunk. This was a very informative lecture and I think that everybody came away with something that they could apply to their clinical practice.

The next two evening lectures are as follows (both at the Northern General Hospital, Sheffield):

- November 19th Optometry and neurological conditions
- January 25th 2007 Clinical Psychology in brain injury

I am sorry that I have insufficient details to publish a full lecture program for next year, as we are reluctant to publish any thing until we have everything confirmed. We will let you know via *Frontline* as well as local advertising when events are happening. For those of you for whom we have email addresses we will continue to use that method to communicate with you but many email addresses are out of date so I would be grateful if you could sent them to me as this is the cheapest and easiest way of keeping in touch. We do, however, understand that not everybody has access to computers and we will still mail information out. As ever, if anyone has any suggestions for lectures or courses or would like to host an event at their hospital, please get in touch with myself or any members of the committee. We are always looking for ideas.

I would also like to take this opportunity to thank the committee for all their hard work over the year, which is done in their own time, and I look forward to seeing you all at the next event!

NORTHERN

Pam Thirlwell
Regional Representative

We are whizzing through the year to Christmas now (sorry to mention it!) and the year's program is well under way.

We had an AGM cheese and wine which was well attended by the committee but not many other people so we plan to tag it onto a course next year to see if we could manage a quorum!

The rest of the courses have gone well the Introductory Bobath weekends were a success (and gained us a few new members) and thanks to Paul Johnson (tutor) and all the staff at North Tees who helped with the venue.

In May we had Mary Lynch Ellerington to teach on a locomotion course at Sunderland – all feedback was very positive from the weekend. Thanks to Mary and to all the staff at Sunderland who helped organise the venue.

In September we have a day course on the Brain Gym to be held at Freeman Hospital in Newcastle so we look forward to finding out what it is all about!

At present we have no other courses booked in for this year but may yet reschedule the case report writing seminar for October or November.

Plans are already underway for the 2007 programme these include:

- Pam Mulholland weekend in January possible topic is the upper limb
- Lynne Fletcher will be doing an Ataxia course in March
- We are also looking at a Gym ball course , hydrotherapy , Vestibular rehab and possibly a spinal injuries course.

Thank you to everyone who supports Northern ACPIN and anyone who would like to join the committee please contact us and you'll be warmly welcomed.

NORTHERN IRELAND

Joanne Wrigglesworth
Regional Representative

The Northern Ireland region has had another successful year. We have had monthly evening lectures and workshops, including events on ataxia, neuroplasticity and botulinum toxin. Our committee had several resignations last year. On behalf of the chair and ACPIN members, I would like to thank those resigning for all their hard work and welcome the new members and their ideas!

This year, Northern Ireland ACPIN has arranged its programme to co-ordinate with the academic year, bringing in the autumn with a workshop on neurological assessment. This is aimed at junior staff, but should provide us all with a refresher to put us in 'back to school' mode!

We hope to follow this with monthly meetings, incorporating workshops on vestibular rehabilitation, pilates and the Bobath concept. There will also be lectures on FES, MS and cognition/perception.

A new certificate of attendance will be issued to our members at the end of the year, for use as evidence within continuing professional development documentation.

Finally, plans are afoot to organise a number of weekend Bobath courses, along with an upper limb course aimed at more senior staff. We are looking forward to an exciting year and hope to share this with many of our Northern Ireland colleagues.

SCOTLAND

Lindsay Masterton/Dorothy Bowman
Regional Representative

Thank you to Paula Cown for all her input as Scottish Representative for the last three years – she will be greatly missed.

The goal negotiation course led by Cathy Sparks was very successful.

Forthcoming events in Scotland include the re-scheduled Management Course, a Fatigue Management Study Day in early 2007, and a study day/AGM led by Debbie Strang on the 28th April 2007.

We are also exploring the possibility of introducing evening events at more regional level and using webcam link-up at courses for members in more remote locations.

We would welcome feedback / thoughts on the latter two suggestions.

SOUTH TRENT

Tina Hutchinson
Regional Representative

Firstly, we would like to say thank you to Victoria Goodman, Membership Secretary for her work on the Committee and wish her well in the future. We are currently looking to recruit more members to the committee from the region as all members are currently from Derby. Please contact me if you are interested in becoming a committee member.

An evening lecture on Evidence Based Practice and Stroke by Dr Marion Walker was well attended. There was a Head, Neck and Thorax Course on the 23rd and 24th September 2006 at Derby City Hospital, led by Bobath tutor, Debbie Strang.

We are also ran a six day Foundation Acupuncture course on the 27th, 28th and 29th October 2006 and which continues on the 19th, 20th and 21st January 2007 at Derby City Hospital. This is an approved foundation course and is being run by Dr Panos Barlas.

We are currently finalising our 2007 programme which at the moment may include a Practical Bobath Workshop by Pam Mullholland (February 2007), a Neurophysiology Course by Liz

Mackay, Get on the Ball Course (September 2007) and an MS evening lecture/workshop. Details will be advertised locally as plans are confirmed.

Again, if you are interested in becoming a committee member, please get in touch. Thanks for your continued support.

SOUTH WEST

Kate Moss
Regional Representative

South West ACPIN has continued to have a strong membership and committee throughout 2006. There have been two changes to the committee, Kirsten Cheadle has stepped down as regional representative following her move to London and has been replaced by Kate Moss and Jeannie Oakey has passed on the role of secretary to Colin Domaille. We would like to thank both Kirsten and Jeannie for all of their hard work in supporting ACPIN events and wish Kirsten all the best for the future in her new region. At the beginning of August, Bryony Williams (treasurer) had a little baby girl called Ettie. We would like to wish Bryony and new family all the best for the future.

Courses in 2006 included two sessions on the shoulder which were well received and an introduction to iCSP by Gina Sargent. Thank you to those involved with running these courses. Future courses include:

- November 18th/19th – Analysis of reaching and manipulation following stroke, Ailie Turton and Colin Domaille/Liz Britton
- February 2007 – AGM and study day, Liz Mackay, Bobath Tutor

Further details will be available on our website www.southwestacpin.net and all courses will be advertised in *Frontline*.

If you are interested in becoming a committee member of have any suggestions for topics for speakers for the 2006/2007 programme please let us know. Contact me on katy.moss@glos.nhs.uk

SURREY & BORDERS

Brigitt Bailey
Regional Representative

At our AGM in February, we finally recruited some more members to join the committee, which now stands at eleven members. This has given the group a boost and hopefully will lead to organising a varied and exciting programme for the future. This was after the interesting talk by Emma Cooke, research physiotherapist at St Georges' Medical School on the 'Effect on functional strength training in upper and lower limb after stroke'. She gave us a good insight into the research process and how the study is progressing.

In May, Dr Emma Stack, from Southampton University talked to us on 'Balance and Falls in PD'. This lecture was very well attended with people travelling from outside of Surrey to join us. Emma gave a very inspiring and practical talk. Dr Fiona Jones gave a lecture on 'A person focused approach to enabling self management after stroke' on the 13th September at Frimley Park Hospital.

The preparations for the study day on 'Spasticity management' are well underway. This will take place on 17th November 2006 at the Postgraduate Centre at the Royal County Surrey Hospital in Guildford and is partly sponsored by Allergan. It promises to be an interesting day with lectures from Dr John Rothwell and Dr Jane Burridge, as well as three workshops in the afternoon on measurement, physical management and use of botulinum toxin.

For next year we are planning the AGM in February with a lecture from Professor Val Pomeroy on evidence based practice. Future topics are evening lectures on MND and HI and hopefully another study day next autumn.

We have started to use e-mail as a way of informing people of forthcoming events, however will continue to send out fliers to departments. Any ideas and suggestions are always welcome.

SUSSEX

Clare Hall
Regional Representative

The membership is at a healthy 33 in Sussex although more members are always welcome.

Sussex ACPIN aims to provide four events per year in different venues.

On 10th February, we had our AGM and Study Day: 'Application of Out-patient Techniques to the Neurological Shoulder Complex', with Carol Mc Crum, Consultant Physiotherapist in out-patients at the Conquest Hospital. There was positive feedback from all participants about the excellent teaching and opportunity to practice assessment techniques.

On 26th April, we had a study day on '24hour Postural Management with Pauline Pope in Eastbourne. This too was well received.

On 23rd September there was a study day on 'Practice and Feedback for Stroke Patients' with Paulette Van Vliet at the Conquest Hospital, St. Leonards-on-sea, East Sussex.

At the time of writing, our 2006/7 programme of study days is as follows:

- November (date and venue TBC) Feedback from ACPIN Stroke Conference by ACPIN members.
- February 15th 2007 'Hydrotherapy in Neurology' with Raija Kuisma PhD, Conquest Hospital, St Leonards-on-sea, East Sussex. This study day will also include our AGM.

We are always seeking further ideas for topics, speakers and venues. Have a think and let us know about your wishes for next year's programme: contact details of all the committee are on the website.

WESSEX

Mary Vincent
Regional Representative

The beginning of 2006 has seen a welcome growth in the Wessex committee. Ros Cox has stepped in to be chair, to replace Nem Wells who left for Australia at Christmas 2005.

We have got back on track with a regular programme of evening lectures, with successful talks from: Job Wooster, Podiatrist on 'Biomechanics of the foot/ankle' in February; Anne- Marie Hughes, Researcher Southampton University on 'Robotic Therapy for Upper Limb Function following Stroke' in March; Jill Lockhard, Senior Stroke Practioner on 'A change in role from Physiotherapist to Senior Stroke Practioner' in May; Tracey McElwine, Parkinson Specialist Nurse on 'Parkinson's Disease' in June and Jackie Pattman on 'Hydrotherapy' in September.

Our main events for the coming year include:

- Date and venue to be announced – Outpatient techniques for neurology by Debbie Prince and Jo Spencer.

Further evening lectures to be arranged following the summer break.

We would like to thank Wessex members for their ongoing support.

WEST MIDLANDS

Liz Cohen
Regional Representative

The West Midlands ACPIN committee has seen a number of changes over the past six months due to relocation and maternity leave. Albeit belated, we wish to congratulate Zoë on the birth of her twin girls and Jo on the birth of her twin boys. Fabienne is off to pastures new so we would like to wish her well. Also at this time, I stand down as regional representative and wish to thank all West Midlands ACPIN members for their continued support on courses and study evenings. I hand over to Fiona Wallace from September as I leave to have my first baby. Despite losing members of the committee we have welcomed some enthusiastic new members to continue the hard work.

In the past six months we have run a few courses and a study evening. On

18th February for our AGM we welcomed back Helen Lindfield and Liz Mackay to present a 'Clinical Reasoning in Neurology' workshop which was very well attended and received. Then, in May Dr Jill Ramsay, lecturer from The University of Birmingham presented a stimulating evening lecture on Proprioception for which we received positive verbal feedback from delegates and in September we had an 'Introduction to FES' with Christine Singleton at the Moseley Hall Hospital.

We are already planning a busy schedule for the remainder of 2006 and into 2007. The provisional programme so far:

- November 11th-12th Out Patient Techniques in Neurology with Helen Lindfield, Worcester Royal Hospital.
- December Evening Lecture with Nikki Ward MS Specialist Nurse from the Queen Elizabeth Hospital.
- February 3rd-4th 2007 Advanced PNF with Nikki Rochford at the Heartlands Hospital.
- February 28th 2007 AGM and Outcome Measures with Helen Lindfield (date and details tbc).
- June 2007 Cerebral Palsy in Adult Life with Chris Barber, Bobath Tutor (date & details tbc).

If you wish to get more involved in the regional committee, come along (no commitment) and see what it is all about. Our next meeting is 10th October 2006 – contact Fiona for details. Meetings usually happen in and around Birmingham.

YORKSHIRE

Jill Fisher
Regional Representative

The Yorkshire region has a thriving committee we were very pleased to welcome Heather Dunbar and Catherine Crampton onto the committee, also briefly Andrea Habibi who joined us for a short time before her move. Liz Walker has taken over from Karen Wood as treasurer. Many thanks to Karen for all she has done as a committee member and treasurer and to Liz for taking up the financial reins.

We have had a series of excellent evening lectures and day courses all well attended. In fact, in June Pauline Pope led a repeat 'Posture Management Study Day', as demand had outstripped place availability for this excellent study day when it was run last September. Earlier in the year Alan Bass and Kate Warren had led an evening session on 'Treatment of the Acute Neurological Patient' – attendance almost too great for the large room to accommodate!

On March the 15th Dr Wanklyn a Care of the Elderly Consultant gave an evening lecture entitled 'Evidence Based Services'.

At our AGM in April, the day course the speaker was Mick Thacker with the topic 'Pain in Neurological Conditions', feedback was very positive from the 41 people who attended.

A 'Gait Study Day' was led by Debbie Strang in July, again excellent feed back was received from course members who managed to get places, we may be able to run the course again next year.

Future events planned are on the 21st of November a joint spasticity management day with our local neuro OT group and an evening lecture is to be held in York on May 15th with Mary Lynch-Ellerington on 'Incomplete Spinal Injuries'. Other subjects to be hopefully be on the programme in future months include 'Behaviour management for patients with head injuries', a day course on 'Functional re- education of the hand' and an evening session on 'Assessment/clinical reasoning skills'.

Syn'apse rate card 2006

JOURNAL AND NEWSLETTER OF THE **ASSOCIATION OF CHARTERED PHYSIOTHERAPISTS INTERESTED IN NEUROLOGY**

To book space in Syn'apse contact: Louise Gilbert on 0208 852 7579 or email at Louise.Gilbert@uhl.nhs.uk

For technical/production details call kwgraphicdesign on 01395 263677 or email at kw@kwgraphicdesign.co.uk

ACPIN (Association of Chartered Physiotherapists Interested in Neurology), is one of the largest Clinical Interest Groups of the Chartered Society of Physiotherapists with a mailing list of over 1,000 nationwide members working in both the NHS and private practice.

Why Syn'apse is an excellent vehicle for advertising:

- Distribution to a targeted group of health professionals, not only physiotherapists.
- Links with both undergraduate and postgraduate physiotherapy
- The readership have sought out this Clinical Interest Group and are dedicated, highly specific, career-minded professionals.
- It is an excellent forum for you to advertise products relevant to physiotherapists working in neurology, whose expertise and quality decision making heavily influence the product purchasing of managers.

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Publication date

Spring issue: 3rd week in April
Autumn issue: 3rd week in November

Copy date

Spring issue: 28th February
Autumn issue: 30th September

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Guidelines
for authors

***Synapse* is the official newsletter of ACPIN. It aims to provide a channel of communication between ACPIN members, to provide a forum to inform, instruct and debate regarding all aspects of neurological physiotherapy. A number of types of articles have been identified which fulfil these aims. The types of article are:**

CASE REPORTS

Synapse is pleased to accept case reports from practitioners, that provide information which will encourage other practitioners to improve or make changes in their own practice or clinical reasoning of how to influence a change or plan a treatment for that condition. The maximum length is 2000 words including references. An outline is given as follows:

Introduction
State the purpose of the report and why the case is worth reading about to include in short sentences:
- The patient and the condition.
- How the case came to your attention.
- What is new or different about it.
- The main features worth reporting.

The patient
Give a concise description of the patient and condition that shows the key physiotherapeutic, biomedical and psychosocial features. The patient's perspective on the problem and priorities for treatment are important. Give the patient a name in the interests of humanity, but not the real name. Do not include any other identifying details or photographs without the patient's permission.

Intervention
Describe what you did, how the patient progressed, and the outcome. This section should cover:
- Aims of physiotherapy.
- Treatment, problems and progress.
- Outcomes, including any changes in impairment and disability.
- Justification of your choice of treatment; clinical reasoning
- The patient's level of satisfaction and the outcome and the impact on quality of life.

Method
This should clarify what intervention took place and what measurements were taken. It should include:
- Description(s) of outcome measures used and reference
- Interventions carried out (where, when, by whom if relevant)

Implications for practice
Discuss the knowledge gained, with reference to published research findings and/or evidence about clinical effectiveness. For example:
- Outcome for the patient.
- Drawbacks.
- Insights for treatment of similar patients.
- Potential for application to other conditions.

Summary
List the main lessons to be drawn from this example.

References
These should be in the Harvard style (see section on 'Measurements' below).

Further guidelines for writing case reports were published in the Spring 2001 issue of *Synapse*, page 19.

ABSTRACTS OF THESIS AND DISSERTATIONS

Abstracts from research projects, including those from undergraduate or postgraduate degrees, audits or presentations. They should be up to 500 words and where possible the conventional format: introduction, purpose, method, results, discussion, conclusion.

AUDIT REPORT

A report which contains examination of the method, results, analysis, conclusions and service developments of audit relating to neurology and physiotherapy, using any method or design. This could also include a Service Development Quality Assurance Report of changes in service delivery aimed at improving quality. These should be up to 2000 words including references.

REVIEW OF ARTICLES

A critical appraisal of primary source material on a specific topic related to neurology. Download the ACPIN information sheet *Reviewing research articles* for further guidance from the ACPIN website.

PRODUCT NEWS

A short appraisal of up to 500 words, used to bring new or redesigned equipment to the notice of the readers. ACPIN and *Synapse* take no responsibility for these assessments, it is not an endorsement of the equipment. If an official trial has been carried out this should be presented as a technical evaluation. This may include a description of a mechanical or technical device used in assessment, treatment, management or education to include specifications and summary evaluation.

REVIEW OF BOOKS, SOFTWARE AND VIDEOS

Short reviews of up to 500 words to include details of availability, price and source for purchasing.

LETTERS TO *SYNAPSE*

These can be about any issue pertinent to neurological physiotherapy or ACPIN. They may relate to material published in the previous issue(s) of *Synapse*.

PREPARATION OF EDITORIAL MATERIAL

Copy 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.

Hard copies should be as close to journal style as possible, on one side of A4 paper with at least a 25mm margin all around, consecutively numbered.

The first page should give:
- The title of the article
- The names of the author(s)
- A complete name and address for correspondence
- Professional and academic qualifications for all authors, and their current positions
- For research papers, a brief note about each author which indicates their contribution and a summary of any funds supporting the work

All articles
- The text should be well organised and written in simple, clear correct English. The positions of tables, charts or photographs should be appropriately titled and numbered consecutively in the text.
- All abbreviations must be explained.
- Any photographs or line drawings should be in sharp focus with good contrast for best reproduction.
- All charts should be in black and white only and captions should reflect this.
- References should be listed alphabetically, in the Harvard style with punctuation as follows: Bloggs A, Collins B (1998) The use of bandages in treating head injuries Physiotherapy 67,3 pp12-13.
- In the text, the reference should be quoted as the author(s) names followed by the date: Bloggs A (1994)
- Acknowledgements are listed at the end.

Measurements
As the International System of Units (SI) is not yet universal, both metric and imperial units are used in the United Kingdom in different circumstances. Depending on which units were used for the original calculations, data may be reported in imperial units followed by the SI equivalent in parentheses, or SI measurements followed by imperial measurements in parentheses. If the article mentions an outcome measure, appropriate information about it should be included, describing measurement properties and where it may be obtained.

Permissions and ethical certification
Protection of subjects: 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. The use of names for patients is encouraged in case studies for clarity and humanity, but they should not be their real names.

Submission of articles
The disk and two hard copies 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.

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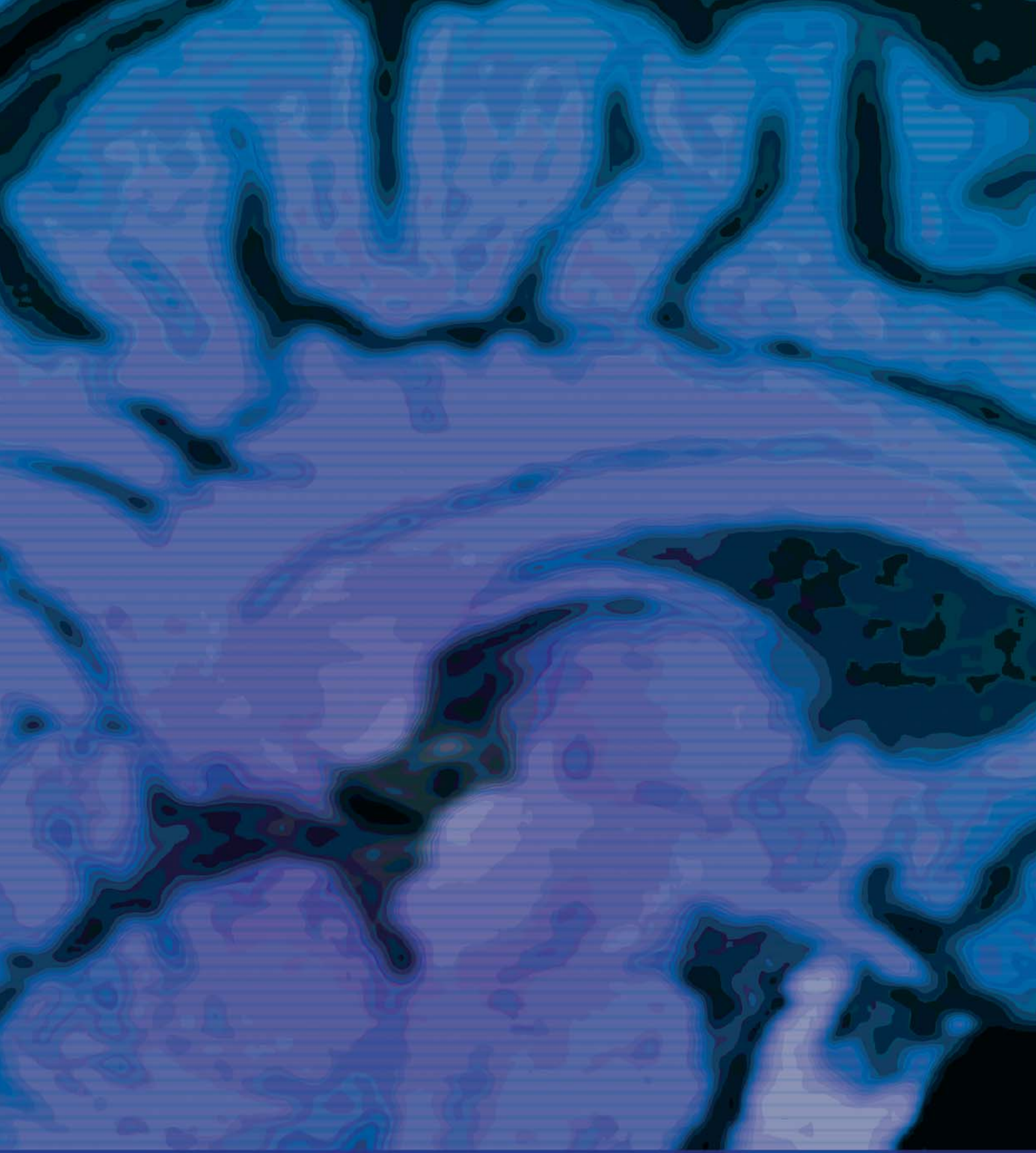

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