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The Society of Research in Rehabilitation (SRR) is the major multidisciplinary rehabilitation research society in the UK (www.srr.org.uk). Its aim is to advance education and research into all aspects of the rehabilitation of people with disability and to disseminate the useful results of such research for the public benefit. The SRR runs two conferences a year, with topic-specific research symposia, free scientific presentations and 'research in progress' posters. The Society aims to be inspiring and educational, while providing excellent opportunities for networking, for junior and established researchers.

These are abstracts from the SRR Summer Meeting, hosted by the University of Central Lancashire in Preston, 2nd and 3rd July 2008.

The effects of stretching in spasticity: a systematic review

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Background: Stretching is a common physical treatment for spasticity. This review investigated the effects of stretching in people with spasticity.

Method: Two researchers independently performed a systematic search of MEDLINE, PEDro, Cochrane library, Web-of-Science, CINAHL and AMED databases and determined whether studies met inclusion criteria: adults with spasticity, stretch used to manage spasticity, English. Methodological quality was rated using the PEDro scale (1–10 highest) for randomized controlled trials and 13 items from CONSORT and CASP guidelines for others.

Results/findings: Twenty-one studies were included; 10 randomized controlled trials, 11 others. Fifteen investigated single interventions. Great diversity was found at the levels of methodology, population, intervention and outcomes, making meta-analysis unfeasible. Stretches were applied manually ($n = 5$), using mechanical devices ($n = 13$) or positioning ($n = 3$). Outcomes most often assessed range of movement, but did not measure spasticity comprehensively, investigate functional or long-term effects. Six randomized controlled trials and 10 other studies reported benefits but methodological quality was low. The randomized controlled trials scored from 4 to 8. The two highest (8) reflected practice; one found no effect, the other underpowered randomized controlled trial showed slower contracture development in one area.

Discussion: High protocol variability indicates little consensus about stretching in practice. Some lower quality evidence suggests the immediate effects of single stretch treatments are positive but whether these persist or are clinically relevant is unclear.

Conclusion: Insufficient evidence exists either to support or abandon stretching for adults with spasticity. Further high-quality studies with controlled interventions that focus on clinical, short- and long-term outcomes are needed.

A phase II randomized controlled trial of a long-term individual fitness enablement intervention for people with multiple sclerosis

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Background: Community-based exercise is a potentially important component within the management of multiple sclerosis. This study aimed to assess the feasibility, acceptability and potential efficacy of an individualized, supported community exercise programme within multiple sclerosis.
Method: A single-blinded phase II randomized controlled trial with independent assessments at baseline and post-intervention (three months), set in community leisure centres in Oxford. Eighteen people with multiple sclerosis received a three-month individualized, progressive physical activity programme with physiotherapeutic support. The control group received standard care. The primary outcome measure was the self-report Physical Activity Scale for the Elderly (PASE). Secondary outcome measures included the Fatigue Severity Scale and two-minute walk test.
Results/findings: There was no loss to follow-up ($n = 18$) and adherence (measured by attendance) was good. Mean PASE scores improved in the intervention group ($n = 7$; baseline: 77, three months: 82) compared with the control group ($n = 11$; baseline 65, three months: 65). Fatigue Severity Scale scores were similar for both groups (4) and remained unchanged. Two-minute walk distance decreased in both the intervention group (baseline: 66, three months: 40) and control group (baseline: 62, three months: 49).
Discussion: Adherence was good with no loss to follow-up. The improvements in PASE scores suggest the intervention improves physical activity levels in multiple sclerosis, although the effect on fatigue and physical endurance are less clear.
Conclusion: A supported individualized community exercise intervention is feasible and acceptable for use in community-dwellers with multiple sclerosis. To confirm effectiveness of this intervention, a phase III trial of adequate power is required.

A Cochrane review of the effect of an ankle foot orthosis on people with stroke

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Background: Weakness of the ankle (or foot drop) causes difficulty with balance and walking for many people with stroke. One way to manage this is with an ankle foot orthosis but their use in clinical practice is controversial, so a Cochrane Review was undertaken to assess the evidence for their effect on walking and balance.
Method: Search strategy: The trials registers of the Cochrane Stroke, Movement Disorders and Injuries Groups, Cochrane Database of Systematic Reviews, Cochrane Central Register of Controlled Trials, MEDLINE, EMBASE, CINAHL, AMED, PsycINFO, RECAL, Database of Abstracts of Reviews of Effects, HTA Database, National Research Register, Current Controlled Trials Register, the Physiotherapy Evidence Database and reference lists of selected articles were searched in February 2007. Lead authors and other researchers in the field were contacted for unpublished data.
Selection criteria: Randomized and quasi-randomized controlled trials of ankle foot orthoses applied to people with stroke.
Data collection and analysis: Two reviewers independently identified trials, extracted data and assessed trial quality. Results for continuous outcomes were combined and analysed using weighted mean difference or standardized mean difference, both with 95% confidence intervals and fixed effect model.
Results: Eleven trials with 389 participants were included and analysed. The overall effect of an ankle foot orthosis on walking disability (speed), walking impairment (step/stride length) and balance impairment (weight distribution in standing) was significant and beneficial. There was no significant effect on postural sway (balance impairment) or mobility disability.
Conclusions: An ankle foot orthosis can improve walking and balance but the included studies have only examined the immediate effects; the effects of long-term use have not been investigated.

Falls and injury up to two years post stroke: A cohort study in north-west England

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Background: Post-stroke individuals are at greater risk of falling and have a higher fracture rate compared to

the general population. Previous studies have reported the incidence and characteristics associated with falls up to 12 months post stroke. This investigation reports the incidence and injuries sustained from falls up to 24 months post stroke.

Method: Consecutive patients were identified at two hospitals. Demographics were recorded on admission and data were collected by home visit (3, 6, 12 months) and postal questionnaire (24 months). Data were collected on function (Barthel), and patient-reported falls and injuries since discharge, which were cumulative at each time point. Falls were coded from none, to minor/moderate (bruising and cuts), and major/severe/head (sutures, X-ray, fracture or surgery).

Results/findings: Over a six-month period, 539 stroke patients were identified. Their median age was 75 (interquartile range (IQR) 68–82 years) and 54% were female. Data were available for 240 patients at 3 months reducing to 178 at 24 months.

By 3 months 64 (27%) reported a fall, this increased to 105 (59%) by 24 months. Patients reporting multiple falls ($\geq$4) increased from 10 (16%) by 3 months to 47 (45%) by 24 months. The proportion of patients who had a major/severe/head injury increased from 11% at 3 months to 24% by 24 months. Median (IQR) 24 months Barthel scores were lower for fallers (13 (9–17)) compared with non-fallers (17 (12–20)).

Discussion: One in four injuries sustained by 24 months were major/severe/head injury. Fallers were more functionally dependent than non-fallers.

Conclusion: Patient-reported falls increased over time post stroke with almost half of patients reporting multiple falls at 24 months.

Repetitive task training after stroke: a Cochrane systematic review

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Background: The repetition of task-specific functional movement is a common component of current approaches to stroke rehabilitation.

Method: We searched the Cochrane Stroke Trials Register, published, unpublished and non-English language databases, conference proceedings and the reference lists of existing systematic reviews, conducted citation searching and contacted authors for all relevant trials. The review included randomized and quasi-randomized trials, which included an intervention where an active motor sequence was performed repetitively within a single training session; where the practice aimed towards a functional goal; and where the amount of task practice could be quantified. Two reviewers independently screened titles and abstracts, extracted data and critically appraised the trials, with disagreements referred to a third reviewer. We contacted trialists for additional information.

Results/Findings: Fourteen trials with 659 participants were included. Results were statistically significant for walking distance and speed, sit-to-stand, and activities of daily living; and of borderline significance for functional ambulation and global motor function. There were no statistically significant effects for upper limb function, quality of life, impairment, or follow-up measures. Therapy effects for lower limbs were modified by the type of task practice, but not the amount of therapy or time since stroke.

Discussion: Repetitive task training resulted in modest improvement in lower limb function, but not in upper limb function. Training effects may be sufficient to impact on activities of daily living. There is no evidence that improvements are sustained once training has ended.

Conclusion: Further research should be directed towards the type and amount of training, and the maintenance of functional gain.

Visual perceptual consequences of stroke

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Background: Some perceptual consequences of stroke include agnosia, alexia, dyschromatopsia, inattention and hallucinations. In this study the aim is to evaluate the prevalence of perceptual consequences in stroke patients referred to the VIS group.

Method: Prospective multicentre cohort trial. Standardized referral and investigation protocol used by local investigators. Data presented from the first year of data collection: May 2006–April 2007. Information obtained on visual acuity, ocular alignment

and motility, visual field, visual inattention and visual cognition/perception.

Results/findings: A total of 178 patients excluded (49% male, 51% female) mainly due to inability to consent because of cognitive difficulties; 323 patients recruited (59% male, 41% female). Mean age at onset of stroke of 69 years (SD = 15: range 1–92). Type of stroke was infarct in 79.5% and haemorrhagic in 20.5%; 6% had had a previous stroke. Laterality of stroke was right sided in 48%, left sided in 40% and bilateral in the remainder. Eight per cent of patients were found to have normal visual status; 68.4% had eye movement impairment; 46.1% had visual field impairment; 25.1% had low vision; 20.5% had perceptual difficulties. Of those with perceptual difficulties, 14.2% had inattention, 1.3% had difficulty judging depth and distance, 0.3% had colour detection problems, 2.5% complained of hallucinations and 2.2% of agnosia.

Discussion: A substantial proportion (92%) of patients referred with suspected visual difficulty had visual impairment. One-fifth had perceptual consequences relating to inattention and cortical visual processing impairment.

Conclusion: It is likely that perceptual deficits are underestimated because of lack of detection by health care professions and lack of reporting by patients.

The experience of providing rehabilitation for patients with locked-in syndrome through the use of communication aids: a qualitative study

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Background: Past research showed that health professionals who treat patients with chronic illness or communication difficulties report high levels of distress and difficulties in treatment delivery. Limited literature about working with patients with locked-in syndrome exists. This study investigates health workers' experiences of treating patients with locked-in syndrome when communication is established through communication aids.

Method: Six members of the multidisciplinary team who have provided rehabilitation for patients with locked-in syndrome were selected from a neurorehabilitation unit. Semi-structured interviews were conducted and transcripts were analysed using interpretative phenomenological analysis. An experience researcher supervised and judged the analysis of transcripts to ensure coherency. A reflexive diary, monitoring possible influential factors, was kept throughout the study.

Results/findings: Themes identified captured the extensive impact of treating patients with locked-in syndrome, labelled as: 'a different communication'; 'the impact of communication aids on therapy'; 'challenges in working with locked-in syndrome'. Participants described a new form of communication imposed by communication aids which challenged them to adapt their practice. Results demonstrated that communication barriers and lack of information on locked-in syndrome treatments resulted in a simplified therapy and feeling of uncertainty, disempowerment and distress for individuals working with patients with locked-in syndrome. Participants also talked about acquiring new skills which resulted in perceiving this experience as educative, challenging and rewarding.

Discussion/conclusion: Participants reported that using communication aids impacted negatively on the therapeutic process. Results indicate that training that enabled workers to use communication aids confidently and effectively could enhance treatment for patients with locked-in syndrome and reduce workers' difficulties and distress.

Identification of patients with depression following stroke? A cohort study using two methods of detection

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Background: Depression following a stroke is common and debilitating. Depressed stroke patients have lower survival rates, longer hospital stays, poorer functional recovery and lower quality of life. Despite its importance in recovery and in re-adaptation, there is still no widely

accepted tool used in clinical practice, consequently it is often missed.

Method: A cohort study comparing a clinical diagnosis of depression (by a psychiatrist) with two nurse-administered clinical interviews, Geriatric Mental State and the Montgomery–Asberg Depression Rating Scale (MADRS) in a large inner-city teaching hospital.

Results/Findings: Seventy-four patients were seen by the nurse and by the psychiatrist, their median age was 70 (interquartile range 59–78) and 40 (54%) were male. According to the psychiatrist, 27 (36%) patients were classified as depressed. The Geriatric Mental State AGECAT (Automated Geriatric Examination for Computer Assisted Taxonomy) was performed on all patients and the MADRS on 73 (86%) of patients. The Geriatric Mental State AGECAT and the MADRS classified 32/74 (43%) and 38/71 (54%) patients respectively as depressed. Relative to the psychiatric interview, the Geriatric Mental State had a sensitivity of 66.7%, specificity of 70.2%, positive predictive value (PPV) of 56.3% and negative predictive value (NPV) of 78.6%. Its overall efficiency was 70.3%. The MADRS had a sensitivity of 81.5%, specificity of 63.0%, PPV of 56.4% and NPV of 85.3%. Its overall efficiency was 69.9%.

Discussion/conclusion: Our study indicates that the MADRS was at least as efficient as the Geriatric Mental State in detecting depression post stroke. However, because the MADRS is quicker to administer, it may have more clinical utility.

Preliminary evaluation of reliability and internal consistency for the Arm Activity Measure (ArMA)

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Background: The Arm Activity Measure (ArMA) is a self-report measure with subscales for active and passive function in the hemiparetic upper limb.

The aim of the study was to evaluate preliminary internal consistency and test–retest reliability.

Methods: Testing was in a cohort of 58 participants. Data were collected at time point 1 (T1), following an interrupter task, time point 2 (T2) and the following day, time point 3 (T3). Cronbach's alpha was used to evaluate internal consistency. Kappa coefficients were used to compare item-by-item T1 to T2 and T1 to T3. Intraclass correlation coefficients (ICC) were used to compare total subscale scores (active and passive function).

Results: Internal consistency using Cronbach's alpha was grater than 0.70 for passive function items, but had little meaning for active function items due to an incomplete range of scores. Agreement was above 75% and $\kappa > 0.60$ apart from one item at T3 in the passive function subscale. Kappa coefficients for active function were not meaningful, due to the incomplete range of scores. ICC for passive function was >0.78 (95% confidence interval (CI) 0.60–0.96) and for active function >0.98 (95% CI 0.96–1.00).

Discussion: The items in the passive function subscale are reliable as well as the scale as a whole. The active function subscale has excellent agreement, but reliability and internal consistency could not be demonstrated due to the incomplete range of scores.

Conclusions: The measure contains passive function items, which have acceptable internal consistency and reliability. Further evaluation of active function is required in a more able patient group.

Measurement of change during rehabilitation using Rasch Analysis: item stability and impact of neuropsychological rehabilitation on the European Brain Injury Questionnaire (EBIQ) depression subscale

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Background: Recording perceived symptom frequency after brain injury using questionnaires is one approach to measuring overall distress. Previous work to demonstrate the validity and reliability of the EBIQ led to a reduction in items in each subscale, but yielded a robust measure overall. This study aimed to explore utility of the revised 'depression' subscale by examining responses before and after rehabilitation.

Method: Clients ($n = 44$), consecutive admissions to a holistic neuropsychological rehabilitation program, completed the EBIQ at admission and discharge. Data from the five item subscale were entered into an analysis using RUMM2020.

Results/findings: A person separation index of 0.85 suggested that three distinct groups could be reliably detected. Visual inspection of item characteristic curves and analysis for differential item functioning by time revealed no significant differential item functioning after Bonferroni adjustment, although one item may be considered borderline. A plot to display the person-item threshold distribution revealed a good spread of items across the range of individual's sense of distress. The change in mean person location (logits $\pm$ SD) before rehabilitation (-0.07 ± 1.89) and at discharge (-0.7 ± 1.92) was found to be significant on ANOVA ($F = 4.1$, df $= 87$, $P = 0.04$).
Discussion: Possible differential item functioning may indicate interesting reduction in our participant's willingness to endorse a question about hopelessness.
Conclusion: This analysis demonstrated that service evaluation using Rasch techniques is (a) possible, (b) informative and (c) further validates the use of the EBIQ as a tool for rehabilitation outcome measurement. Reduction in individual's subjective ratings of their distress suggests that the programme, which has this as an overall objective, is indeed successful.

What is Bobath? A survey of UK stroke physiotherapists' perceptions of the content of the Bobath concept to treat postural control and mobility

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Background: Most UK stroke physiotherapists use the Bobath concept but little is known about its content. This study was to identify which interventions physiotherapists perceive to be part of the Bobath concept and focused on the treatment of postural control and mobility problems.
Method: Seventy-four hospital-based stroke physiotherapists from 33 hospitals used a previously published checklist of commonly used interventions to treat postural control and mobility problems to report whether each intervention was a part of the Bobath concept. Frequencies and percentages were calculated. Each intervention was classified as follows: 'Definitely Bobath' if >75% of participants felt it was part of the Bobath concept; 'Not sure' if 51–75% felt it was part of the Bobath concept; 'not Bobath' if <50% of respondents thought it was part of the Bobath concept.
Results/findings: Interventions involving facilitation techniques, practising the components of activities and mobilizations were considered 'definitely Bobath'. Exercise and the use of equipment were 'not Bobath'. There was uncertainty about 'practising whole tasks' and 'independent practice'.
Discussion/conclusion: UK stroke physiotherapists consider facilitation, mobilization and practising the components of an activity to be the 'crux' of the Bobath concept. They exclude exercise and the use of equipment and are uncertain about practising whole tasks and independent practice. These views contrast with those of the British and international teachers of the Bobath concept. Consequently, it was impossible to define the interventions representing the Bobath concept. This limits the feasibility of further research into the concept. Future research should focus on the effectiveness of specific, well-defined interventions.

Functional impact of vision problems in neurorehabilitation

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Background: A number of studies have investigated the functional impact of reduced vision using a variety of approaches and various methods of measuring function. There is, however, a lack of evidence to demonstrate the impact of other aspects of visual dysfunction on functional ability and there are no known studies illustrating the impact of such problems on the neurorehabilitation population.
Method: Prospective, cross-sectional study of visual problems; visual field defects, ocular motility defects, binocular function deficits, visual perceptual dysfunction and their affect on activities of daily living (ADL) using the Functional Independence Measure + Functional Assessment Measure (FIM + FAM) as a measure of function.
Subjects: Twenty-six patients in an acute neurorehabilitation setting.
Results/findings: Subjects with vision problems were found to score, on average, 24 points lower on ADL assessment than those without vision problems.

This was found to be statistically significant using a *t*-test ($P = 0.007$) after adjusting for non-visual aspects of ADL and other confounding variables. Self-care and mobility appeared to be the aspects of ADL that were most affected.

Discussion: Subjects with visual problems were found to have significantly lower ADL scores than those without visual problems. As well as being statistically significant, a difference of 24 (just over half of the standard deviation of the sample) is significant clinically and would represent a notable difference in function.

Conclusion: ADL scores in neurorehabilitation patients with visual problems are reduced when compared with neurorehabilitation patients with no visual function deficit. More detailed research is needed on a larger sample size to explore functional impact further.

A comparison of the agreement between the General Health Questionnaire-28 and the Yale at different time points in a stroke rehabilitation trial

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Background: Depression following a stroke is common and can have an adverse effect on recovery and rehabilitation. Screening for depression using psychological scales can be time consuming. The single-item Yale may be a better way of assessing depression than longer traditional scales.

Method: As part of a rehabilitation trial patients completed a questionnaire, which included the General Health Questionnaire-28 and the Yale at one week (baseline), and at three and 12 months post stroke. The General Health Questionnaire-28 scores were dichotomized to depressed (≤ 5) or not depressed (<5) and compared with the Yale at the three time points using the kappa statistic to measure agreement.

Results/findings: Four hundred and eleven patients were recruited with a median age of 70 (IQR 61–77) of whom 58% were male. At baseline, percentage agreement between the General Health Questionnaire-28 and the Yale was poor (66%; $\kappa = 0.34$), at three months it was fair (74%; $\kappa = 0.48$) and at 12 months it was moderate (78%; $\kappa = 0.55$). The poor agreement at baseline was due mainly to a disproportionately high number of patients who were identified as depressed on the General Health Questionnaire-28 (63%).

Discussion/conclusion: Early after stroke there was poor agreement between these screening tools. The General Health Questionnaire-28 identified a disproportionately high number of patients as depressed. This may be due to the response format of the questionnaire (i.e. 'worse than usual'). The value of using the General Health Questionnaire-28 early after stroke is questionable; however, the Yale may be useful as a simple screening tool.

A study to investigate the inter-rater and intra-rater reliability of portable diagnostic ultrasound in the measurement of acromio-humeral distance in healthy individuals

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Background: Acromio-humeral distance is the distance between the surface of the humeral head and the lateral tip of the acromion process. Alteration in acromio-humeral distance is indicative of various shoulder pathologies such as rotator cuff tears and shoulder subluxation in patients with stroke. Diagnostic ultrasound has been shown to be a sensitive and cost-effective technique in the diagnosis of musculoskeletal-related problems. The aim was to assess both intrarater and interrater reliability of ultrasonographic measures of acromio-humeral distance in healthy individuals, prior to its application on a patient population.

Method: Twenty healthy participants (9 male, 11 female) aged 18–26 years (mean 21.80 ± 2.62) were recruited. Seated participants were scanned by three assessors using the standardized protocol. Two sets of three measurements were recorded with an interval of 5 minutes between sets. Reliability was assessed by intraclass correlation coefficients (ICC) and standard error of measurement (SEM).

Results: Mean acromio-humeral distance was $2.24\,\text{cm} \pm 0.40$ (range: 1.29–3.04 cm). Intrarater reliability coefficients for the three raters were 0.908, 0.889 and 0.958. Corresponding value for interrater reliability was 0.78. The SEM showed low values.

Discussion: Consistent with previous findings, portable ultrasound is a quick and reliable method of assessing acromio-humeral distance in healthy individuals, within and between raters.
Conclusion: Future studies are needed to assess the intrarater and interrater reliability of ultrasonography on older, healthy individuals and patients with musculoskeletal-related problems.

Can complex interventions be defined? An example from stroke physiotherapy

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Objective: Lack of detail about the interventions tested is a frequent criticism in rehabilitation research. One reason for this is a lack of tools to record the content of interventions in sufficient detail that they can be replicated. The aim of this study was to explore whether a complex intervention – physiotherapy to restore postural control and mobility problems for people with stroke – could be defined and described. We aimed to identify not only the frequency with which interventions were used, but also the ways they were combined into 'treatment packages'.
Method: A convenience sample of 74 physiotherapists from 33 hospitals recorded the interventions used to treat 251 patients with stroke in 1156 treatment sessions using the previously published Stroke Physiotherapy Intervention Recording Tool. Descriptive statistics assessed the frequency with which the interventions were used and geometric coding identified treatment packages.
Results: The most frequently used interventions involved facilitation, practice of activities and their components and mobilizations. The least frequently used interventions involved the provision of equipment, teaching carers and exercise. Two treatment packages were identified; one involving the facilitation (of activities and their components) and the other involving whole activities (facilitation and practice).
Conclusions: A detailed description of stroke physiotherapy for postural control and mobility problems was obtained. Interventions are often combined into two treatment packages. One involved facilitation (of whole and component activities) and the other, practice and facilitation of whole tasks. Future research in which conventional or standard UK stroke physiotherapy is delivered should focus on these interventions and exclude atypically used interventions.

Exploring adherence to self-managed rehabilitation programmes

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Background: Adherence to self-managed rehabilitation programmes, such as exercise, is often problematic; resulting in suboptimal therapeutic benefit and wasted resources. Lack of adherence may confound interpretation of treatment effects. Reasons for poor adherence are complex; measurement of adherence is fraught with difficulties, with no 'gold standard'. This research aims to identify key issues with a view to developing an adherence measurement tool.
Method: Qualitative interviews explored perspectives of patients ($n = 20$) and health professionals ($n = 19$) in three separate studies (one published) about (1) urinary incontinence, (2) low back pain and (3) asthma. Transcribed participant accounts were subject to interpretative phenomenological analysis, with team verification.
Results/findings: Emergent themes included: the condition does not hold priority; finding time to establish routines; notions of control versus cure. Condition-specific issues also emerged: the silent private nature of incontinence; frustrations for health professionals with giving asthma advice; concerns with long-term low back disability.
Discussion: The findings provide the basis for developing items for attitudinal, intentional and behavioural domains of an adherence scale with a mixed method approach, involving Rasch analysis, ensuring the new measure meets stringent requirements of measurement as defined by modern psychometric theory.
Conclusion: An adherence measure will help identify if individuals are achieving their full potential in terms of gaining most benefit from their rehabilitation, provide researchers with a tool to help evaluation of rehabilitation treatment efficacy and determine what 'dose' of exercise is required for obtaining therapeutic benefit for a particular chronic condition.