
Proceedings of SRR

These abstracts are from the proceedings of the Society for Research in Rehabilitation meeting held at Westwood Hall, Leeds on 15 January 2004.

A randomized controlled trial evaluation of a stretch positioning programme for prevention of contractures after stroke

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Background: The development of contractures following stroke is a common problem that can impair recovery of upper limb function and hinder self-care. This exploratory trial evaluated the effects of a positioning regime designed to prevent development of contractures. Muscle groups at risk of shortening were positioned in extension for part of the day.

Method: Twenty-five subjects, within four weeks of stroke, with loss of arm function participated. While they were inpatient the intervention group were prescribed a wrist and a shoulder position; each to be carried out for two half-hour periods a day. The control group received standard care (no prolonged stretches). Measurements of passive range of movement to standard forces were taken at 4, 8 and 12 weeks after stroke.

Results: Frequency of positioning was fair from four to eight weeks post stroke but declined after that. Mean (SD) frequency between four and eight weeks was 36.5 (13.0) for wrist, 31.2 (14.1) for shoulder, out of 56 prescribed.

There were significant effects of time post stroke on range of movement (ANOVA, $F=17.7$ wrist, $F=15.6$ shoulder, $p<0.01$), but no significant effects of treatment. By eight weeks post stroke patients in both groups had lost approximately 40% range of wrist extension and shoulder external rotation.

Discussion: Variability within the groups and small sample size means that statistical power in this study was low. Also the treatment was not well tolerated over many weeks.

Conclusion: On the basis of this study stretch positioning cannot be recommended as a treatment to prevent contractures.

A randomized controlled trial to evaluate the use of a standing frame for patients with acute stroke

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Background: Early standing is believed by some clinicians to have benefits in addressing motor and sensory impairments. For severely disabled stroke patients' practical implementation of early standing is difficult, resource intensive and can be physically demanding upon staff. One useful device to facilitate standing in the clinical setting is the Oswestry Standing Frame (OSF). A randomized controlled trial was undertaken to evaluate the use of the OSF for heavily dependent stroke patients.

Method: Patients admitted to the Bradford Stroke Unit were considered for recruitment and were stratified and randomized to receive a minimum of 14 days' treatment with the OSF ($n=71$), or to a control regime ($n=69$). Blind assessments were conducted at baseline, six weeks, 12 weeks and six months post stroke. The primary outcome measure was the Rivermead Mobility Index (RMI) at six weeks post stroke. An intention-to-treat analysis assessed changes from baseline to each of the three time points.

Results: There was no statistically significant difference between groups. Mann–Whitney U -tests for the

RMI change from baseline scores to six weeks, 12 weeks and six months post stroke were $p=0.310$; $p=0.970$ and $p=0.282$.

Discussion: No clinically important differences in outcome were observed based on the primary or secondary measures selected for this study.

Conclusion: This study does not provide any evidence to support the use of the OSF above any other method.

Admission to hospital following head injury in England: incidence and socio-economic determinants

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Background: Head injury in England is common. Evidence suggests that socio-economic factors may cause variation in incidence.

Method: Data were obtained from the Office for National Statistics with respect to socio-economic variables at the local level and merged with Hospital Episodes Statistics obtained from the DoH. All patients admitted for head injury with ICD-10 codes S00.0-S09.9 during 2001–2002 were included and data were collated at the level of extant Health Authorities (HA) in 2002.

Results: During the year, 112 718 patients were admitted giving a hospitalized incidence rate for England of 229 per 100 000. This rate varied across the English HAs ranging from 91 to 419. Three clusters of HAs were identified; those typical of London, with lower than average incidence, unemployment and high use of public transport. Shire counties, with high home ownership, high use of cars for journeys to work and almost average incidence. Finally other urban authorities characterized by higher unemployment, people permanently unable to work and high incidence. A regression model showed that factors such as 16–24 unemployment rate significantly increased incidence, but that use of public transport for work decreased incidence.

Discussion: Head injury incidence in England is variable. Half the HAs in England had an incidence rate greater than $\pm 20\%$ of the England rate.

Conclusion: Estimates of the demand for rehabilitation services derived from a single locality and expressed as a rate will be conditional upon local incidence, and cannot be extrapolated to other localities.

An evaluation of the validity of the Hospital Anxiety and Depression Scale for use after acquired brain injury

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Background: Brain injury can result in significant mood disorder, requiring effective assessment. The Hospital Anxiety and Depression Scale (HADS) is frequently used for this purpose. However, it is suggested that some items in the HADS may reflect physical or cognitive changes associated with brain injury rather than reflecting problems with anxiety or depression. It was hypothesized that a factor analysis of HADS data from a large sample of people with acquired brain injury would result in two major factors (anxiety and depression), but that specified items would not load on to either of these factors.

Method: Principal components analysis was carried out on HADS data from 140 people with acquired brain injury attending for assessment at a brain injury rehabilitation centre. In the analysis, factors were defined by eigenvalues >1 . The oblique rotation method was used.

Results: A three-factor solution emerged, accounting for 58.1% of total variance. The two main factors mapped on to anxiety and depression scales, but two items relating to personal appearance and feeling slowed down did not load on to either of these factors.

Discussion: The hypothesis that two main factors reflecting the constructs anxiety and depression would emerge was confirmed. Furthermore the hypothesis that some items would not load on to these factors was also confirmed.

Conclusion: The HADS is a useful tool for examining mood disorder in people with acquired brain injury, but caution is required in interpreting results from items that may be more likely to be related to physical effects of brain injury.

Comparison of Bobath-based and Movement Science-based treatment for stroke: a randomized controlled trial

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Background: Bobath-based (BB) and Movement Science-based (MSB) physiotherapy interventions are widely used for patients after stroke but there is little evidence to suggest which is most effective. The purpose of this single-blind randomized controlled trial was to compare the effectiveness of these treatments in improving movement abilities and functional independence.

Method: One hundred and twenty patients with stroke were randomized into either a BB or MSB treatment group. Primary outcome measures were the Rivermead Motor Assessment and the Motor Assessment Scale. Secondary outcome measures were used to assess functional independence, walking speed, arm function, spasticity and sensation. Measures were performed by a 'blind' assessor at baseline, then at one, three and six months after baseline.

Results: Comparison of the area under the curve showed no significant difference between the groups for any outcome measures. Significance values for the Rivermead Motor Assessment ranged from $p=0.23$ to $p=0.97$ and for the Motor Assessment Scale from $p=0.29$ to $p=0.87$. Comparison of measures at one, three and six months using the Mann–Whitney *U*-test showed fewer significant differences than would be expected by chance.

Discussion and conclusion: There were no differences in movement abilities or functional independence between two groups of patients receiving a BB or an MSB intervention, so physiotherapists may choose to use either approach. (This study was funded by The Stroke Association, UK.)

Discharge from stroke physiotherapy: the management of disappointment?

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Background: Patients tend to have high expectations of physiotherapy and view discharge from physiotherapy before they have attained their expected level of recovery as distressing. Explicit discussion between physiotherapists and patients of the anticipated extent of recovery tends to be avoided during physiotherapy treatment, making discharge the point at which potentially different expectations might be expected to be confronted. The aim of this study was to explore

how the process of discharge is experienced by patients and physiotherapists and how potential disappointment on the part of patients is managed.

Method: A qualitative longitudinal study was conducted with 16 stroke patients and their physiotherapists. These data comprise audio-taped interview and observational material. A grounded theory approach was used to analyse these data.

Results: Patients' expectations and optimism about recovery were not confronted at the point of discharge from physiotherapy. The notion of natural recovery and information about exercise post discharge discussed by physiotherapists as part of the discharge process had the effect of maintaining patients' high expectations and hope about eventual recovery. Craib's (1994) ideas about the management of disappointment in modern society were used to make sense of these experiences.

Discussion: Failure to engage with patients' disappointment at discharge has implications for the process of adaptation and adjustment that patients eventually go through in order to accommodate their altered abilities and identity.

Conclusion: Services need to be developed in ways that enable physiotherapists to engage with patients about the possibility of disappointment with stroke outcome.

Factors relating to depression after stroke

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Background: Depression is reported to affect 25–79% of stroke patients and can be a barrier to rehabilitation. The aim of this study was to determine which factors predicted severity of depression at the time of recruitment to a treatment study and depression at six months follow-up.

Method: One hundred and twenty-three depressed stroke patients who were 1–6 months after stroke were recruited to a randomized controlled trial of cognitive–behaviour psychotherapy to treat depression. At recruitment and six months follow up ($n=112$) patients were assessed on the Beck Depression Inventory, Wakefield Depression Inventory, GHQ-28, Barthel Index, Extended Activities of Daily Living

Scale, Sheffield Screening Test for Acquired Language Disorders (SST) and Recovery Locus of Control Scale.

Results: Patients were aged 23–90 years (63 males). Logistic regression showed that greater communication impairment on the SST at recruitment was predictive of severe depression at recruitment (OR = 0.72, $p=0.01$). Patients with greater communication impairment (OR = 0.69, $p < 0.05$) and an external locus of control (OR = 0.89, $p < 0.05$) at recruitment were more likely to be depressed at follow-up. Patients depressed at follow-up had more severe depression at recruitment ($p=0.001$).

Discussion: Communication impairment was the strongest predictor of depression severity and prognosis. Mild depression was more likely to resolve. The regression models only accounted for a small proportion of the variance.

Conclusion: External locus of control and communication impairment were related to depression. Further studies of psychosocial factors in a more representative sample are required.

Factors that influence ambulant mobility in patients with primary muscle disease

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Background: Activity monitoring in neurological populations provides information regarding mobility. Whilst the reliability is established, the predictive validity reflecting walking is unknown. This study aimed to identify strength-related impairments impacting upon walking as reflected by mean step counts in patients with primary muscle disorder (MD).

Method: Measures of gait speed, muscle strength and sit-to-stand (STS) performance in MD ($n=15$) and matched control subjects were obtained. All subjects wore an activity monitor (recording each step taken) over seven days. Independent t -tests and correlation coefficients were used to assess between groups.

Results: As expected, MD patients walked less than controls, mean (SD) steps 3582 (1457) versus 6302 (1772) ($p=0.001$), and demonstrated slower

gait speeds, 0.82 m/s (0.23) versus 1.28 (0.15) ($p=0.001$). Isometric muscle strength was significantly less than in healthy subjects for quadriceps, mean (SD) 84.5 (52.5) Nm versus 180.7 (104.2) Nm and hamstrings, mean (SD) 47.9 (37.3) Nm versus 97.7(46.8) Nm in MD patients ($p=0.001$). Strength measures were not related to gait speed, STS performance or activity levels. Gait speed was related to activity levels in MD patients ($r=0.56$, $p=0.03$).

Discussion: Ambulant activity was significantly related to gait speed and not STS performance. Thigh muscle weakness did not appear a limiting factor. Strength of muscles not tested or balance difficulties should be considered.

Conclusion: Activity monitoring is a useful method to investigate impairments impacting on participation.

Health state valuation in chronic and disabling conditions

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Background: Health-related quality of life (HRQoL) is increasingly identified as an important outcome. In clinical trials general population estimates of HRQoL may well be used, but ratings have been shown to differ from those of people with the condition themselves. We set out to explore this difference and model factors that might explain the relationship.

Method: A cross-sectional postal survey of 1036 participants with different conditions. Participants completed a set of questionnaires addressing HRQoL (including the EQ-5D). Data from a self-valuation VAS scale was compared with a population-based VAS valuation.

Results: Self-ratings were significantly different to population ratings and agreement was poor. The mean difference was 0.13 (95% CI 0.117 ± 0.143) with limits of agreement of -0.279 to 0.539. Diagnosis, health-state severity, and its square explained 35.3% of the variation in the differences with a curvilinear relationship, suggesting that differences increased as the health state worsened, but at a decreasing rate at more severe health states.

Discussion: The degree of difference between the two ratings is extremely variable and relatively little variance has been explained. EQ-5D population valuation estimates of treatment benefit for people with disabling and chronic conditions may well be inaccurate representations of the degree of change actually experienced by the individual with the condition.

Conclusion: The varying magnitude of difference between the two forms of valuation determined in this study has important implications for interpreting shifts in health status valuation following interventions for people with disabling conditions.

Internal construct validity of the Rivermead Post-concussion Symptoms Questionnaire (RPQ)

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Background: The Rivermead Post-concussion Symptoms Questionnaire (RPQ) measures severity of post-concussive symptoms (PCS) following head injury, and comprises 16 items where respondents rate symptoms from 0 (not experienced) to 4 (severe). Although initial evidence has been presented for reliability, construct validity remains to be assessed.

Method: One hundred and forty-eight patients (13.7% response rate) referred for skull X-ray following a head injury completed a follow-up questionnaire incorporating the RPQ. Data were fitted to the Rasch model to assess internal construct validity.

Results: RPQ scores ranged from 0 to 64 (9% floor, 0.8% ceiling). Overall fit to the Rasch model was adequate (item fit mean -0.208 , SD 0.971) though item-trait interaction was poor (chi-squared 69.38 , $p < 0.01$) suggesting a lack of unidimensionality. Both the 'headaches' and 'dizziness' items displayed misfit (chi-squared $11.7; 13.6$, both p -values < 0.01 , residual > 2.5). After removing these items the RPQ demonstrated good fit at overall and individual item levels. All items functioned consistently across age and gender. However, in six items, response options were not functioning in the intended progression from 0 to 4 (disordered thresholds).

Discussion: Modern psychometrics indicate that 'headaches' and 'dizziness' do not 'tap into' the overall

PCS construct, and should not be summated with the other RPQ items. Combining response categories may further improve scale properties.

Conclusion: If items 1 and 2 are excluded, the raw score of the RPQ can be summated and is a sufficient statistic to estimate the extent of PCS in head injury patients. These results should be confirmed in a larger sample.

Measuring quality of movement: Rasch analysis on the Motor Evaluation Scale for Upper Extremity in Stroke Patients (MESUPES)

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Background: (1) To develop a new scale Motor Evaluation Scale for Upper Extremity in Stroke Patients (MESUPES), addressing quality of movement, (2) investigate inter-rater reliability and internal consistency, and (3) evaluate for item unidimensionality using a Rasch model.

Method: Thirty, 56 and 216 stroke patients participated in the two reliability studies and in the Rasch analysis study respectively. They were recruited in 12 hospitals and rehabilitation centres in Belgium, the Netherlands and Germany. The scale consists of three subsets, pertaining to arm and hand movements, and scoring orientation of wrist and fingers in functional tasks. Two therapists scored patients independently for inter-rater reliability. Weighted kappa (κ_w), weighted percentage agreement ($w\%agr$), ICC and Chronbach's α were used for data analysis. Four therapists each tested a cohort of patients once for the Rasch analysis.

Results: The scale was reliable at item level ($\kappa_w = 0.62-0.79$, $w\%agr = 85.00-8.21$), subset and

total score level (minimum ICC(2,1) = 0.83, 95% (CI) = 0.68–0.92). Chronbach's α for internal consistency were 0.99, 0.97, 0.93 for the three subsets respectively. Based on Rasch analysis, all items were rescored and two items were deleted.

Discussion: So far, no scale for upper extremity in stroke has focused on the quality of movement or undergone Rasch analysis.

Conclusion: A new scale was developed for the evaluation of quality of upper limb movements in stroke patients. The scale meets the statistical properties of reliability and unidimensionality.

Reproducibility of observational gait recordings in children with cerebral palsy

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Background: Gait analysis is used to evaluate clinical intervention targeted at improving walking. Complex technological gait analysis is difficult to undertake in young children. In clinical practice outcome is determined by gait observation. The aim of this study is evaluate reproducibility of a simple observational gait analysis scale used in children with cerebral palsy (CP).

Method: The video gait scale was developed from the foot contact subscale of the Physicians Rating Scale (PRS). Standardized video recordings (walking along a 10-m walkway) in 40 children (median age 6 years) with CP, were taken at five time points over three months. Videos were copied to a master tape in a random sequence (undertaken independently). Three doctors and five paediatric physiotherapists rated the pattern of initial foot contact. The kappa statistic used to determine agreement between and within raters. Bias was analysed using the ANOVA.

Results: Inter-observer reproducibility was fair to very good between raters (kappa statistic 0.54–0.83). Reproducibility within raters was fair to excellent (kappa statistic 0.45–0.93). Bias was identified in some pair wise comparisons.

Discussion: Overall there was a good level of agreement between both doctors and physiotherapists in their assessment of initial foot contact in children with

both hemiplegic and diplegic CP. Only a short period of training was undertaken prior to the study in use the use of the rating scale.

Conclusion: This simple observational gait analysis tool is reliable in children with CP. The scale would be easy to use in the clinical setting.

The effect of foot orthoses on balance parameters

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Background: Foot orthoses (FO) have been prescribed by clinicians for numerous lower limb and foot conditions. One of the most widely quoted uses of FO is that of balance enhancement, but reasoning for their use in controlling or improving balance is largely anecdotal and is not based on a sound body of evidence.

Method: A convenience sample of 50 healthy subjects with clinically diagnosed excessively pronated feet, according to a validated foot classification system were randomly assigned to either a control or intervention group. A test–retest experimental design of four weeks' duration was used to assess mean balance (%), medial lateral sway and anterior posterior sway. A standardized foot placement protocol was used. The aim was to evaluate significant differences between baseline and four weeks of wear. At baseline the intervention group were issued with over-the-counter rigid FO.

Results: Results demonstrated a significant difference wearing the rigid FO in the medial–lateral sway after weeks of wear ($p=0.02$). All other results demonstrated no significant differences ($p>0.05$).

Discussion: The results demonstrated that FO significantly enhance medial–lateral sway in subjects with pronated feet over a four week period. The results suggest that FO may have an impact on proprioception and lower limb kinetic chain activities. The results also suggest that the mechanical properties of the FO may play an important role in determining the impact of FO in conditions where balance is reduced.

Conclusion: Future studies are required to investigate the effect of custom-made FO on balance parameters.

The interaction between simultaneous attentional loading and arm movement tasks in people with stroke

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Background: Walking in stroke can worsen when cognitive tasks are simultaneously undertaken. Several theories (Limited capacity, Multiple resource) may explain how the brain divides attention. This study investigates interaction between cognitive and arm movement 'performance' with increasing cognitive loads.

Method: Seven people with stroke (age 47–67) and six healthy controls were recruited (ethics approval granted). Motor performance was measured using accuracy and speed of elbow flexion/extension. The cognitive task consisted of counting low tones from a randomly generated sequence of high/low tones (modification of 'Elevator counting with distraction' component of Test of Everyday Attention) while undertaking arm movement. Tones were grouped into couplets, triplets, quadruplets and quintuplets reflecting increasing cognitive loads. Error rates (ER) in motor/cognitive performance were compared (ANOVA) at baseline and at different attentional loads.

Results: ER in cognitive performance increased in stroke group as cognitive load was increased (stroke group: 0.0–1.57; controls: 0.0–0.0). However with simultaneous motor activity, error rates increased further (stroke group: 0.47–3.7; control group: 0.17–0.67). Cognitive loading did not significantly decrease accuracy of arm movement.

Discussion: In stroke, cognitive performance deteriorates when simultaneous arm movement is undertaken. Arm movement did not deteriorate with increasing cognitive load. Subjects may have attended to the motor task at expense of the cognitive task despite being requested to minimize errors in both tasks without preference.

Conclusion: Deterioration in cognitive processing should be considered when complex motor tasks are undertaken, although small sample limits generalizability.

The effect of using a slider shoe on hemiplegic gait

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Background: A slider shoe is a device used to help stroke patients swing their leg forwards when walking. It is a half shoe that fits over the patient's own shoe and is secured with an elastic strap. Although used in physiotherapy practice its effects have not been objectively assessed. The aim of this study is to assess the effect of a slider shoe on hemiplegic gait.

Design: An A-B-A single case design.

Subjects: Four subjects (inpatients undergoing gait training in a stroke rehabilitation unit).

Procedure: Subjects walked along a 10-metre walkway without the slider (phase A), with the slider (phase B) and again without the slider (phase A2) over a six-day period (2 days \times 3).

Outcome measures: Walking speed (10-metre walk test) and efficiency (physiological cost index).

Analysis: Data were plotted and the two standard deviation band method applied.

Results: All four subjects showed improved efficiency and walking speed when wearing the slider. A carry-over effect was seen in three subjects for energy efficiency and two subjects for speed.

Discussion: Using a slider enabled stroke patients to walk with improved efficiency and speed. The slider has the potential to allow increased walking practice and thus promote skill acquisition in hemiplegic patients.

Conclusion: The slider shoe may be a useful adjunct to hemiplegic gait re-education.

Users' and carers' perceptions of rehabilitation post stroke

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Background: We are challenged to incorporate service users' and carers' views when planning care and redesigning stroke services.

Design: Qualitative semi-structured interviews, exploring patient/carer stroke journeys.

Setting: Three Acute Trusts, North-West Region, UK.

Participants: Thirty patients (16 (53%) females, median age 72 (IQR 62.5–78)) admitted with acute stroke, and their carers.

Procedures: Patients and/or carers were interviewed: in hospital, at one and six weeks post discharge. One hundred and seven interviews were recorded, transcribed verbatim, and explored using thematic analysis and constant comparison. Checking respondent validity was incorporated in interviewing and re-interviewing participants. Confirmability was addressed by coders reaching agreement.

Results: Issues included: information/knowledge; investigations; security; basic care; medication; discharge plans, access; communication (between patients, carers and staff); attention; complaint procedures; and staffing.

In terms of impact on rehabilitation, issues were raised that may directly or indirectly reduce the likelihood of engagement. Patients felt that they did not know where they were in their recovery, and were unclear as to what they were allowed to do. Furthermore, the multidisciplinary team had not communicated rehabilitation targets and required activities to each other or to patients. This was compounded by patients feeling a lack of attention to basic needs such as personal hygiene and insecurities relating to other patients' behaviour.

Discussion: Issues important to patients and their carers were identified that may not have been considered if they had not been consulted.

Conclusion: The issues identified have formed a robust basis to inform service redesign firmly grounded in users' and carers' views.

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Balance disability in acute stroke

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Background: Restoring balance skills is a key part of stroke rehabilitation but there is little detailed evidence about the incidence of balance deficits, which factors affect balance disability, or the impact balance deficits have on function.

Method: A cross-sectional survey was used. People with first-time stroke were recruited from six NHS Trusts. Balance, weakness, sensation, neglect, stroke location, type and severity, age, sex and pre-morbid disability and independence in ADL were measured 2–4 weeks post stroke. Descriptive statistics and linear regression were used in the analysis.

Results: One hundred and two people were recruited. Eighty-eight (86%) had a balance disability, 29 (33%) had sitting balance only, 32 (36%) had standing balance and 24 (27%) could walk but had limited balance. When entered in a linear regression model individually, weakness, sensation, neglect, stroke type and severity were significant contributors to balance disability. Age, sex, pre-morbid disability and side of stroke were not. The significant factors were entered into a multifactorial model; weakness and stroke severity emerged as the independent factors affecting balance disability. When the same process was used with independence in ADL as the outcome variable, balance disability and weakness emerged as the independent factors.

Conclusion: Balance disability is common in the acute stages post stroke. Degree of weakness and severity of stroke are the strongest factors affecting balance disability. Balance disability is the strongest factor affecting independence in ADL.

An investigation of identity change and mood following an acquired neurological disability

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Background: Studies have shown that following a single stroke, survivors feel that they have changed as people. The greater this perceived change, the greater their anxiety/depression. This study explored whether change occurs in neurological conditions with a gradual onset.

Method: Thirty-six participants ($F=23$; mean age 50 (20–70) years) with no severe speech, perceptual or cognitive problems, with neurological diagnoses (MS 67%); disabled for 15 (2–36) years, (OCPS score 7 (0–10)) were recruited from a rehabilitation centre for younger neurologically disabled adults. They completed a questionnaire including disability severity (Office Population Censuses Surveys); past, present and future self-concept (Semantic Differential Self-concept Scale); and mood (Hospital Anxiety and Depression Scale). Analyses included Wilcoxon signed rank comparisons and Spearman rho correlations.

Results: Participants felt that they had changed as people following diagnosis; (past–present, $z = -3.58$; $p = 0.000$) and had little expectation that this would change in the future (present–future, $z = -0.17$, $p = 0.86$). The level of perceived change was not associated with disability severity ($r = 0.11$, $p = 0.54$) but was significantly associated with anxiety ($r = 0.52$, $p < 0.001$) and depression ($r = 0.57$, $p < 0.001$).

Discussion: Participants had a more limited view of themselves and their futures following diagnosis; independent of disease severity. The more limited the view, the higher the levels of anxiety/depression.

Conclusion: Following diagnosis, people face psychological challenges to their sense of self independent of physical challenges. These aspects should be addressed within their rehabilitation.

A randomized controlled trial of the use of botulinum toxin in the prevention of chronic whiplash syndrome

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Background: Approximately 20% of patients with acute whiplash syndrome will develop longer term problems. The evidence for effective treatments of the whiplash syndrome is sparse and there has been no research to date addressing the issue of preventing acute progressing into chronic whiplash.

Method: A randomized double-blind placebo-controlled study compared the effects of the injection of 2.5ml (250 units) of botulinum toxin or 2.5ml of placebo (normal saline) divided between five trigger points in patients with neck pain persisting two months after acute whiplash injury. Outcome measures included a visual analogue scale, the Vernon Mior neck pain and disability index (NDI) and cervical range of motion (CROM).

Results: Seventeen patients received botulinum toxin and 19 received placebo. Both groups showed a clinical trend towards improvement in pain scores and NDI, more marked in the placebo group. The NDI met criteria for clinical significance (i.e., change in score ≥ 5) but did not reach statistical significance ($p=0.961$). CROM improved in both groups, with the changes in the botulinum toxin group being more pronounced but did not reach statistical significance ($p>0.05$).

Discussion: Statistical significance may have been achieved with larger numbers.

Conclusion: Botulinum toxin shows a trend towards improving CROM in patients with neck pain two months after whiplash (not statistically significant) but does not appear to have any benefit over placebo with regard to pain scores or functional outcome.

The benefits of a day service for adults following stroke—users' and nonusers' perceptions

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Background: An evaluation of the Cardiff Day Service for adults aged 18–55 years who have had a stroke has been conducted. The aim of the service is to enable

users to identify and pursue meaningful and realistic opportunities within the community. A key aspect of the evaluation was to identify the perceptions of benefit for the various stakeholders, that is, users, carers, staff including volunteers and the funding agency.

Method: Q methodology, a research method that uses both qualitative and quantitative techniques and is appropriate to study subjective views was used. Focus groups of current various stakeholders were used to generate relevant statements. Seventeen users and 18 nonusers sorted the final Q packs. Factor analysis, with principal component analysis and Varimax with Kaiser normalization was used.

Results: Six user factors were identified, suggesting they saw the service as providing the opportunity for new experiences, a place to feel valued and secure and which prevents isolation and promotes social and general recovery. Five nonuser factors were identified, suggesting that they too saw the service as a place to promote social confidence but also one that provided psychological gains, respite for carers and gave users a sense of purpose.

Discussion: The perceived benefits related to a safe environment and psychological support, however, they did not fully coincide with the aims of the service and represented little expectation of gain in functional terms.

Conclusion: Perceptions of benefits need to be considered when evaluating services to ensure all stakeholders' views are obtained.

What do people with disabling conditions consider the most important consequences of their condition?

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Background: Outcome measures are often based upon 'expert' opinion. This approach has been challenged in ICIDH-2 and ICF but questions remain about what people with disabilities themselves consider most important.

Method: A qualitative study extending previous work was performed utilizing theoretical sampling and a grounded theory approach. Forty people ($n=10$ with

stroke, arthritis, chronic pain and cancer) were interviewed regarding 'what mattered most'. Interviews were tape-recorded and transcribed. Checks of validity were performed.

Results: Many issues were elicited and categories were collated into five themes: personal/intrinsic, external/extrinsic, future, perceptions of normality and taking charge. Despite differences at category level, the five themes encapsulated the breadth of experience of the sample and indicated marked similarities between diagnostic groups.

Discussion: Despite differences within the personal/intrinsic theme (approximating impairment and activity limitation), many similarities were found in other themes. A further study is underway to test the relationship between these themes. We do not suggest that the results are generalizable. However, the findings indicate a number of areas of concern for patients and we suggest they may be worth considering in relation to interventions and/or outcomes.

Conclusion: People with disabling conditions have an important contribution to make to the outcome debate and to service development. Whilst our study in part supports models like ICF, it suggests additional areas of concern. Further, important similarities exist across different diagnostic groups and this challenges assumptions that emphasize differences in relation to what matters most to people in their lives.

A pilot study investigating the effect of aerobic exercise on subjects with moderate disability multiple sclerosis (MS)

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Background: Few researchers have evaluated the aerobic capacity of people with multiple sclerosis (MS). Less efficient patterns of mobility demand high-energy expenditure. An improvement in cardiovascular function could lead to an improved functional capacity. The aim of this pilot study was to investigate the effect of aerobic exercise on the mobility and function of people with MS.

Method: Intervention consisted of bi-weekly sessions of 30 minutes cycling on a static bike within individuals' aerobic training zone. Stability of condition was established pre intervention using three assessments over

two weeks. An independent rater completed assessments post intervention. Outcome measures included the 10-metre and 6-minute walk, the functional reach, the Gulick and the Guys Neurological Disability Scale. Potential negative effects were recorded on the Fatigue Severity Scale and the Modified Ashworth Scale. Interrater reliability was found to be acceptable.

Results: Eight subjects with moderate disability MS, were recruited. Pre- and post-comparisons (Wilcoxon signed ranked test) showed significant improvement in the Guys neurological disability scale (0.026) and the 6-minute walk (0.046). Other measures failed to reach significance.

Discussion: Findings suggest overall disability, endurance and stamina improved with the training. Knowledge of establishing predictive heart rate and monitoring the effects of cycling with people with MS will inform future work.

Conclusion: A positive treatment effect in this small study suggests the need for a larger trial.

Is the intervention of an occupational therapist effective in increasing independence in residents with a stroke living in residential or nursing homes?

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Background: Nearly 25% of all stroke discharges in the UK are direct to care homes. Few receive any occupational therapy.

Design: A cluster randomized controlled trial.

Setting: Nursing and residential homes in Oxfordshire.

Participants: One hundred and eighteen residents of 12 homes with stroke related disability.

Intervention: A targeted OT intervention aimed at improving independence.

Primary outcome measure: The Barthel ADL Index.

Results: The intervention group had 11 men, 52 women, mean age 88.6 years (SD 6.5). The standard care group had 10 men, 45 women, mean age 86.3 (SD 8.8). At three months the mean change in Barthel score in the intervention group was 0.6 (SD 3.9), and in the control group -0.9 (SD 2.2) and at six months the mean change in Barthel score in the intervention group was -0.4 (SD 4.1) and in the control group -2.1 (SD 3.7). Global poor outcome (deterioration in Barthel or

death) post treatment was more commonly seen in the control group at both three and six months, with 20/63 worse or dead in intervention group compared with 31/53 at three months, and 32/63 compared with 42/53 at six months, *p*-value for difference after adjustment for cluster randomization is 0.06 at three months and 0.03 at six months.

Discussion: The small numbers and high variability indicate the need for a larger study.

Conclusion: The results suggest that occupational therapy decreases the rate of deterioration and/or maintains ability.

Oxygen uptake during treadmill ambulation with body weight support: test–retest reliability with healthy controls

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Background: There is increasing interest in body weight-supported treadmill training in gait re-education in varied patient populations. There is little physiological validation of this technique. The application of oxygen uptake as an assessment tool in this context has not been previously established. This study investigated the reliability of the effect of body weight support (BWS) on oxygen uptake as an indication of cardiovascular effort.

Method: Twenty healthy individuals from a student population (7 males, 13 females, mean age 26, mean body mass 69 kg) performed a test–retest study. After initial acclimatization periods, breath-by-breath analysis measured oxygen consumption during steady state exercise at self-selected speeds on a treadmill with and without 30% BWS. Intraclass correlation coefficient (ICC) was used with scatterplots to establish reliability.

Results: ICC values were 0.84 with no BWS, 0.83 with BWS and 0.6 for the difference between variables. 30% BWS reduced oxygen uptake by 10.7%. Interestingly, it was noted that six participants showed an increase in oxygen cost with a wide range in values (SD 20.44%, –5 to +7.3 ml O₂/kg).

Discussion: The oxygen cost of treadmill ambulation was comparable to previous studies. This study represents an increased data set that includes reliability indices, not previously reported.

Conclusion: Oxygen cost of walking on a treadmill is reduced in the majority, but not all subjects, when

given BWS. This observation was found to be reliable. BWS may be experienced as effortful by some patients.

The reliability of the fourth lumbar vertebra centre of mass indicator method for estimating gait efficiency

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Background: Energy cost is minimized during walking when there is maximal conservation of energy during centre of mass (CoM) displacement. Energy cost of walking, as measured by the rate of oxygen consumption, correlates with CoM displacement. During walking, individuals with acquired brain injury have elevated oxygen consumption and an altered CoM displacement pattern. This study examines the intra-individual reliability of vertical CoM displacement in healthy individuals as indicated by a marker placed on the fourth lumbar vertebra (L4).

Method: Subjects walked under standardized conditions at a self-selected 'comfortable natural speed' with a marker positioned on L4. Kinematic three-dimensional data were collected after two minutes of the walk over four strides. Retest took place within one week. CoM displacement in the Z-axis was analysed as a sine wave with oscillation, wavelength and wave time examined for intra-individual reliability.

Results: Nine healthy individuals, 4 men and 5 women (Mean age 30, SD ±10) walked within ±5% of speed recorded at original test on retest. The results obtained were as follows: oscillation: mean (test 1 and 2) 43.02 mm; bias (average difference test 1–2) –0.28 mm; random error (1.96 standard deviations) ±5.76 mm. Wavelength: mean 732.86 mm; bias 14.02 mm; random error ±76.43 mm. Wavetime: mean 0.56 s; bias –0.001 s; random error ±0.237 s. None of the parameters showed significant difference (>0.05) between test.

Conclusion: The L4 CoM indicator method may be a reliable measure of gait economy and further research into its use as a measure is warranted.