A UK-based questionnaire study of perceptions relating to exercise and joint health among rheumatoid arthritis patients

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Background: Exercise is important in the management of rheumatoid arthritis (RA). However, RA patients are less active than the general population. Previously we used a focus group methodology to generate themes relating to exercise and joint health in RA. This research aims to assess the factorial validity of a subsequent questionnaire, also quantitatively describing patient perceptions.
Method: Following ethical approval, National Rheumatoid Arthritis Society members were emailed an online questionnaire. A five factor model was tested using confirmatory factor analysis in LISREL 8.8. Considering substantive meaningfulness, items with high modification indices and low factor loadings were removed.
Results/Findings: 247 participants (87.8% females; age: 18-77 years; disease duration: <1-51 years) completed the questionnaire using a 5-point Likert scale (strongly disagree-strongly agree). The factorial validity of the final 32-item model was confirmed (*Satorra-Bentler* χ^2=774.47, *df*=454, p<.0.001). 49.6% of participants endorsed the factor 'health professionals showing a lack of exercise knowledge'. 39.2% endorsed the factor 'not knowing what exercise should be done'. 44.2% agreed with the factor 'worry about causing harm to joints' and 51.7% agreed with the factor 'not wanting to exercise as joints hurt'. 71.8% endorsed the factor 'having to exercise because it is helpful'.
Discussion: Patients believe exercise is beneficial but expressed concerns about joint health, joint pain and their own lack of exercise knowledge. Many respondents perceived that health professionals lack specificity when making exercise recommendations.
Conclusion: The benefits of exercise need continual emphasis and uncertainties surrounding joint health, pain and exercise specificity need to be addressed.

Pedal Power Pilot Study: Adapted dynamic cycling for children with Cerebral Palsy

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Background: Children with Cerebral Palsy (CP) can have limited activity levels and decreased muscle strength. Adapted dynamic cycling (ADC), using adapted cycles, may increase their activity levels and strength. This pilot study investigated effects of six ADC sessions on lower limb muscle strength.
Method: School of Healthcare Studies Research Ethics Committee, Cardiff University, provided ethical approval. Parents and children volunteered for participation following written informed consent. In a same subject experimental design, four bilateral quadriceps and hamstring strength measures were recorded at 90°knee flexion, while seated. Children participated in 6 ADC sessions over 8 weeks using an outdoor circuit, increasing time and distance cycled as able.
Results/Findings: Eleven children (5 boys, 6 girls) aged 2.6 – 17.8 years (SD: 5.56) participated. Mean strength differences (Right Quads=11.51N; SD: 3.99; Left Quads=17.43N; SD: 14.96; Right Hamstrings=8.4N; SD: 1.80; Left Hamstrings=7.4N; SD: 1.6) were analysed with non-parametric Wilcoxon's Rank Sign test; Significance level $p \leq 0.05$. Quadriceps strength changes were significant (Right=0.028; Left=0.026). Hamstring strength changes were not significant (Right=0.075; Left=0.114).
Conclusion: ADC provides an opportunity for increasing activity levels and strength in children with CP. This pilot study found significant differences in bilateral quadriceps strength following 6 ADC sessions however the study is limited. A larger study with control group is recommended.

Goal setting in stroke rehabilitation: a systematic review of effects and experiences

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Background: Goal setting (GS) is widely used in stroke rehabilitation, but there is debate about the optimum methodology. This paper presents a systematic review of the literature on the experiences and effectiveness of GS in stroke rehabilitation.
Method: The complete holdings of relevant databases were searched until February 2010. Studies of any design employing GS, defined according to McGrath (1992), reporting stroke-specific data and evaluating its effects and/or experiences were included. Full articles had to be available in English. Three reviewers (TS, with FvW/GM) independently applied selection criteria, agreed on final inclusion and extracted data.
Results/Findings: From 52,533 hits, 19 studies were eligible, including 6 exploring the experiences of GS, 2 validation studies, 1 study on the appropriateness of GS and 10 (mostly observational) studies using GS for intervention and/or outcome assessment. The review did not identify any eligible RCTs examining the effectiveness of GS with people with stroke. A total of 834 people with stroke, 23 carers and 29 health professionals were involved. Goal Attainment Scaling or the Canadian Occupational Performance Measure featured in 13 studies.
Discussion: The wide range of study methodologies did not allow results to be pooled. Despite GS being generally accepted as a core element of rehabilitation practice, there is a dearth of good quality evidence on its effectiveness, feasibility, appropriateness and meaningfulness in stroke rehabilitation.
Conclusion: Further rigorous quantitative and qualitative research on GS with stroke survivors is required to strengthen the evidence base, and explore the experiences of GS with all relevant stakeholders.

To what extent does upper limb hemiparesis affect dressing performance in the presence of cognitive impairment?

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Background: Individuals use both bi-manual and uni-manual skills to perform daily activities. Arm paresis is the dominant functional impairment in 80% of acute stroke patients, leaving many unable to perform bi-manual tasks. Previous studies suggest the importance of bi-manual skills to the dressing success of cognitively impaired patients. This study explored the dressing performance of cognitively impaired stroke survivors who had bilateral hand function as compared with unilateral hand function.

Method: Participants with cognitive impairment were recruited two weeks post stroke. Upper body dressing performance was assessed using the Nottingham Stroke Dressing Assessment (NSDA) at baseline and six weeks later. The association between dressing method (uni-manual or bi-manual) and upper body dressing performance was explored by comparing dressing independence to dressing method, at baseline and follow-up. NSDA scores for those not independent at baseline and follow-up were also compared.

Results/Findings: Seventy participants were recruited. At baseline assessment 36 used a bi-manual dressing method. Of these, 23(64%) were dependent for upper body dressing, 13(36%) were independent. All 34 participants using a uni-manual method were unsuccessful. A Chi-square test for independence indicated a strong association between dressing method and dressing success, $p<0.001$. Of the 57 who were dependent at baseline, NSDA scores were higher for those using a bi-manual method than the group using a uni-manual method (medians 78 (IQR 50 to 88) and 29 (IQR 6 to 50) respectively, Mann-Whitney $p<0.001$).

Conclusion: Independence in dressing and dressing ability in stroke survivors with cognitive impairment is greater in those who are able to use a bi-manual dressing method.

ICONS: Identifying continence options after stroke: findings from the case study phase

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Background: Urinary incontinence following acute stroke is common, affecting between 40%-60% of people admitted to hospital. It is related to poor outcome and poorly managed in many cases.
We conducted a case study of the introduction of a systematic voiding programme in one stroke service to inform a Phase II randomised controlled trial.
Method: Critical path analysis
Urinary incontinence was measured as (i) number of incontinence episodes in last 5 days prior to discharge (ii) Barthel UI item. Incontinence at discharge was analysed descriptively and factors affecting discharge incontinence were investigated using multiple logistic regression.
Health professionals' views of the algorithm
We conducted six taped focus group interviews with a purposive sample of health professionals delivering the programme (n=21) at monthly intervals throughout the case study.
Whole systems analysis
A soft systems approach (Checkland, 1981), comprising four group interviews with clinical staff and managers (n=17), was used to identify system requirements for the trial algorithm to be embedded in mainstream stroke practice.
Results/Findings: Preliminary results
At discharge, the mean (SD) number of incontinence episodes (over 5 days) was 6.8 (6.8), a reduction of 3.2 from baseline. Twenty-three (53.5%) patients remained incontinent at discharge.
The systems analysis highlighted that responsibility for decision-making was diffuse, with considerable distances between aspects of practice, assessment, care planning and organisational aspects of continence care.
Discussion:
While incontinence was viewed as a significant problem, this was not reflected in the organisation and delivery of continence care. Findings will be used to inform implementation of the systematic voiding programme in the trial phase of the ICONS research programme.

The effect of peripheral electric neuromuscular stimulation (ES) on cortical remapping after stroke

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Background: There is little evidence of how ES improves motor recovery. This study aims to quantify neuroplasticity following upper-limb ES program.
Method: Double-blinded-randomized-controlled design recruited participants, 2-8 weeks post-stroke. Participants randomized to receive active/sham-ES for six weeks on the paretic elbow and wrist extensors.
Outcomes were measured 0&6 weeks post-randomisation:
1) Bi-cortical changes on Functional-MRI (Laterality-Index)
2) Learning novel rhythmic-coordination task, measuring tracking success and stability (Learning-Index)
3) Improvement in Box and Block test (B&B).
Results/Findings: Fourteen participants were recruited. We quantified changes in laterality-index with no significant difference between the groups. To test the methodology, comparison according to handedness showed improvement in laterality-index favouring the dominant-paretic hemispheres.
There was significant difference favouring the active-ES group (P=0.018) in the tracking stability at 0°&90° Mean(SD) 0.116(0.03) and 0.178(0.043) respectively. The active-ES group improved more on B&B but with no statistical significance.
Using F-MRI laterality-index as primary outcome measure, assuming a P=0.05, 80% power and SD=0.54; future study would require 32 participants in each group to detect 0.39 units difference (The difference between the changed means in both groups).
Discussion: This feasibility study aimed to quantify neuroplasticity. The outcome measured sought to capture the neuroplastic effect on biological, behavioural and functional levels. We recruited the proposed participant number but only 9/14 completed the F-MRI data due to long scanning time. We innovated shaming technique to ensure blinding and computed sample size for future trial.
Conclusion: The study demonstrated the feasibility to quantify neuroplastic ES effect in stroke using RCT design.

Robotic aids in upper limb retraining after stroke: how many people could benefit from use of these devices?

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Background: Robotic aids can provide high-intensity, repetitive, treatment of the impaired upper limb. Little work has looked at the practical implications of using these devices in a rehabilitation setting.
Method: Acute stroke patients within a week of stroke were recruited from a hyper acute stroke unit. A range of outcome measures were taken at baseline and at 6 weeks, these included: Fugl Meyer Upper limb Assessment, Action Research Arm Test. Patients were also examined to see the proportion of people who could potentially benefit from rehabilitation using a robotic aid.
Results/Findings: Descriptive analysis was used to interpret the data. 100 people were recruited. 48% were found to have arm problems. Patients who had no upper limb movement initially were found to continue to have little to no movement at 6 weeks. Patients with mild problems in their arms (such as reduced dexterity) overall seemed to have made a full recovery at 6 weeks. 90% of people were able to use the robotic arm. However people who had very mild upper limb weakness and arm ataxia found using the device to be easy and would be unlikely to find any benefit from using such a device.
Discussion: This matched reported studies of the amount of people after stroke who have arm problems. The robotic aid was able to be used by people with very little arm movement, to people with less severe arm impairment.
Conclusion: This is the first study which has looked at the practical implications and actual amount of people who could benefit from use of a robotic aid.

Evaluation of carer responses to the Independent rater version of the Dysexecutive (DEX) questionnaire using Rasch analysis.

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Background: The ability to assess the everyday problems brought about by executive dysfunction following acquired brain injury (ABI) is greatly valued by neurorehabilitation services offering specifically targeted interventions. The self report version of the Dysexecutive (DEX) questionnaire (Burgess, Alderman, Wilson, Evans, & Emslie, 1996) was designed to assess level of executive functioning following ABI and its multidimensional structure and properties have recently been explored (Simblett & Bateman, in press). Reliance on self report measures alone is problematic within this client group who may experience difficulties with insight and memory. The construct validity and reliability of the independently rated version of the DEX (DEX-I) was therefore explored in this study.
Method: Rasch analysis was completed on 277 responses to the DEX-I completed by carers whose relatives had sustained an ABI.
Results/Findings: The DEX-I data did not demonstrate fit to the Rasch model ($\chi 2 = 153.4$, $p < 0.01$) and did not meet the assumption of unidimensionality suggesting that the DEX-I cannot be considered an interval-level scale measuring a single underlying construct of executive functioning. Several previously proposed subscales did not perform as unidimensional interval-level scales either. New subscales, based on theoretical conceptualisations of executive functioning (Simblett & Bateman, in press) were able to demonstrate fit to the Rasch model and unidimensionality.
Discussion: These results will supplement future studies evaluating the efficacy of executive function rehabilitation programmes using both self and carer assessment.
Conclusion: The utility of Rasch analysis in the rehabilitation field is clearly demonstrated.

Evaluation of the modified Carer Strain Index (mCSI) using Rasch analysis and factor analysis in a sample of carers of adults with acquired brain injury (ABI)

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Background: Cognitive, behavioural and emotional difficulties after ABI are understandably stressful for the client's family and carers. As a result, carers often experience adverse consequences including depression, anxiety and financial difficulties. This study investigated psychometric properties of the mCSI, a 16 item schedule, in order to demonstrate the validity of using this measure to assess strain in carers of those with an ABI.

Method: Rasch analysis using RUMM2020 was completed using responses of 241 carers. Standard procedures were used to assess the overall fit, scoring thresholds, individual item fit, person separation index (PSI) and unidimensionality.

Results/Findings: The most readily endorsed item refers to 'worry about the future'. The MCSI demonstrated a lack of fit to the Rasch model ($\chi 2=113.55$, $p=0.000$; PSI=0.91). All items were rescored as 15 had disordered scoring thresholds. Response categories were collapsed from an 11 to a 4-point likert scale. The measure was found to be multi-dimensional, and based on the findings of an exploratory factor analysis, we propose that carer strain is better understood in terms of three subscales; 'time/practical strain', 'personal-emotional strain' and 'personal-role strain'. These subscales demonstrated both fit to the model, and unidimensionality.

Discussion/Conclusion: The findings also help us improve our understanding of carer strain and suggest we should offer appropriate support and services to carers, prioritising our attention to their worry about the future. The proposed version of the mCSI is a viable measure for use in this population and will enable further evaluation of rehabilitation outcomes.

Attenuated heart rate response in people with multiple sclerosis was absent after participation in exercise programs

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Background: People with multiple sclerosis (PwMS) present with disturbed cardiovascular regulation. This study examined the effect of participation in exercise programs on heart rate response (HRR) in this population.
Method: A subset of participants (n=21) with a neurologist confirmed diagnosis of MS were identified for additional analysis from a larger randomized exercise trial involving sixty PwMS. Participants were randomly assigned to either a continuous (n=12; Barthel index median=19; range=13-20) or interval (n=9; Barthel index median=19; range=18-20) exercise program on a cycle ergometer at 45% peak power or 90% peak power for 30 sec. on 30 sec. off, respectively. Twenty minute exercise sessions were delivered twice a week, over ten weeks and in each session heart rate was recorded.
Results/Findings: PwMS had an initial attenuated HRR to exercise, which was eliminated irrespective of the type of program followed ($F=6.87$; $p<0.01$).
Discussion: The attenuated HRR during continuous and interval exercise programs that was absent after participation in ten weeks exercise, irrespective of the type of program that was followed, may be due to de-conditioning rather than the autonomic dysfunction, per se. The observed change in HRR to exercise suggests that other autonomic dysfunctions observed in PwMS may benefit from exercise participation.
Conclusion: The findings from the current study suggest that the attenuated HRR in PwMS can be ameliorated with participation in either a continuous or interval exercise program.

A comparison of classification-guided and generalized postural interventions in subgroups non-specific chronic low back pain

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Background: Sitting and standing postures aggravate NSCLBP therefore postural re-education is a common aspect of rehabilitation. Spinal postures are shown to vary in different subgroups of NSCLBP therefore specific rehabilitation is recommended. Specific interventions proved effective in specific populations of LBP. However, comparison of classification-guided and generalized interventions in NSCLBP is required prior to integrating specific interventions into clinical practice.
Method: Two subgroups of NSCLBP (n=50) were randomly allocated into classification-guided intervention (CSI) or generalized intervention (GI). Pain and disability scores and thoracic and lumbar absolute error (AE), variable error (VE) and constant error (CE) during sitting and standing was evaluated. Both interventions were evaluated (i) immediately post-individual training session and (ii) post-4-week home-based training.
Results/Findings: CSI group produced significant improvement in disability (RMDQ) ($p<0.01$)and pain (VAS)($p<0.01$), compared to minimal change in GI group following completion of training. Compared to GI group, CSI produced significantly greater reduction in thoracic AE (sitting,$p<0.01$) and lumbar AE (standing,$p<0.01$) and lumbar CE (standing,$p<0.01$) immediately post-individual training but this was not maintained following the 4-week home-based training.
Conclusion: Matching rehabilitation to specific subgroup may be more effective in improving pain and disability scores and in producing immediate improvements in some aspects of spinal position sense. It is uncertain, however, whether the between-group difference was related to the specificity of training or presence of more feedback in CSI group. Short-duration of the training and limited feedback strategies in the home-based training may have contributed to short-lasting benefit.

Improving function after stroke: what interventions work for Visual Field Defects (VFD)?

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Background:, Stroke-related visual problems include VFD which remove the ability to see up to half of visual space and may impact considerably on activities of daily living. We conducted a Cochrane systematic review to synthesise the evidence of the effectiveness of interventions for VFD (eg scanning, prisms, vision restoration therapy (VRT)) on function and vision.
Method: We searched Cochrane Trials Registers for the Stroke and Eyes and Vision Groups plus nine bibliographic databases including: CENTRAL, MEDLINE, EMBASE and CINAHL. We searched reference lists, trials registers and contacted experts. Randomised controlled trials involving adult stroke survivors and interventions targeting VFD were identified. Two authors independently appraised the methodology quality and extracted data.
Results/Findings: Thirteen studies (n=285) met the inclusion criteria, six compared the effect of a VFD intervention with a control/placebo group. Meta-analysis of 3 studies (n=129) demonstrated that scanning training is more effective than control/placebo at improving reading ability (MD=3.24[0.84,5.59]) and visual scanning (MD=18.84[12.01,25.66]), but not visual field outcomes (MD=-0.70[-2.28,0.88]). Individual studies assessed the effectiveness of scanning training on activities of daily living (n=33); compared VRT with control/placebo (n=19); and compared prisms with control/ placebo (n=39).
Discussion: There is limited evidence which supports the use of scanning training for patients with VFD following stroke. There is insufficient evidence to reach a conclusion on its effect on ADL, or to reach generalised conclusions about the benefits of VRT or prisms. Methodological quality of studies was generally poor or poorly reported and high quality RCTs are required.