Stroke Rehabilitation

Evidence Update
June 2018 (Quarterly)
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Current Journals: Tables of Contents

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If you require full articles please email: library@uhbristol.nhs.uk
Your Outreach Librarian Jo Hooper

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**Lunchtime Drop-in Sessions**

**July (13.00-14.00)**

5th (Thu) **Critical Appraisal**
9th (Mon) **Statistics**
19th (Thu) **Literature Searching**
23rd (Mon) **Critical Appraisal**

**August (12.00-13.00)**

1st (Wed) **Statistics**
6th (Mon) **Literature Searching**
16th (Thu) **Critical Appraisal**
22nd (Wed) **Statistics**
30th (Thu) **Literature Searching**
Library Clinic

Stop by and find out more about our services. We will be here to answer any questions you may have!

July 3<sup>rd</sup>: Welcome Centre, BRI 10.00-16.00

July 4<sup>th</sup>: Canteen (Level 9, BRI) 12.00-14.00

August 8<sup>th</sup>: Foyer, Education Centre 12.00-14.00

August 29<sup>th</sup>: Foyer, St Michael’s Hospital 12.00-14.00

September 5<sup>th</sup>: Canteen (Level 9, BRI) 12.00-14.00

September 11<sup>th</sup>: Welcome Centre, BRI 10.00-16.00

October 3<sup>rd</sup>: Terrace (Level 4, Education Centre) 12.00-14.00

November 7<sup>th</sup>: Canteen (Level 9, BRI) 12.00-14.00

December 5<sup>th</sup>: Foyer, Education Centre 12.00-14.00

December 11<sup>th</sup>: Welcome Centre, BRI 10.00-16.00
Latest Evidence

**Self-directed therapy programmes for arm rehabilitation after stroke: a systematic review**
Source: PubMed - 01 May 2018 - Publisher: Clinical Rehabilitation Read Summary

**Person-Generated Health Data in Simulated Rehabilitation Using Kinect for Stroke: Literature Review**
Source: PubMed - 08 May 2018 - Publisher: Jmir Rehabilitation And Assistive Technologies Read Summary

**Effects of physical exercise interventions on dual-task gait speed after stroke: A systematic review and meta-analysis**
Source: PubMed - 05 May 2018 - Publisher: Archives Of Physical Medicine And Rehabilitation Read Summary

**Effects of mirror therapy on walking ability, balance and lower limb motor recovery after stroke: a systematic review and meta-analysis of randomized controlled trials**
Source: PubMed - 01 April 2018 - Publisher: Clinical Rehabilitation Read Summary

**Cognitive behavioral therapy for post-stroke depression: A meta-analysis**
Source: PubMed - 05 April 2018 - Publisher: Journal Of Affective Disorders Read Summary

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**Interventions for improving modifiable risk factor control in the secondary prevention of stroke**
Online Publication Date: May 2018

**Motor imagery for gait rehabilitation after stroke**
Online Publication Date: May 2018

**Haemostatic therapies for acute spontaneous intracerebral haemorrhage**
Online Publication Date: April 2018

**Interventions for reducing sedentary behaviour in people with stroke**
Online Publication Date: April 2018
Overview of geriatric rehabilitation: Patient assessment and common indications for rehabilitation

- Stroke
- Summary and recommendations

Literature review current through: May 2018. | This topic last updated: Apr 18, 2018.

Current Awareness Database Articles

Below is a selection of articles recently added to the healthcare databases on the following topics:

- Early Stroke Discharge
- Occupational Therapy
- Upper Limb
- Cognition and Perception

If you would like any of the following articles in full text, or if you would like a more focused search on your own topic, then get in touch: library@uhbristol.nhs.uk

Early Stroke Discharge

A Person-Centered Approach to Poststroke Care: The COMprehensive Post-Acute Stroke Services Model.

Author(s): Bushnell, Cheryl D; Duncan, Pamela W; Lycan, Sarah L; Condon, Christina N;

Source: Journal of the American Geriatrics Society; May 2018; vol. 66 (no. 5); p. 1025-1030

Publication Type(s): Journal Article

Abstract: Many individuals who have had a stroke leave the hospital without postacute care services in place. Despite high risks of complications and readmission, there is no standard in the United States for postacute stroke care after discharge home. We describe the rationale and methods for the development of the COMprehensive Post-Acute Stroke Services (COMPASS) care model and the structure and quality metrics used for implementation. COMPASS, an innovative, comprehensive extension of the TRAnsition Coaching for Stroke (TRACS) program, is a clinician-led quality improvement model providing early supported discharge and transitional care for individuals who have had a stroke and have been discharged home. The effectiveness of the COMPASS model is being assessed in a cluster-randomized pragmatic trial in 41 sites across North Carolina, with a recruitment goal of 6,000 participants. The COMPASS model is evidence based, person centered, and stakeholder driven. It involves identification and education of eligible individuals in the hospital; telephone follow-up 2, 30, and 60 days after discharge; and a clinic visit within 14 days conducted by a nurse and advanced practice provider. Patient and caregiver self-reported assessments of functional and social determinants of health are captured during the clinic visit using a web-based application. Embedded algorithms immediately construct an individualized care plan.
Identifying stroke care pathways in the UK: The sentinel stroke national audit programme: Investigating and evaluating stroke therapy (ssnapiest)

**Author(s):** Gittins M.; Vail A.; Tyson S.; Paley L.; Bray B.; Lugo Palacios D.; Bowen A.

**Source:** European Stroke Journal; May 2018; vol. 3 (no. 1); p. 282-283

**Publication Type(s):** Conference Abstract

**Abstract:** Background and Aims: To further investigate in detail the organisation of post-acute care and multi-disciplinary stroke therapy we first needed to identify the routes (or pathways) that patients experienced through stroke services. Method: Data from the Stroke Sentinel National Audit Programme (SSNAP), a national stroke register for all strokes occurring in England and Wales, were extracted for July 2013-June 2015. An iterative step-by-step procedure using data driven factors and clinical experience then identified the common pathways patients undertook. Results: Based on 124,674 stroke patients, 874 possible routes were identified and then consolidated to nine common pathways. Eighty four percent stayed in a single stroke inpatient unit which were split across four pathways; Shorter-stay (<7 dys stroke unit average) acute unit > no community rehabilitation (28.3%) or community rehabilitation (19.6%), Longer-stay acute unit > no community rehabilitation (20.6%) or community rehabilitation (16.2%). Fourteen percent transferred to a secondary in-patient rehabilitation unit split into; Shorter-stay acute unit > other in-patient rehabilitation unit > no community rehabilitation (5.3%) or community rehabilitation (6.8%), Longer-stay acute unit > other inpatient rehabilitation unit > no community rehabilitation (0.9%) or community rehabilitation (1.4%). The remaining 1.1% of routes were classed another'. Descriptive statistics of baseline demographics, stroke characteristics, and patient stay indicated differences in the patients present in these pathways. Conclusion: Though variation in the routes through a health care system experienced by stroke patients can seem numerous, common stroke pathways can be observed and help identify patients with similar characteristics and experiences.

Perceived quality of care transitions between hospital and the home

**Author(s):** Lindblom S.; Flink M.; Elf M.; Von Koch L.; Ytterberg C.; Laska A.C.

**Source:** European Stroke Journal; May 2018; vol. 3 (no. 1); p. 282

**Publication Type(s):** Conference Abstract

**Abstract:** Background and Aims: There is a lack of knowledge on how patients with stroke in Sweden perceive the current care transitions from stroke unit to the home. Therefore, the aim of this study is to explore the perceived quality of care transitions between hospital and the home for patients with stroke. Method: A total of 200 patients with stroke referred from stroke unit to home rehabilitation will be included. To date, 190 patients have been included. One week after discharge, the perceived quality of care transitions are assessed with the Care Transitions Measure (CTM). Baseline data on age, sex and stroke severity are collected from medical records. Results: Preliminary results from 80 participants with a mild stroke (53 men, mean age 70 years), show that a majority perceived a high quality of care transitions. However, 26% did not perceive they had clear health goals or knew how to reach them; 30% did not know what warning signs and symptoms to watch out for; and 20% lacked a written healthcare plan. Further, 24% perceived they had a poor understanding about their health and 29% lacked written understandable information about plans after discharge. In addition, 46% had not clearly understood the possible side-effects of their medications. Conclusion: The preliminary conclusion shows that there is room for improvement regarding the transition process. Staff at stroke units should acknowledge the importance of informing about subsequent care and rehabilitation after discharge. Specific attention should be drawn towards self-monitoring and increasing patient knowledge about potential sideeffects of their medications.
Patients’ experiences with very early supported discharge after stroke

Author(s): Nordin A.; Stibrant Sunnerhagen K.; Axelsson A.

Source: European Stroke Journal; May 2018; vol. 3 (no. 1); p. 132

Publication Type(s): Conference Abstract

Abstract: Background and Aims: An Early Supported Discharge and rehabilitation at home is recommended for patients with mild to moderate stroke, and implies an accelerated discharge from hospital. Beneficial long-term effects, such as reduced dependency and improved ADL ability, has been reported. There are limited knowledge about patients’ early experiences of returning home and going through rehabilitation. The aim was to explore patients’ experiences with very early supported discharge after stroke. Method: This was an interview study, nested within a randomized controlled trial; Gothenburg very early supported discharge (GOTVED), comparing very early supported discharge, containing team based home rehabilitation, to conventional care. A consecutive sample of 12 participants with mild to moderate stroke were recruited from the intervention group in GOTVED. Interviews were performed on average 12 days after discharge, transcribed verbatim and analyzed with thematic analysis. Results: The initial analysis showed that the participants’ confidence in their ability grew by recovering and going through rehabilitation at home, and the team played an important role in this process. At home, they discovered the stroke consequences and tried to adapt to the new situation. But, unfulfilled needs of information and for cognitive and emotional support were reported, as well as a lack of verification of their post-stroke experiences. Also, the very early discharge raised uncertainty whether they would manage at home and about their recovery and rehabilitation. Conclusion: The preliminary conclusion suggests that the intervention increased confidence and responsibility for recovery and rehabilitation. But, early homecoming also highlighted the vulnerable situation for patients after stroke.

Gothenburg very early supported discharge: A block-randomized trial with superiority design of very early supported discharge for patients with stroke

Author(s): Rafsten L.

Source: European Stroke Journal; May 2018; vol. 3 (no. 1); p. 9-10

Publication Type(s): Conference Abstract

Abstract: Background: Early supported discharge (ESD) has shown to be efficient yet not implemented everywhere. Aim: To assess if very early supported discharge (VESD) is useful. Method: A block randomized controlled trial comparing VESD with ordinary discharge. Inclusion: confirmed stroke, >18 years, living <= 30 min from the hospital, National institute of health stroke scale (NIHSS) 0-16 and Barthel Index (BI) 50-100 on day 2, with BI 100 the Montreal Cognitive Assessment (MoCA)<26. Exclusion: life expectancy<1 year, inability to speak or to communicate in Swedish. Intention to treat analyses were made. Chi-square was used for group differences. Primary outcome: anxiety assessed with Hospital Anxiety and Depression Scale (HADS-A). Secondary outcomes: function with modifies Ranking Scale (mRS) activities of daily living with Barthel Index (BI). Results: Of 140 included patient 54% were woman. Median age was 74 years. The median length of stay was 12 days in the VESD and 15 days in the controls. Thirty two patients were lost before start of intervention. There was no significant shift regarding HADS-A between admittance, 3 months or one year post stroke. The mRS was significant lower in the VESD three months post stroke (p=0.004). There was a significant shift in proportions in mRs between admittance, 3 months post stroke and one year post stroke in both groups. Conclusion: The VESD were discharged 3 days earlier than the control group. The mRS at 3 months was better in the VESD group but at 12 months, there were no significant differences left.
**Increasing intensity of practice after stroke using apps, internet and sensors to connect patients and therapists remotely: A feasibility study**

**Author(s):** Simpson D.; Callisaya M.; Bird M.L.; Smith S.; Schmidt M.

**Source:** European Stroke Journal; May 2018; vol. 3 (no. 1); p. 200

**Publication Type(s):** Conference Abstract

**Abstract:** Background and Aims: Intensity of task practice after stroke is important to improve function, yet adherence to complete exercise programs can be challenging once home. We aimed to determine whether using a chair sensor, tablet application and internet connection could motivate and provide feedback on progress of a sit to stand exercise at home. Method: Ten participants with stroke completed a 4-week sit-to-stand exercise in the community. Participants learnt how to use the app and chair sensor that a therapist installed in their home. A therapist remotely monitored the exercise program, updated exercise targets, and provided personalised feedback via the app. Feasibility measures included adherence to the prescribed exercise session frequency and number of exercise repetitions (%), and participant satisfaction measures (enjoyment, usability and perceived benefit questionnaires). Results: Participants (mean age 73.6 years [SD 9.9 years], 50% male, mean gait speed 0.57m/s [SD 0.31m/s] at baseline) performed 125% of the exercise sessions prescribed over the 4 week period. There was a mean exercise repetition adherence of 104% [range 97% to 111%). Participants rated the system usability as high (78%), enjoyment as high (70%) and rated perceived benefit of the system positively (80%) Conclusion: It was feasible to prescribe, monitor and progress exercise by connecting participants and therapists remotely using an app and sensor-based system. Exercise session and repetition adherence was high, with positive satisfaction reported by participants. A definitive trial is now required to determine if use of such technology may facilitate greater exercise participation and improve function after stroke.

**The effect of home versus rehabilitation environment on activity levels of stroke survivors: Go home and sit less**

**Author(s):** Simpson D.; Breslin M.; Gall S.; Callisaya M.; De Zoete S.; Cumming T.; Schmidt M.;

**Stroke Journal; May 2018; vol. 3 (no. 1); p. 200**

**Publication Type(s):** Conference Abstract

**Abstract:** Background and Aims: Sedentary time is high and physical activity low in rehabilitation environments after stroke. There is limited understanding of factors which promote activity, and consequently improve function and reduce cardiovascular risk. We aimed to examine whether change in environment (hospital/home) influenced the time spent sitting, upright and walking, as well as factors predicting any change Method: 34 participants with stroke were recruited consecutively from 2 rehabilitation units. An activity monitor (ActivPAL3) was worn for 7 days (24 hours/day) at 2 time points: final week in hospital, and first week home. Other measures included mood (HADS), fatigue (FAS) and physical function (gait speed, 6 min walk). Linear mixed models (adjusted for waking hours) were performed with activity time as the outcome and environment as the exposure Results: Activity data was available at both time points for 32 (94%) participants (mean age 68 [SD 13] years, 53% male). At home participants spent 45 fewer minutes sitting (95%CI -84,-6 p=0.023), 45 more minutes upright (95%CI 6.85 p=0.024), 12 minutes more walking (95% CI 5-19 p=0.001) and completed 712 additional steps per day (95%CI 188,1236 p=0.008), compared to the final week in hospital. Depression prior to discharge modified the differences for all activity outcomes (p<=0.05) Conclusion: Change in environment from hospital to home reduced sitting time and increased time spent in physical activity and daily step count, though depression modified this change. The environment may be a modifiable factor which clinicians can target to reduce sitting time and promote increases in physical activity.
Rehabilitation and recovery-excluding clinical trial results stroke early supported discharge (ESD): The impact of patients' characteristics and clinical profile on rehabilitation goal attainment and clinical outcomes

Author(s): Georgy E.

Source: European Stroke Journal; May 2018; vol. 3 (no. 1); p. 198

Publication Type(s): Conference Abstract

Abstract: Background and Aims: Stroke Early Supported Discharge (ESD) was introduced to provide a comprehensive stroke specialist therapy input, whilst reducing cost of acute care. ESD resulted in better health-related outcomes (1). A consensus has not yet been established regarding specific ESD patient characteristics and clinical profile (2). The main aim is to provide clinical data to support the development of an ESD patient profile and eligibility criteria. The paper outlines the relationship between ESD patients' clinical profile, service provision and clinical outcomes, in terms of disability, goal attainment and institutionalisation rates. Method: A prospective correlational design was implemented and data was collected for all patients admitted to Suffolk ESD service between August and October 2016, including stroke type and severity, therapy frequency and intensity, as well as clinical outcomes including the Barthel Index (3), Modified Rankin Scale (4) and Goal Attainment Scale (GAS)(5). Results: Data was collected for 53 patients (Table 1). Data was analysed for all patients in the three groups (1) goals not achieved, (2) achieved, and (3) achieved to a higher level) according to GAS as shown in Table 2. Results showed significant association between goal attainment and the stroke subtype, severity, disability and length of hospital stay but not age, gender or stroke side (analysis of variance and Chi square tests; p<0.05). Conclusion: Specific clinical characteristics and disease profile correlate with functional outcomes and could influence goal attainment and functional status. A specific patient cohort seem to benefit the most from ESD services in terms of optimised functional outcomes and recovery.

The impact of the stroke early supported discharge service on acute stroke rehabilitation

Author(s): Aweid B.; Norbutiene C.; Mason C.; Vasileiadis E.; Jacob S.

Source: European Stroke Journal; May 2018; vol. 3 (no. 1); p. 269-270

Publication Type(s): Conference Abstract

Abstract: Background and Aims: The Stroke Early Supported discharge service was introduced in Hillingdon, London in October 2016. Once a patient completed their Hyper-acute Stroke investigations and treatment they could be discharged to receive intensive therapy in their own home rather than in a hospital environment. This is potentially beneficial to the patient who prefers the comfort of their home and also the hospital in terms of cost saving from reduced bed days. We wanted to review the impact of this service on both The Stroke Unit and patients. Method: A comparison was made of the level of patient dependency (using the Modified Barthel Index) and stroke categorisation (Oxford Stroke Classification) for the 3rd quarter (October-December) in 2015 and 2016 respectively. This represents a snapshot period, before and after the Stroke ESD service was introduced. Results Conclusion: There has been an increase in the level of depedency of Stroke inpatients in The Stroke Unit thereby indicating that a significant number of those less severe Strokes were successfully being treated in the community under the new Stroke ESD service. Patients preferred to be discharged early and the service represented a cost saving in terms of reduced 'bed-days'.

A trial to evaluate an extended rehabilitation service for stroke patients (EXTRAS): Main results

Author(s): Rodgers H.; Shaw L.; Francis R.; Hills K.; Price C.; Bhattarai N.; Howel D.; Stamp E.; Vale L
Source: European Stroke Journal; May 2018; vol. 3 (no. 1); p. 4

Publication Type(s): Conference Abstract

Abstract: Background and Aims: Development of longer term stroke rehabilitation services is limited by lack of evidence of effectiveness for specific interventions and service models. Method: Study design: Multicentre randomised controlled trial with health economic and process evaluations. Participants: Adults with a new stroke (and carer if appropriate) discharged from hospital under the care of an Early Supported Discharge (ESD) team. Intervention: An extended stroke rehabilitation service for 18 months following completion of routine ESD. The extended rehabilitation service involves regular contact (usually by telephone) with a senior ESD team member who leads and coordinates further rehabilitation. Control: Usual care post ESD. Randomisation: Central independent web based service. Primary outcome: Nottingham Extended Activities of Daily Living (NEADL) Scale at 24 months. Secondary outcomes: For patients: health status, quality of life, mood and experience of services at 12 and 24 months. For carers: quality of life, experience of services and carer stress at 12 and 24 months. Resource use and adverse events were also collected. Process evaluation: Semi-structured interviews with participants and staff to gain insight into perceptions and experience of study treatments. Sample size: Allowing for 25% attrition, 510 participants provide 90% power to detect a difference in mean NEADL score of 6 with a 5% significance level. Results: From November 2012 to June 2015, 573 participants from 19 centres were randomised. Intervention delivery was completed in March 2017 and final follow up data were collected in September 2017. The main results will be available for presentation at ESOC in 2018. Conclusion: The main results will be available for presentation at ESOC in 2018.

Occupational Therapy

Tele-Rehabilitation after Stroke: An Updated Systematic Review of the Literature.

Author(s): Sarfo, Fred S; Ulasavets, Uladzislau; Opare-Sem, Ohene K; Ovbiagele, Bruce

Source: Journal of stroke and cerebrovascular diseases : the official journal of National Stroke Association; Jun 2018

Publication Type(s): Journal Article Review

Abstract: BACKGROUND Tele-rehabilitation for stroke survivors has emerged as a promising intervention for remotely supervised administration of physical, occupational, speech, and other forms of therapies aimed at improving motor, cognitive, and neuropsychiatric deficits from stroke. OBJECTIVE We aimed to provide an updated systematic review on the efficacy of tele-rehabilitation interventions for recovery from motor, higher cortical dysfunction, and poststroke depression among stroke survivors. METHODS We searched PubMed and Cochrane library from January 1, 1980 to July 15, 2017 using the following keywords: "Telerehabilitation stroke," "Mobile health rehabilitation," "Telemedicine stroke rehabilitation," and "Telerehabilitation." Our inclusion criteria were randomized controlled trials, pilot trials, or feasibility trials that included an intervention group that received any tele-rehabilitation therapy for stroke survivors compared with a control group on usual or standard of care. RESULTS This search yielded 49 abstracts. By consensus between 2 investigators, 22 publications met the criteria for inclusion and further review. Tele-rehabilitation interventions focused on motor recovery (n = 18), depression, or caregiver strain (n = 2) and higher cortical dysfunction (n = 2). Overall, tele-rehabilitation interventions were associated with significant improvements in recovery from motor deficits, higher cortical dysfunction, and depression in the intervention groups in all studies assessed, but significant differences between intervention versus control groups were reported in 8 of 22 studies in favor of tele-rehabilitation group while the remaining studies reported nonsignificant
This updated systematic review provides evidence to suggest that tele-rehabilitation interventions have either better or equal salutary effects on motor, higher cortical, and mood disorders compared with conventional face-to-face therapy.

Physical and Occupational Therapy From the Acute to Community Setting After Stroke: Predictors of Use, Continuity of Care, and Timeliness of Care.

Author(s): Freburger, Janet K; Li, Dongmei; Johnson, Anna M; Fraher, Erin P

Source: Archives of physical medicine and rehabilitation; Jun 2018; vol. 99 (no. 6); p. 1077

Abstract: OBJECTIVE To identify predictors of therapist use (any use, continuity of care, timing of care) in the acute care hospital and community (home or outpatient) for patients discharged home after stroke. DESIGN Retrospective cohort analysis of Medicare claims (2010-2013) linked to hospital-level and county-level data. SETTING Acute care hospital and community. PARTICIPANTS Patients (N=23,413) who survived the first 30 days at home after being discharged from an acute care hospital after stroke. INTERVENTIONS Not applicable. MAIN OUTCOME MEASURES Physical and occupational therapist use in acute care and community settings; continuity of care across the inpatient and home or the inpatient and outpatient settings; and early therapist use in the home or outpatient setting. Multivariate logistic and multinomial logistic regression analyses were conducted to identify hospital-level, county-level, and sociodemographic characteristics associated with therapist use, continuity, and timing, controlling for clinical characteristics. RESULTS Seventy-eight percent of patients received therapy in the acute care hospital, but only 40.8% received care in the first 30 days after discharge. Hospital nurse staffing was positively associated with inpatient and outpatient therapist use and continuity of care across settings. Primary care provider supply was associated with inpatient and outpatient therapist use, continuity of care, and early therapist care in the home and outpatient setting. Therapist supply was associated with continuity of care and early therapist use in the community. There was consistent evidence of sociodemographic disparities in therapist use. CONCLUSIONSTherapist use after stroke varies in the community and for specific sociodemographic subgroups and may be underused. Inpatient nurse staffing levels and primary care provider supply were the most consistent predictors of therapist use, continuity of care, and early therapist use.

Occupational performance coaching for stroke survivors (OPC-Stroke): Understanding of mechanisms of actions.

Author(s): Kessler, Dorothy; Egan, Mary Y.; Dubouloz, Claire-Jehanne; McEwen, Sara;

Source: British Journal of Occupational Therapy; Jun 2018; vol. 81 (no. 6); p. 326-337

Abstract: Introduction Occupational performance coaching modified for stroke survivors is a promising new intervention to improve occupational performance post stroke. In the intervention, following client-centred occupational goal-setting, clients are led through strengths-based problem-solving and experimentation. Emotional support, individualized education and goal-focused problem-solving are hypothesized as key elements. Examination of clients’ experiences is necessary to better understand how occupational performance coaching modified for stroke survivors works, and improve its potential effectiveness. Method A descriptive qualitative study was embedded in a pilot randomized controlled trial. Semi-structured interviews were completed with seven participants in the treatment arm who received occupational performance coaching modified for stroke survivors. Qualitative content analysis was used for analysis. Findings Three categories were identified related to participants’ experiences of occupational performance coaching modified for
stroke survivors: (a) the coaching was helpful; (b) the coaching provided opportunity for insightful reflection and (c) a different approach was preferred. Findings also lend support to the critical role of hypothesized key components and theorized mechanisms of action, and demonstrate the overarching role of the therapeutic relationship and the contribution of personal characteristics. Conclusion The revised theoretical understanding of occupational performance coaching modified for stroke survivors provides a valuable framework for communicating the actions that occupational therapists take in enabling occupation and emphasizes the role of the therapeutic relationship in client-centred approaches to improving occupational performance post stroke.

Use of Virtual Rehabilitation to Improve the Symmetry of Body Temperature, Balance, and Functionality of Patients with Stroke Sequelae

Author(s): Zanona A.D.F.; de Souza R.F.; Monte-Silva K.K.; Paixao M.D.C.; Sampaio P.Y.S.; Aidar F.J
Source: Annals of Neurosciences; Jun 2018 ; p. 167-174
Publication Type(s): Article In Press
Abstract: Background: Stroke rehabilitation that is based on the patients’ needs, experiences, and priorities requires extensive knowledge and skills to capture and integrate the perspectives of the subject. Purpose: The objective of this study was to evaluate the acute effect of an occupational therapy protocol associated with virtual reality (VR) on the symmetry of body temperature (BTP), balance, and functionality of patients with stroke sequelae. Methods: Ten patients (69.84 +/- 7.55 years) diagnosed with stroke between 2 and 10 years earlier were evaluated during clinical care sessions integrated with VR games. Associated with games, all patients were stimulated to use both upper and lower limbs and distribute body weight symmetrically, and perceptual stimuli of body-half training, alignment, postural control, and balance were given. The variables of thermography (temperature [degreeC] and body asymmetry) of the upper and lower limbs, balance (Berg scale), and functionality were analyzed before and after the test. Results: BTP was reduced in the 4 upper and lower limb body regions of interest: the right arm (p = 0.024, Cohen’s d = 1.02), previous direct hand (p = 0.034, Cohen’s d = 1.22), right back hand (p = 0.003, Cohen’s d = 1.85) and Left (p = 0.013, Cohen’s d = 0.92), right thigh (p = 0.035, Cohen’s d = 1.32), and left thigh (p = 0.047, Cohen’s d = 0.92). The mean of the bilateral asymmetry variation of the arm in the anterior position at the pre test was classified according to the level of attention monitoring (which means that the asymmetry rate is above normal), changing its state at the end of the intervention to normal. There was an increase in the functional independence score (p = 0.015, Cohen’s d = 0.50) and in the static and dynamic balance function (p = 0.001, Cohen’s d = 0.07). Conclusion: VR associated with occupational therapeutic planning can amplify and potentiate neurological recovery following stroke. Copyright © 2018 S. Karger AG, Basel

Can the Amount of Interventions during the Convalescent Phase Predict the Achievement of Independence in Activities of Daily Living in Patients with Stroke? A Retrospective Cohort Study.

Author(s): Umehara, Takuya; Tanaka, Ryo; Tsunematsu, Miwako; Sugihara, Katsunori;
Source: Journal of stroke and cerebrovascular diseases : the official journal of National Stroke Association; May 2018
Publication Type(s): Journal Article
Abstract: BACKGROUND This study aimed to evaluate the diagnostic performance of the amount of physical, occupational, and speech therapy intervention and optimal timing necessary for activities of daily living (ADL) independence in patients with stroke. METHOD Patients (N = 441) with stroke admitted to the convalescent rehabilitation ward were classified into an early intervention or a nonearly intervention group on the basis of the duration from the date of onset to date of hospital
admission. Logistic regression model was used to identify factors influencing independence in ADL in both groups. Cutoff point, likelihood ratio, and posterior probabilities for ADL independence were calculated, and diagnostic accuracy was evaluated for extracted factors.

RESULTS
Results of logistic regression analysis revealed that age and physical and occupational therapy intervention amount provided during convalescent phase and Functional Independent Measure (FIM) motor score at admission significantly influenced independence in ADL at discharge from the hospital in the early intervention group (hospitalization date was 30 days or less). The cutoff point was 168 hours; positive likelihood ratio was 1.74; negative likelihood ratio was .78; and the posterior probability for the time spent by the therapist was 81.0%. FIM motor score at admission was the only factor extracted for the nonearly intervention group (hospitalization date was 31 days or more).

CONCLUSION
The ADL independence in patients with stroke admitted to convalescent rehabilitation ward during their convalescent phase cannot be determined simply on the basis of the amount of physical and occupational therapy they receive.

Allied health clinicians using translational research in action to develop a reliable stroke audit tool.

Author(s): Abery, Philip; Kuys, Suzanne; Lynch, Mary; Low Choy, Nancy

Source: Journal of evaluation in clinical practice; May 2018

Publication Type(s): Journal Article

Abstract: OBJECTIVE To design and establish reliability of a local stroke audit tool by engaging allied health clinicians within a privately funded hospital. METHODS Design: Two-stage study involving a modified Delphi process to inform stroke audit tool development and inter-tester reliability. PARTICIPANTS Allied health clinicians. INTERVENTIONS A modified Delphi process to select stroke guideline recommendations for inclusion in the audit tool. Reliability study: 1 allied health representative from each discipline audited 10 clinical records with sequential admissions to acute and rehabilitation services. MAIN OUTCOME MEASURES Recommendations were admitted to the audit tool when 70% agreement was reached, with 50% set as the reserve agreement. Inter-tester reliability was determined using intra-class correlation coefficients (ICCs) across 10 clinical records. RESULTS Twenty-two participants (92% female, 50% physiotherapists, 17% occupational therapists) completed the modified Delphi process. Across 6 voting rounds, 8 recommendations reached 70% agreement and 2 reached 50% agreement. Two recommendations (nutrition/hydration; goal setting) were added to ensure representation for all disciplines. Substantial consistency across raters was established for the audit tool applied in acute stroke (ICC .71; range .48 to .90) and rehabilitation (ICC .78; range .60 to .93) services. CONCLUSIONS Allied health clinicians within a privately funded hospital generally agreed in an audit process to develop a reliable stroke audit tool. Allied health clinicians agreed on stroke guideline recommendations to inform a stroke audit tool. The stroke audit tool demonstrated substantial consistency supporting future use for service development. This process, which engages local clinicians, could be adopted by other facilities to design reliable audit tools to identify local service gaps to inform changes to clinical practice.

Rehabilitation Characteristics in High-Performance Hospitals after Acute Stroke.

Author(s): Sawabe, Masashi; Momosaki, Ryo; Hasebe, Kiyotaka; Sawaguchi, Akira; Kasuga, Seiji

Source: Journal of stroke and cerebrovascular diseases : the official journal of National Stroke Association; May 2018

Publication Type(s): Journal Article

Abstract: BACKGROUND Rehabilitation characteristics in high-performance hospitals after acute stroke are not clarified. This retrospective observational study aimed to clarify the characteristics of
high-performance hospitals in acute stroke rehabilitation.

**METHODS**

Patients with stroke discharged from participating acute hospitals were extracted from the Japan Rehabilitation Database for the period 2006-2015. We found 6855 patients from 14 acute hospitals who were eligible for analysis in this study after applying exclusion criteria. We divided facilities into high-performance hospitals and low-performance hospitals using the median of the Functional Independent Measure efficiency for each hospital. We compared rehabilitation characteristics between high- and low-performance hospitals.

**RESULTS**

High-performance hospitals had significantly shorter length of stay. More patients were discharged to home in the high-performance hospitals compared with low-performance hospitals. Patients in high-performance hospitals received greater amounts of physical, occupational, and speech therapy. Patients in high-performance hospitals engaged in more self-exercise, weekend exercise, and exercise in wards. There was more participation of board-certified physiatrists and social workers in high-performance hospitals.

**CONCLUSIONS**

Our data suggested that amount, timing, and type of rehabilitation, and participation of multidisciplinary staff are essential for high performance in acute stroke rehabilitation.

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**Occupational therapy for complex inpatients with stroke: identification of occupational needs in post-acute rehabilitation setting.**

**Author(s):** Schiavi, Margherita; Costi, Stefania; Pellegrini, Martina; Formisano, Debora;

**Source:** Disability and rehabilitation; May 2018; vol. 40 (no. 9); p. 1026-1032

**Publication Type(s):** Journal Article

**Abstract:**

**PURPOSE**

Inpatients admitted to rehabilitation express needs not linked to disease causing hospitalization. This observational cross-sectional study identifies features and occupational needs of complex inpatients during rehabilitation, focusing on function and ability, regardless of diagnosis.

**METHOD**

This study included sixteen adult inpatients with stroke, deemed complex according to Rehabilitation Complexity Scale-Extended, at admission to Rehabilitation ward (from July 2014 to February 2015). Patients with primary psychiatric disorders, language barriers, cognitive or severe communication deficits were excluded. Upon admission, a multidisciplinary team collected data on general health, independence in daily activities (Modified Barthel Index), fatigue (Fatigue Severity Scale), resistance to sitting and ability to perform instrumental activities (Instrumental Activities of Daily Living). The occupational therapist identified occupational needs according to Canadian Occupational Performance Measure.

**RESULTS**

Inpatients enrolled in this study were dependent in basic ADL, limited in instrumental ADL and easily fatigable. Their occupational needs related to self-care (75%) and, to a lesser extent, productivity (15%) and leisure (10%). According to inpatients, rehabilitation process should firstly address self-care needs, followed by productivity and leisure problems.

**CONCLUSIONS**

Despite small sample size, this study described patterns of occupational needs in complex inpatients with stroke. These results will be implemented in client-centered rehabilitation programs to be tested in a phase-two trial. [NCT02173197] Implications for Rehabilitation Priority occupational needs of complex inpatients with stroke during rehabilitation are focused on self-care area. Productivity and leisure problems also arise in early post-acute phase. Client-centered rehabilitation programs should firstly address self-care needs and, later on, they should also focus on the recovery of family and social roles.

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**Search training for people with visual field loss after stroke: A cohort study.**

**Author(s):** Turton, Ailie J.; Angilley, Jayne; Longley, Verity; Clatworthy, Philip; Gilchrist, Iain D.

**Source:** British Journal of Occupational Therapy; May 2018; vol. 81 (no. 5); p. 255-265

**Publication Type(s):** Academic Journal
Abstract: Introduction: People with visual field loss after stroke often experience difficulties in everyday activities. The purpose of this study was to assess the acceptability of search training as used within occupational therapy and the feasibility of possible measures for use in a future trial.

Method: Nine participants took part in a goal oriented intervention that was delivered three times a week for 3 weeks. Patient reports of acceptability and outcomes using the Visual Function Questionnaire-25 were collected. Participants' room-search behaviour before and after the intervention was recorded using a head-worn camera. Results: Eight participants completed nine treatment visits. All participants reported improved awareness and attention to the blind side during activities following the intervention. Seven participants' change scores on the Visual Function Questionnaire-25 exceeded six points. Patterns of head-direction behaviour and overall room-search times were variable across patients; markedly, improved performance was only evident in the most severely affected participant. Conclusion: The intervention was acceptable. The Visual Function Questionnaire-25 is a feasible measure for assessing patient-reported outcomes. While the room search was informative about individuals' behaviour, more sophisticated methods of gaze tracking would allow search processes to be determined in real-world activities that are relevant to patients' goals.

Telerehabilitation in the home versus therapy in-clinic for patients with stroke

Author(s): Cramer S.; Lucy D.; Le V.; Jill S.; Renee A.; Alison M.; Robert Z.; Nina C.; Walt S.; Megan S.;

Source: European Stroke Journal; May 2018; vol. 3 (no. 1); p. 590-591

Publication Type(s): Conference Abstract

Abstract: Background and Aims: Occupational/physical therapy improves poststroke outcomes in a dose-dependent manner. However, many patients receive suboptimal therapy doses for reasons that include cost, availability, and difficulty with travel. This problem is likely to increase with time given the aging population and increased post-stroke survival rates. Telehealth, defined as the delivery of health-related services and information via telecommunication technologies, can potentially address this unmet need. The current study examined the effect of a home-based telerehabilitation program designed to improve motor recovery and patient education in patients with stroke.

Method: Using a randomized, assessor-blinded, controlled, non-inferiority clinical trial, a total of 124 participants were enrolled across 11 US centers as part of the NIH StrokeNet clinical trials network. Entry criteria included arm motor deficits (arm motor Fugl-Meyer (FM) score 22-56/66), stroke onset 4-36 weeks prior, and age +/-18. Those with significant depression, cognitive impairment, or communication deficits were excluded. Patients were randomized (1:1) to receive 6 weeks of intensive arm motor therapy either (a) in a traditional in-clinic setting or (b) via in-home telerehabilitation (rehabilitation services delivered to the subject's home via an internet-connected computer). Therapy intensity, duration, and frequency were matched across the two groups, with all participants assigned 36 sessions (18 supervised and 18 unsupervised), 80 minutes each (including a 10 minute break), over 6 weeks. The primary endpoint is within-subject change in FM score from the Baseline Visit to 30 Day Follow-Up Visit. Additional measures pertain to stroke education, secondary prevention, behavioral compliance, and patient motivation. Results: Will-be-presented. Conclusion: Will-be-presented.

Health care and rehabilitation consumption during five years after stroke

Author(s): Berglund A.; Von Koch Karolinska L.; Karolinska M.T.; Karolinska C.Y.

Source: European Stroke Journal; May 2018; vol. 3 (no. 1); p. 212

Publication Type(s): Conference Abstract
Abstract: Background and Aims: The consequences of stroke often affect a person's functioning and independence which may lead to a continuous need of rehabilitation and medical attention. The aim of this study was to describe the consumption of health care and rehabilitation during five years after stroke. Method: Participants with diagnosed stroke were recruited from the stroke units at a hospital in Stockholm, Sweden, during 2006 to 2007. Five years data on in- and out-patient care were collected from the Stockholm County Council's register. Results: Of the 121 participants, median age was 65 years and 57% were men. Stroke was classified as mild (Barthel Index 51-100) in 79% of the participants. The number of in-hospital admissions and out-patient visits differed widely in range, table 1. The major part of the total in-patient care, 47% and out-patient care 30%, was used during the first year after stroke. About 80% of the 665 hospital admissions were in medical care and 20% in rehabilitation. Of the 20 639 out-patient visits, rehabilitation represented 27 %. The visits in out-patient rehabilitation were mostly taking place in rehabilitation facilities, 77%, home visits in 11 % and 12 % were nonpatients- visits. The most common out-patient rehabilitation visits were to physiotherapists, 39%, physician 23%, occupational therapist 14%, speech and language therapist 10% and psychological-social support 6%. Conclusion: The data show that rehabilitation constituted a smaller part of the total consumption of care and rehabilitation. In further analysis aspects of sex, age and stroke severity will be included.

Do women receive equivalent acute stroke care to men? a national stroke registry study
Author(s): Dunn G.; Hoffman A.; Paley L.; Stanley K.; McCurran V.; Kavanagh M.; Bray B.; James M.
Source: European Stroke Journal; May 2018; vol. 3 (no. 1); p. 55
Publication Type(s): Conference Abstract
Abstract: Background and Aims: Analysis of a national register of stroke was undertaken to determine whether quality of care differs by gender. Method: 12 quality measures (representative of whole stroke pathway) were analysed using 2016/17 Sentinel Stroke National Audit Programme (SSNAP) data, a national quality register for England, Wales and Northern Ireland. Adjustment was made for age, stroke onset while inpatient, stroke type, modified Rankin Scale score, hypertension, atrial fibrillation (AF), diabetes, previous stroke/TIA and NIHSS-on-admission. Results: Using data for 83,484 patients between April 2016-March 2017 admitted to hospital with acute stroke, small differences were identified for whether patient attended a stroke unit within 4hrs (adjusted odds ratio 1.04, 95% CI 1.01-1.07), swallow screen within 4hrs (aOR 1.05, CI 1.01-1.10), received Early Supported Discharge (aOR 1.05, CI 1.01-1.08). More marked differences were present for receiving thrombolysis (aOR 1.10, CI 1.05-1.15), door-to-needle time within 60min (aOR 1.15, CI 1.05-1.25), physiotherapy within 72hrs (aOR 1.11, CI 1.03-1.19). No evidence of differences in care by gender were found for brain scanning within 1 hour, admitted on an anticoagulant if in AF, seen by stroke nurse within 24hrs, assessed by occupational therapist within 72hrs, swallow assessment within 72hrs, seen by speech and language therapist within 72hrs. Conclusion: Many aspects of care did not show differences between genders, however small differences were identified for the management of thrombolysis and access to physiotherapy. It is unclear why such differences might exist and care quality should be monitored to ensure that inequalities are identified and overcome. The possibility of incomplete adjustment for confounding requires further exploration.

Combination of cerebrolysin and occupational therapy for men with post-stroke depression
Author(s): Melnikova E.; Shmonin A.; Maltseva M.
Source: European Stroke Journal; May 2018; vol. 3 (no. 1); p. 131
Publication Type(s): Conference Abstract
Abstract: Background and Aims: Purpose: to evaluate the effectiveness combination therapy of Cerebrolysin and ergotherapeutic correction for men with poststroke depression. Method: The study included 24 male patients aged 47 to 67 years with lacunar stroke 5-7 months before the start of the study, who had no motor and speech disorders. The criterion for inclusion in the study was the presence of depressive disorders and disadaptation. The Beck Depression Inventory (BDI) was applied to assess the severity of the depressive disorder. The Canadian Occupational Performance Measure (COPM) was applying for assessment of activity and social adaptation. In the main group, during the first 14 days of training, Cerebrolysin was administered: intravenously, 10 ml daily, once a day. In the control group, a placebo preparation was administered in the same manner. The course of ergotherapy lasted for 3 months. Results: In patients receiving Cerebrolysin was a significant decrease in the depression level estimated by BDI in comparison with the placebo group (p=0.0000007 and p=0.00002, respectively) in all end points. In the Cerebrolysin group was a faster and more complete recovery of activity in the social environment (shopping) and productive activities (work for money and cooking) of the COPM-rated performance and satisfaction compared with the placebo group after end of infusion and on the 90th day. Conclusion: Combination of Cerebrolysin infusions and the course of occupational correction in patients with post-stroke depression are more effective for depression and social disadaptation than for a separate course of occupational therapy without drug support.

Determinants of antidepressant treatment and rehabilitative participation after stroke

Author(s): Ladwig S.; Werheid K.

Source: European Stroke Journal; May 2018; vol. 3 (no. 1); p. 202

Publication Type(s): Conference Abstract

Abstract: Background and Aims: Depression is common after stroke, yet substantially undertreated. Additionally, rehabilitative therapies are indicated in most people post-stroke while depressive symptoms may reduce participation. Identifying determinants of antidepressant treatment and predictors of rehabilitative participation enables to improve health care after stroke. Method: People with ischaemic stroke (N=294) were consecutively recruited from inpatient rehabilitation. Demographic, psychological, and stroke-related measures were assessed during inpatient stay and one year later. Multiple logistic and linear regression analyses identified determinants of antidepressant treatment and rehabilitative participation in physical, occupational, speech, and neuropsychological therapy. Results: Use of antidepressants after one year (n=28/111; 20.1%) was predicted by antidepressant treatment at admission (OR=48.41), current depressiveness (OR=3.03), and lower stroke severity (OR=0.45; all p<.05). Half of the participants (n=68/136; 50%) used at least one rehabilitative therapy after one year. The number of rehabilitative therapies used was predicted by functional dependency (beta=.43), cognitive impairment (beta=.31), and years of education (beta=.25, all p<.001). Conclusion: As expected, use of antidepressants was predicted by higher depressiveness. Additionally, use of antidepressants was substantially influenced by previous use while patients with severe stroke may be at risk of being undertreated. Rehabilitative participation was predicted by functional and cognitive impairment, and influenced by sociodemographic variables. Patients with lower educational level used these therapies less likely.

Factors, trends and long-term outcomes for stroke patients returning to work: The South London stroke register (SLSR)

Author(s): Sen A.; Rudd A.; Bhalla A.; Bisquera A.; Mckevitt C.; Wolfe C.

Source: European Stroke Journal; May 2018; vol. 3 (no. 1); p. 354

Publication Type(s): Conference Abstract
Abstract: Background and Aims: There is limited information on factors, trends and outcomes in return to work (RTW) at different time-points poststroke. This study aims to identify these in a multi-ethnic urban population. Method: Patterns of RTW were identified in individuals in paid work prior to first-ever stroke in the population-based SLSR between 1995–2014. Outcomes including the Barthel Index (BI), Hospital Anxiety and Depression Scale and 12-Item Short-Form survey were assessed at 1 year (1y), 5 years (5y) and 10 years (10y) post-stroke. Multivariable logistic regression examined associations between patient characteristics and RTW. Results: Among 5609 patients, 940 (17%) were working prior to their stroke (mean age 53 years), of which 319 (34%) were working 3 months post-stroke, declining to 250 (27%) at 1y, 230 (25%) at 5y and 93 (10%) at 10y. Factors associated with RTW, after logistic regression, included receiving thrombolysis (p<0.01) and occupational therapy (p<0.01) at 1y and increasing age (p<0.05) at all three time-points. RTW within 1y increased the likelihood of working at 5y (OR: 7.6; 95% CI: 3.5-16.2) and 10y (3.8; 1.0-14.5). Of those who were independent at follow-up (BI>=19), 39% were working at 1y, 47% at 5y and 69% at 10y. Anxiety, depression and lower self-rated health were all associated with RTW at 1y (p<0.01) and 5y (p<0.05). Conclusion: A large proportion of stroke survivors remain unemployed despite functional independence, however this proportion reduces with time. Individuals returning to work after stroke can experience anxiety, depression and lower self-perceived quality of life in the long-term.

Upper Limb

Effectiveness of a single session of dual-transcranial direct current stimulation in combination with upper limb robotic-assisted rehabilitation in chronic stroke patients: a randomized, double-blind, cross-over study.

Author(s): Dehem, Stéphanie; Gilliaux, Maxime; Lejeune, Thierry; Delaunois, Emmanuelle;
Source: International Journal of Rehabilitation Research; Jun 2018; vol. 41 (no. 2); p. 138-145

Publication Type(s): Academic Journal

Abstract: The impact of transcranial direct current stimulation (tDCS) is controversial in the neurorehabilitation literature. It has been suggested that tDCS should be combined with other therapy to improve their efficacy. To assess the effectiveness of a single session of upper limb robotic-assisted therapy (RAT) combined with real or sham-tDCS in chronic stroke patients. Twenty-one hemiparetic chronic stroke patients were included in a randomized, controlled, cross-over double-blind study. Each patient underwent two sessions 7 days apart in a randomized order: (a) 20 min of real dual-tDCS associated with RAT (REAL+RAT) and (b) 20 min of sham dual-tDCS associated with RAT (SHAM+RAT). Patient dexterity (Box and Block and Purdue Pegboard tests) and upper limb kinematics were evaluated before and just after each intervention. The assistance provided by the robot during the intervention was also recorded. Gross manual dexterity (1.8±0.7 blocks, P=0.008) and straightness of movement (0.01±0.03, P<0.05) improved slightly after REAL+RAT compared with before the intervention. There was no improvement after SHAM+RAT. The post-hoc analyses did not indicate any difference between interventions: REAL+RAT and SHAM+RAT (P>0.05). The assistance provided by the robot was similar during both interventions (P>0.05). The results showed a slight improvement in hand dexterity and arm movement after the REAL+RAT tDCS intervention. The observed effect after a single session was small and not clinically relevant. Repetitive sessions could increase the benefits of this combined approach.

Physiotherapy based on problem-solving in upper limb function and neuroplasticity in chronic stroke patients: A case series.
Abstract: Rationale, aims, and objectives: Upper limb recovery is one of the main concerns of stroke neurorehabilitation. Neuroplasticity might underlie such recovery, particularly in the chronic phase. The purpose of this study was to assess the effect of physiotherapy based on problem-solving in recovering arm function in chronic stroke patients and explore its neuroplastic changes. Methods: A small sample research design with a n of 3 using a pre-post test design was carried out. Neuroplasticity and function were assessed by using functional magnetic resonance imaging (during motor imagery and performance), action research arm test, motor assessment scale, and Fugl-Meyer assessment scale, at 3 sequential time periods: baseline (m0—before a 4-week period without physiotherapy), pre-treatment (m1), and post-treatment (m2). Minimal clinical important differences and a recovery score were assessed. Assessors were blinded to moment assignment. Patients underwent physiotherapy sessions, 50 minutes, 5 days/week for 4 weeks. Four control subjects served as a reference for functional magnetic resonance imaging changes. Results: All patients recovered more than 20% after intervention. Stroke patients had similar increased areas as healthy subjects during motor execution but not during imagination at baseline. Consequently, all patients increased activity in the contralateral precentral area after intervention. Conclusions: This study indicates that 4 weeks of physiotherapy promoted the recovery of arm function and neuroplasticity in all chronic stroke patients. Future research is recommended to determine the efficacy of this therapy.
motor function in affected upper limb in post-stroke patients after inpatient rehabilitation combined with rTMS using the bispectral index (BIS) monitor. During 15-day hospitalization, each patient received rTMS and intensive occupational therapy. Low-frequency rTMS with 1 Hz was applied over the contralesional motor cortex. During rTMS session, adhesive sensor was put on each patient’s forehead and connected to the BIS monitor. The mean score for the maximum change of BIS values during each rTMS session (ΔBIS) was calculated. We regarded the patients with and over 10 of mean ΔBIS as Asleep group and under 10 as Awake group. Fugl-Meyer assessment (FMA) and Action Research Arm Test (ARAT) were evaluated on admission and discharge. Awake group included six patients and Asleep group included seven patients. There was no significant difference in clinical characteristics and in increase of FMA between two groups. Asleep group was significantly superior to Awake group in the increase of ARAT (p < 0.05). There was a significant correlation between the mean of ΔBIS and increase of ARAT (ρ = 0.78, p = 0.002). Sleep during low-frequency rTMS may contribute to improvement of motor function in the affected upper limb.

Enabling stroke rehabilitation in home and community settings: A wearable sensor-based approach for upper-limb motor training

Author(s): Lee S.I.; Adans-Dester C.P.; Grimaldi M.; Black-Schafer R.M.; Bonato P.; Dowling A.V.
Source: IEEE Journal of Translational Engineering in Health and Medicine; May 2018; vol. 6
Publication Type(s): Article
Available at IEEE journal of translational engineering in health and medicine - from Europe PubMed
Abstract: High-dosage motor practice can significantly contribute to achieving functional recovery after a stroke. Performing rehabilitation exercises at home and using, or attempting to use, the stroke-affected upper limb during Activities of Daily Living (ADL) are effective ways to achieve high-dosage motor practice in stroke survivors. This paper presents a novel technological approach that enables 1) detecting goal-directed upper limb movements during the performance of ADL, so that timely feedback can be provided to encourage the use of the affected limb, and 2) assessing the quality of motor performance during in-home rehabilitation exercises so that appropriate feedback can be generated to promote high-quality exercise. The results herein presented show that it is possible to detect 1) goal-directed movements during the performance of ADL with a $c$-statistic of 87.0% and 2) poorly performed movements in selected rehabilitation exercises with an $F$-score of 84.3%, thus enabling the generation of appropriate feedback. In a survey to gather preliminary data concerning the clinical adequacy of the proposed approach, 91.7% of occupational therapists demonstrated willingness to use it in their practice, and 88.2% of stroke survivors indicated that they would use it if recommended by their therapist. Copyright © 2013 IEEE.

Synergistic effect of acupuncture and mirror therapy on post-stroke upper limb dysfunction: a study protocol for a randomized controlled trial.

Author(s): Xu, Ying; Lin, Shufang; Jiang, Cai; Ye, Xiaoqian; Tao, Jing; Wilfried, Schupp;
Source: Trials; May 2018; vol. 19 (no. 1)
Publication Type(s): Academic Journal
Available at Trials - from EBSCO (MEDLINE Complete)
Abstract: Background: Upper limb dysfunction is common after stroke, posing an important challenge for post-stroke rehabilitation. The clinical efficacy of acupuncture for the recovery of post-stroke upper limb function has been previously demonstrated. Mirror therapy (MT) has also been found to be effective. However, the effects of acupuncture and MT have not been systematically compared. This trial aims to elucidate the synergistic effects of acupuncture and MT on upper limb dysfunction after stroke. Methods: A 2 × 2 factorial randomized controlled trial will be conducted at
the rehabilitation hospitals affiliated with Fujian University of Traditional Chinese Medicine. A total of 136 eligible subjects will be randomly divided into acupuncture treatment (AT), MT, combined treatment, and control groups in a 1:1:1:1 ratio. All subjects will receive conventional treatment. The interventions will be performed 5 days per week for 4 weeks. AT, MT, and combined treatment will be performed for 30 min per day (combined treatment: AT 15 min + MT 15 min). The primary outcomes in this study will be the mean change in scores on both the FMA and WMFT from baseline to 4 weeks intervention and at 12 weeks follow-up between the two groups and within groups. The secondary outcomes are the mean change in the scores on the Visual Analogue Scale, Stroke Impact Scale, and modified Barthel index. Medical abstraction of adverse events will be assessed at each visit.Discussion: The results of this trial will demonstrate the synergistic effect of acupuncture and MT on upper limb motor dysfunction after stroke. In addition, whether AT and MT, either combined or alone, are more effective than the conventional treatment in the management of post-stroke upper limb dysfunction will also be determined.Trial Registration: Chinese Clinical Trial Registry: ChiCTR-IOR-17011118 . Registered on April 11, 2017. Version number: 01.2016.09.1.

Shoulder pain after stroke - experiences, consequences in daily life and effects of interventions: a qualitative study.

Author(s): Lindgren, Ingrid; Gard, Gunvor; Brogårdh, Christina

Source: Disability & Rehabilitation; May 2018; vol. 40 (no. 10); p. 1176-1182

Publication Type(s): Academic Journal

Abstract: Purpose: To describe experiences of shoulder pain after stroke, how pain affects daily life and perceived effects of interventions. Method: A qualitative interview study including 13 community-dwelling persons (six women; median age 65 years) with persistent shoulder pain after stroke. Results: Three categories emerged from the content analysis. In "Multiple pain characteristics" an insidious pain onset was reported. The pain existed both day and night and could be located around the shoulder girdle but also have radiation to the arm and hand. An explanation of the pain was seldom given. In "Limitations caused by the pain" it was described how the pain negatively influenced personal care, household activities and leisure, but also could lead to emotional reactions. In "Multiple pain interventions with various effects" a variety of interventions were described. Self-management interventions with gentle movements were perceived most effective. A restraint attitude to pain medication due to side effects was reported. Conclusions: Shoulder pain after stroke can lead to a variety of pain characteristics. As the pain is complex and may affect many important areas in a person's life, multidisciplinary rehabilitation interventions are important.

Implementing evidence-based practice: A context analysis to examine use of task-based approaches to upper-limb rehabilitation.

Author(s): Radomski, Mary Vining; Anheluk, Mattie; Arulanantham, Christine; Finkelstein, Marsha

Source: British Journal of Occupational Therapy; May 2018; vol. 81 (no. 5); p. 285-289

Publication Type(s): Academic Journal

Abstract: Statement of context: Many occupational therapists experience challenges in implementing evidence-based practice, which may be best approached as a context-specific enterprise. Critical reflection on practice: This practice analysis article reports the results of analyzing 24 home programs that occupational therapists issued to rehabilitation inpatients with stroke upon their discharge home. Home programs did not reflect a task-based approach to upper-limb recovery, even though this is supported by established evidence. Examination of contextual factors provides a framework to facilitate evidence implementation. Implications for practice: Occupational therapists
may optimize evidence-based practice implementation by first evaluating and addressing practice-specific contextual factors.

**Predicting shoulder function after constraint-induced movement therapy: a retrospective cohort study.**

**Author(s):** Hansen, Gunhild Mo; Svendsen, Susanne Wulff; Brunner, Iris; Nielsen, Jørgen Feldbæk

**Source:** Topics in Stroke Rehabilitation; May 2018; vol. 25 (no. 4); p. 281-287

**Publication Type(s):** Academic Journal

**Abstract:** Background: Several predictors have been associated with upper extremity (UE) recovery after stroke, but characteristics that predict shoulder function after constraint-induced movement therapy (CIMT) have not yet been identified. Objectives: To identify predictors associated with satisfactory shoulder function in patients with reduced shoulder function at admission to CIMT. Methods: One hundred and seventy five patients were treated using CIMT while in a specialized inpatient hospital. Satisfactory shoulder function was defined according to the functional ability scale of the Wolf Motor Function test. Predictors of satisfactory shoulder function after CIMT were identified using multivariable logistic regression. Results: Better distal arm function and good proximal shoulder function on admission to CIMT were strong predictors of satisfactory shoulder function, while age and time of admission to CIMT since stroke were not. Seventeen percent of all CIMT-participants with reduced shoulder function pre-CIMT reached a level of satisfactory shoulder function after CIMT. Discussion: A substantial part of patients with reduced shoulder function reached a level of satisfactory shoulder function after CIMT. Intensive CIMT training, comprising tasks that require both distal and proximal UE function, may increase shoulder function in patients with a potential functional reserve.

**Effects of robot-assisted training on upper limb functional recovery during the rehabilitation of poststroke patients.**

**Author(s):** Daunoraviciene, Kristina; Adomaviciene, Ausra; Grigonyte, Agne; Griškevičius, Julius

**Source:** Technology and health care : official journal of the European Society for Engineering and Medicine; May 2018

**Publication Type(s):** Journal Article

**Abstract:** BACKGROUND The study aims to determine the effectiveness of robot-assisted training in the recovery of stroke-affected arms using an exoskeleton robot Armeo Spring. OBJECTIVE To identify the effect of robot training on functional recovery of the arm. METHODS A total of 34 stroke patients were divided into either an experimental group (EG; n = 17) or a control group (n = 17). EG was also trained to use the Armeo Spring during occupational therapy. Both groups were clinically assessed before and after treatment. Statistical comparison methods (i.e. one-tailed t-tests for differences between two independent means and the simplest test) were conducted to compare motor recovery using robot-assisted training or conventional therapy. RESULTS Patients assigned to the EG showed a statistically significant improvement in upper extremity motor function when compared to the CG by FIM (P< 0.05) and ACER (P< 0.05). The calculated treatment effect in the EG and CG was meaningful for shoulder and elbow kinematic parameters. CONCLUSIONS The findings show the benefits of robot therapy in two areas of functional recovery. Task-oriented robotic training in rehabilitation setting facilitates recovery not only of the motor function of the paretic arm but also of the cognitive abilities in stroke patients.
Effect of intensive motor training with repetitive transcranial magnetic stimulation on upper limb motor function in chronic post-stroke patients with severe upper limb motor impairment.

**Author(s):** Hirakawa, Yuichi; Takeda, Kazuya; Tanabe, Shigeo; Koyama, Soichiro; Motoya, Ikuo

**Source:** Topics in stroke rehabilitation; May 2018 ; p. 1-5

**Abstract:** Background Intensive motor training with low-frequency repetitive transcranial magnetic stimulation (rTMS) has efficacy as a therapeutic method for motor dysfunction of the affected upper limb in patients with mild to moderate stroke. However, it is not clear whether this combination therapy has the same effect in chronic post-stroke patients with severe upper limb motor impairment. Objectives The aim of this study was to test the treatment effects of intensive motor training with low-frequency rTMS in chronic post-stroke patients with severe upper limb motor impairment. Methods A convenience sample of 26 chronic post-stroke patients with severe upper limb motor impairment participated in this study with the non-randomized, non-controlled clinical trial. All subjects were hospitalized to receive intensive motor training with low-frequency rTMS. During 2 weeks in which Sundays were excluded, a total of 24 sessions (2 sessions per day) of the intervention were conducted. The Fugl-Meyer Assessment (FMA) and Wolf Motor Function Test (WMFT) were used to assess motor impairment and function of the affected upper limb, respectively, before and after intervention. Paired t-test was used to analyze the effects of the intervention. Results The FMA total score and WMFT log performance time significantly improved from before to after intervention (FMA: 12.6–18.0; WMFT: 3.6–3.3, p < 0.001). Conclusions The present results suggest that intensive motor training with low-frequency rTMS could improve motor impairment in chronic post-stroke patients with severe upper limb motor impairment and contribute to the expansion of the application range of this combination therapy.

Cortico-spinal excitability and hand motor recovery in stroke: a longitudinal study.

**Author(s):** Veldema, Jitka; Bösl, Kathrin; Nowak, Dennis Alexander

**Source:** Journal of neurology; May 2018; vol. 265 (no. 5); p. 1071-1078

**Abstract:** OBJECTIVE To describe the relationship between changes of cortico-spinal excitability and motor recovery of the affected hand after stroke. METHOD Eighteen hemiparetic stroke patients with a severe-to-mild upper limb motor impairment were randomized. Cortico-spinal excitability measures (resting motor thresholds and motor evoked potentials) obtained from a distal (abductor pollicis brevis) and proximal (biceps brachii) upper limb muscle were assessed for both hemispheres. Motor function of the affected hand was tested by the Wolf Motor Function and Action Research Arm tests. The evaluations were performed at baseline and weekly over 7 weeks of in-patient neurological rehabilitation. RESULTS Severe hand dysfunction was associated with a strong suppression of ipsilesional cortico-spinal excitability and a shift of excitability towards the contralesional hemisphere. Mild hand impairment was associated with a shift of cortico-spinal excitability towards the ipsilesional hemisphere. Favorable motor recovery correlated with an increase of ipsilesional cortico-spinal excitability.

Automated FES for Upper Limb Rehabilitation Following Stroke and Spinal Cord Injury.

**Author(s):** Hodkin, Edmund F; Lei, Yuming; Humby, Jonathan; Glover, Isabel S; Choudhury, Supriyo

**Source:** IEEE transactions on neural systems and rehabilitation engineering : a publication of the IEEE Engineering in Medicine and Biology Society; May 2018; vol. 26 (no. 5); p. 1067-1074

**Publication Type(s):** Journal Article
**Abstract:** Neurorehabilitation aims to induce beneficial neural plasticity in order to restore function following injury to the nervous system. There is an increasing evidence that appropriately timed functional electrical stimulation (FES) can promote associative plasticity, but the dosage is critical for lasting functional benefits. Here, we present a novel approach to closed-loop control of muscle stimulation for the rehabilitation of reach-to-grasp movements following stroke and spinal cord injury (SCI). We developed a simple, low-cost device to deliver assistive stimulation contingent on users’ self-initiated movements. The device allows repeated practice with minimal input by a therapist, and is potentially suitable for home use. Pilot data demonstrate usability by people with upper limb weakness following SCI and stroke, and participant feedback was positive. Moreover, repeated training with the device over 1-2 weeks led to functional benefits on a general object manipulation assessment. Thus, automated FES delivered by this novel device may provide a promising and readily translatable therapy for upper limb rehabilitation for people with stroke and SCI.

**Responsiveness of five measures of arm function in acute stroke rehabilitation.**

**Author(s):** Vratsistas-Curto, Angela; Sherrington, Catherine; McCluskey, Annie

**Source:** Clinical rehabilitation; May 2018; p. 269215518778316

**Publication Type(s):** Journal Article

**Abstract:** OBJECTIVE To determine the responsiveness of five arm function measures in people receiving acute inpatient stroke rehabilitation. DESIGN Inception cohort study. SETTING Comprehensive stroke unit providing early rehabilitation. SUBJECTS A total of 64 consecutively admitted stroke survivors with moderately severe disability (Modified Rankin Scale score median (interquartile range (IQR)): 4.0 (1.0)). MAIN MEASURES Responsiveness was analyzed by calculating effect size, standardized response mean and median-based effect size. Floor/ceiling effects were calculated as the percentage of participants scoring the lowest/highest possible scores. RESULTS Average length of stay and number of therapy days were 34 (SD = 27.9) and 12 (SD = 13.1), respectively. Box and Block Test and Functional Independence Measure-Self-Care showed the highest responsiveness with values in the moderate-large range (effect size = 1.09, standardized response mean = 1.07 and median-based effect size = 0.76; effect size = 0.94, standardized response mean = 1.04 and median-based effect size = 1.0). Responsiveness of Action Research Arm Test and Upper Limb-Motor Assessment Scale were moderate (effect size = 0.58, standardized response mean = 0.69 and median-based effect size = 0.59; effect size = 0.62, standardized response mean = 0.75 and median-based effect size = 0.67). For Manual Muscle Test, responsiveness was in the small-moderate range (effect size = 0.42, standardized response mean = 0.59 and median-based effect size = 0.5). Box and Block Test showed the largest floor effect on admission (28%), and Action Research Arm Test and Manual Muscle Test showed the largest ceiling effect on discharge (31%). CONCLUSION These five measures varied in their ability to detect change with responsiveness ranging from the small to large range. Box and Block Test and Functional Independence Measure-Self-Care showed a greater ability to detect change; both demonstrated moderate-large responsiveness.

**A technology-assisted, high intensive, task-oriented exercise program to improve arm and hand functions in stroke patients: Study protocol for the techito feasibility and pilot trial**

**Author(s):** Wong Y.; Langhammer B.

**Source:** European Stroke Journal; May 2018; vol. 3 (no. 1); p. 595-596

**Publication Type(s):** Conference Abstract
Abstract: Background and Aims: Stroke patients with reduced arm and hand functions often experience increased dependence in activities of daily living, restricted social participation, and low quality of life. In this context, an intervention combining task-oriented exercises with orthosis in the community rehabilitation unit and home environment is hypothesized to increase perceived goal achievement, repetition, and intensity of exercises. The primary objective of the study is to evaluate the feasibility and clinical usefulness of the program in terms of patient compliance and outcomes improvement. The secondary objective is to compare the effectiveness of the program with or without the use of the orthosis in a randomized controlled trial (RCT). Method: The study will first be carried out in a cohort of 30 stroke patients aged over 18 years regardless of lesion location and temporal evolution. Subsequently, the pilot RCT will include 30 first-time stroke patients in which the experimental group will receive an orthosis for use during the exercises. The intervention will be performed at a rehabilitation unit 3 times/week for 3 weeks and at home for 9 weeks. A comprehensive assessment will be performed at baseline, week 3, and week 12 following intervention. The primary outcome measure is the Action Research Arm Test. Secondary outcomes include Fugl-Meyer Assessment, Motor Assessment Scale, Nine-peg-hole test, grip-strength, modified Ashworth Scale, EQ-5D instrument, and Borg scale. Additionally, a qualitative evaluation will be performed. Results: Conclusion: If the intervention proves effective, the proposed study will provide important information for clinicians and policymakers.

Recovery of kinematic arm function in well-performing people with subacute stroke: A longitudinal cohort study

Author(s): Thrane G.; Alt Murphy M.; Sunnerhagen K.S.

Source: European Stroke Journal; May 2018; vol. 3 (no. 1); p. 212-213

Publication Type(s): Conference Abstract

Abstract: Background and Aims: Most motor function improvements in people who have experienced strokes occur within the first 3 months. However, individuals showing complete or nearly complete arm function recovery, as assessed using clinical scales, still show certain movement kinematic deficits at 3 months, post-stroke. This study evaluated the changes in upper extremity kinematics, in individuals demonstrating minor clinical motor impairments, 3-12 months post-stroke, and also examined the association between kinematics and the subjects's self-perceived hand abilities during the chronic stage, 12 months post-stroke. Method: Forty-two subjects recovering from strokes and having Fugl-Meyer upper extremity motor assessment scores >=60 were included from the Stroke Arm Longitudinal Study at the University of Gothenburg (SALGOT). Kinematic analyses of a drinking task, performed 3, 6, and 12 months post-stroke, were compared with kinematic analyses performed in 35 healthy controls. The Stroke Impact Scale-Hand domain was evaluated at the 12-month follow-up. Results: There were no significant changes in kinematic performance between 3 and 12 months, post-stroke. The patients recovering from stroke showed lower peak elbow extension velocities, and increased shoulder abduction and trunk displacement during drinking than did healthy controls, at all time points. At 12 months, post-stroke, better self-perceived arm functions correlated with improved trunk displacements, movement times, movement units, and time to peak velocity percentages. Conclusion: Kinematic movement deficits, observed at 3 months poststroke, remained unchanged at 12 months. Movement kinematics were associated with the patient's self-perceived ability to use their more affected hand.

Self-assessment and quantification of the S.A.F.E. prognostic test for arm weakness after stroke

Author(s): Lotay R.; Mace M.; Rinne P.; Burdet E.; Pucek M.; Fernandes C.; Waibel S.; Bentley P.

Source: European Stroke Journal; May 2018; vol. 3 (no. 1); p. 387
**Publication Type(s):** Conference Abstract

**Abstract:** Background and Aims: Assessment of arm function is complex and expert-dependent, but critical for prognostication and treatment stratification after stroke. A simple, two-stage functional test - Shoulder Abduction + Finger Extension (S.A.F.E.) - can reliably distinguish patients who will recover arm function at 6 months, and thus explains a large degree of the variance of arm function post-stroke. However the test is observer dependent and relatively imprecise. We developed a method to quantify the functional components of the S.A.F.E score, and to allow for easy self-assessment of S.A.F.E by patients with a view to home monitoring. Method: We utilised a pair of commercial sensors that can detect finger flexion and extension (gripAbleTM) and shoulder abduction ('MyoTM' inertial motion unit armband sensors). A bespoke software was developed that illustrated to patients on an avatar the arm movements to be tested, with realtime sensor feedback. We tested 20 hemiplegic stroke patients and 5 healthy controls; and compared software measures with goniometer-measured joint angles, and clinician-judged MRC power (both blinded to software measures). A 1-3 minute calibration step was required prior to use. Results: Arm joint angles were reliably recorded by the gripAble-Myo system. Finger extension and shoulder abduction estimated by a clinician using the Medical Research Council motor score correlated closely with sensor measures of force and range of motion (r=0.80 - 0.86; p<0.01). All subjects were able to complete the study without prompting or guidance. Conclusion: A relatively simple system of commercially-available sensors allows for accurate self-S.A.F.E. quantification.

**Effect of training eye hand coordination using emerging natural user interface technologies to improve hand function in stroke patients-a randomized controlled study**

**Author(s):** Choudhary N.

**Source:** European Stroke Journal; May 2018; vol. 3 (no. 1); p. 210-211

**Publication Type(s):** Conference Abstract

**Abstract:** Background and Aims: Eye-hand coordination is essential for humans, as many activities in daily life require precise eye and hand functions. The stroke survivors have poorer eye-hand coordination when using their hemiparetic hand. A significant correlation exists between eye-hand coordination performance and hand function test scores. The aim of this study was to develop a low cost system for testing and training eye and hand coordination using gamification as a tool for improving hand function in chronic stroke patients. Method: 6 subjects (mean age 63.2+/4.3 years) with chronic stroke were screened and randomized into experimental and control groups with n=3 each. Both groups received 1 hour of standard upper limb physical therapy, 6 days a week for total 4 weeks. Experimental group also played a customized eye hand coordination game called 'HandEye?' using Tobii Eye XVR and Leap MotionVR for 3 sessions of 2 minutes each. Primary outcome measure was BBT (Box and Block Test). Results: A significant improvement in scores of BBT was found in both experimental (F5234.244, p<0.001) and control (F585.099, p<0.001) group from pre to post intervention but the change in BBT scores were higher in experimental group. The difference between change in BBT scores from pre to post intervention were significant (F552.071, p<0.001). Pearson’s correlation analysis revealed a highly positive relationship (r2=0.604; p<0.01) between scores of Handeye and Box and Block Test of the hemiparetic extremity in the experimental group. Conclusion: Natural user interface technology and gamification techniques can be useful for hand rehabilitation in stroke survivors.

**Evaluation of an embodied virtual reality device in upper limb rehabilitation post-stroke**

**Author(s):** El-Hilly A.; Harris R.; Gillion N.; Cole C.; Dimaano A.; Johnson J.; Lawrence E.; Kee Y.Y.K.

**Source:** European Stroke Journal; May 2018; vol. 3 (no. 1); p. 208
**Publication Type(s):** Conference Abstract

**Abstract:** Background and Aims: There is increased evidence that intensity in therapy is important in improving outcomes after stroke. Current United Kingdom recommendations state that patients should receive at least 45 minutes of each required therapy, 5 days a week. Virtual reality gaming platforms is an innovative method of improving engagement and intensity of rehabilitation. This is a small feasibility study to explore the use and efficacy of an immersive virtual reality platform for intensive upper limb rehabilitation on an acute stroke unit. Method: 3 patients were recruited from an acute stroke unit in London. Patients received their normal therapy as well as sessions on the MindMotion Pro; a virtual reality gaming platform. Chedoke McMaster Stroke Assessment scoring was performed at 0 and 4 weeks to assess for changes in upper limb function. Qualitative feedback was collected from patients and their therapists. Results: All patients saw improvement in their score (Table 1). Patients reported positive effects on mental health and enjoyed the ability to monitor progress easily. Therapists described ease of use of the platform. Conclusion: The MindMaze Pro shows promise in providing engaging, enjoyable and effective rehabilitation for stroke patients whilst helping to meet therapy targets. It has the potential of improving intensity of therapy especially on weekends. Further work is needed to establish cost-efficacy and to explore long term benefits for various patient cohorts.

**Upper limb kinematics in stroke and healthy controls using target-totarget task in virtual reality**

**Author(s):** Hussain N.; Alt Murphy M.; Stibrant Sunnerhagen K.

**Source:** European Stroke Journal; May 2018; vol. 3 (no. 1); p. 207

**Publication Type(s):** Conference Abstract

**Abstract:** Background and Aims: Virtual reality technique for kinematic assessment has rarely been used in evaluating motor function in stroke despite its availability as a training device in stroke rehabilitation. The aim is to discriminate the upper limb movements between individuals with stroke and healthy controls using kinematic variables from target-to-target task in virtual reality. Method: Sixty-seven participants (mean age of 65.7) extracted from the Stroke Arm Longitudinal Study at Gothenburg University - SALGOT cohort of non-selected individuals within the first year of stroke, subdivided into moderate (31-57 points) and mild (58-65 points) stroke impairment based on Fugl-Meyer Assessment of Upper Extremity score along with 43 healthy controls performed the target-to-target pointing task. Using a haptic stylus, participants pointed at 32 circular targets that appeared successively in a virtual 3D space to make them disappear. Kinematic parameters captured by the stylus were movement time, velocities and smoothness of movement. Kruskal-Wallis and Mann-Whitney U tests were used to determine if significant differences were present between moderate and mild stroke impairment and healthy controls. Results: Movement time and mean velocity were discriminatory between groups with moderate and mild stroke impairment and healthy controls. The movement time was longer and mean and peak velocity lower for individuals with stroke. The number of velocity peaks, representing smoothness, was higher in stroke groups compared to controls. Movement trajectories in stroke more frequently showed clustering close to the target. Conclusion: The target-to-target pointing task can provide valuable and specific information about sensorimotor impairment of the upper limb following stroke.

**Recovery of dexterity after stroke: A longitudinal study of precision grip force control and relation to brain lesion location**

**Author(s):** Pennati G.V.; Plantin J.; Borg J.; Lindberg P.; Carment L.

**Source:** European Stroke Journal; May 2018; vol. 3 (no. 1); p. 53

**Publication Type(s):** Conference Abstract
Abstract: Background and Aims: Impaired precision grip control is common after stroke but not well characterized. The Strength-dexterity test permits quantification of the dynamic regulation of fingertip forces during precision grip. Longitudinal changes in the capacity to generate and control precision grip force were explored in individuals with stroke using the Strength-dexterity test, and the relation between precision grip impairments and stroke lesion location was studied. Method: 80 first ever stroke patients with varying degrees of weakness were evaluated at 3 weeks, 3 and 6 months after injury. Strength-dexterity test was performed on the affected and contralateral less-affected hands. Compression force was measured with springs of varying length (longer springs increase the requirements of strength and dexterity). Dexterity-score and correlation between index finger and thumb forces (CorrForce) were calculated. Conventional clinical measures included pinch strength, Box and Block test and upper limb Fugl-Meyer Assessment. Anatomical MRI was used to calculate weighted corticospinal tract lesion load (wCST-LL) and to perform voxel-based lesion-symptom mapping (VLSM). Results: Preliminary findings showed reduced ability to compress longer springs and low pinch strength, dexterity score and correlation of forces in the affected hand compared to the contralateral less-affected hand. Pinch strength values of affected hand represented approximately 61.5%, 77% and 84.5% of the less-affected hand for each time point, respectively. The values improved by ca. 25% at 3 months and again by 10% at 6 months. The length of spring compressed with the affected hand correlated significantly and negatively with the amplitude of pinch force, with FM-UE motor function and FM-UE wrist/hand subscale (p< 0.01). All measures improved significantly over time. There was in fact a significant effect of time on maximum voluntary pinch strength and spring number successfully compressed [F(2, 38)=10.114, p<0.001 and F (1.293, 29.750)=8.925, p< 0.005]. wCST-LL correlated with pinch strength, spring length (rs= 0.602, p=0.01), and CorrForce (rs= -0.386, p=0.05) and VLSM revealed a relation between lesion to CST and compression force control. Conclusion: The Strength-dexterity test allows detection of impaired precision grip control after stroke which likely contributes to activity limitations. Degree of lesion to the CST is a key predictor of poor grip control.

Dynamic lycra orthosis as an adjunct to upper limb rehabilitation after stroke: A feasibility randomised controlled trial

Author(s): Morris J.; John A.; Wedderburn L.
Source: European Stroke Journal; May 2018; vol. 3 (no. 1); p. 52-53
Publication Type(s): Conference Abstract

Abstract: Background and Aims: Upper Limb (UL) recovery after stroke at six months is incomplete in up to 66% of cases. Recovery requires high dose repetitive task training that is challenging to achieve. Dynamic LycraVR Orthoses (DLO) are lycra garments designed to provide dynamic support and sensory feedback and may optimise task practice conditions. Often used in rehabilitation, evidence of effects in stroke is scant. The aim of this study was to examine feasibility of conducting a randomised controlled trial of DLO in stroke rehabilitation. Method: Design: Randomised controlled feasibility trial Participants: Stroke survivors with UL activity limitation, admitted to two stroke units 2-4 weeks following stroke onset, randomised 2:1 to intervention or control groups. Intervention: After provision of individually tailored dynamic lycra orthosis (DLO), participants wore the DLO for eight hours per day over eight weeks. The control group received usual care. Feasibility outcomes were recruitment and retention rates, recorded adherence, withdrawal and completion, missing data, adverse events. Changes in Action Research Arm Test, Nine Hole Peg Test, Nottingham Sensory Assessment, Motor Assessment Log, Motricity Index, Modified Tardieu were assessed at eight weeks. Results: Recruitment was complete on 30/12/17. Of 43 participants, 25 received the DLO. Outcome assessment is ongoing with completion by 28/2/18. To date, non-completion of assessment occurred with eight intervention group participants, four because of issues with the
DLO, and with four control group participants. Conclusion: This study provides an assessment of feasibility of DLO as an adjunct to rehabilitation after stroke. Results will be reported in May 2018.

International consensus recommendations for outcome measure use in stroke upper limb rehabilitation trials: Development of the standardising measurements in arm rehabilitation trials (SMART) toolbox

Author(s): Duncan Millar J.; Pollock A.; Ali M.; Van Wijck F.
Source: European Stroke Journal; May 2018; vol. 3 (no. 1); p. 52
Publication Type(s): Conference Abstract
Abstract: Background and Aims: Randomised controlled trials (RCTs) of stroke upper limb (UL) rehabilitation interventions use numerous outcome measures, hindering comparison and pooled analyses. We developed international consensus recommendations (the SMART Toolbox), to support informed selection of outcome measures for use in future RCTs. Recommendations considered feasibility, psychometrics, outcomes captured by the measure, and the International Classification of Functioning, Disability and Health domain(s) addressed. Method Phase 1: Systematic identification of outcome measures from RCTs within the Cochrane Overview of stroke UL rehabilitation. Phase 2: Focus groups and interviews with stroke survivors, carers and clinicians to identify important outcomes related to life with UL impairment. Systematic identification of where these important outcomes were captured by existing measures. Phase 3: International e-Delphi with stroke UL rehabilitation researchers and subsequent consensus meeting with stakeholders to select measures for inclusion in the SMART toolbox. Results: Phase 1 identified 144 measures from 243 RCTs. Phase 2 participants (n=53 stroke survivors and carers; n=58 clinicians) identified 66 important outcomes. Phase 3 e-Delphi participants (n=55; n=17 countries) identified 28 measures for discussion at the meeting. Meeting participants (n=16) selected the Visual Analogue Scale for pain/0-10 Numeric Pain Rating Scale; Dynamometry; Action Research Arm Test; Fugl-Meyer Assessment (UL-section); Wolf Motor Function Test; Barthel Index; Modified Rankin Scale; Motricity Index (UL-section); Box and Block; Motor Activity Log 14; Nine Hole Peg Test; Functional Independence Measure; EQ-5D and Canadian Occupational Performance Measure. Conclusion: Selection from the agreed measures in the SMART toolbox in future stroke UL RCTs will facilitate data comparability and aggregation for efficacy analyses.

Electrical somatosensory stimulation in early rehabilitation of arm paresis following acute stroke: A randomized assessor-blinded controlled trial

Author(s): Ghaziani E.; Couppe C.; Magnusson S.P.; Christensen H.; Siersma V.; Sondergaard M.
Source: European Stroke Journal; May 2018; vol. 3 (no. 1); p. 121
Publication Type(s): Conference Abstract
Abstract: Background and Aims: Upper limb motor deficits are reported in 48-77% of patients after acute stroke and complete functional recovery is reported in 12-34% of patients. Although the recovery of arm functioning is most pronounced during the first 4 weeks post-stroke, few studies have investigated the effects of motor rehabilitation interventions during this period. This trial investigated the effect of electrical somatosensory stimulation (ESS) during early rehabilitation post-stroke on the recovery of arm functioning. Method: 102 patients with arm paresis were randomized to the intervention or the control group within 7 days post-stroke according to our sample-size estimation. The intervention group received 1-hour suprasensory ESS-treatment to the paretic arm daily during hospitalization immediately followed by minimum 15-minutes task-oriented arm training which was considered a component of the usual rehabilitation. The control group received a sham ESS-treatment followed by identical training. Primary outcome was hand dexterity (Box and
Combining functional electrical stimulation and mirror therapy for upper limb motor recovery following stroke: a randomised trial

Author(s): Mathieson S.; Kaplan M.; Parsons M.; Parsons J.

Source: European of Physiotherapy; May 2018; p. 1-6

Publication Type(s): Article In Press

Abstract: Introduction: There is a growing need to develop effective rehabilitation interventions for people presenting with stroke as healthcare services experience ever-increasing pressures on staff and resources. The primary objective of this research is to examine the effect that mirror therapy combined with functional electrical stimulation has on upper limb motor recovery and functional outcome for a sample of people admitted to an inpatient stroke unit. Methods: A total of 50 participants were randomised to one of three treatment arms; Functional Electrical Stimulation, Mirror therapy or a combined intervention of Functional Electrical Stimulation with Mirror therapy. Socio-demographic and health information was collected at recruitment together with admission dates, medical diagnoses and baseline measures. Blinded assessments were undertaken at baseline and at discharge post-stroke by a registered physiotherapist and a clinical nurse specialist. Results: The Action Research Arm Test and the Fugl-Meyer Upper Extremity assessment revealed statistically superior results for Functional Electrical Stimulation compared with Mirror therapy alone (p=0.03). There were no other significant differences between the three groups. Conclusion: The theory of combining interventions requires further investigation and warrants further research. Combining current interventions may have the potential to enhance stroke rehabilitation, improve functional outcomes and help reduce the overall burden of stroke. Copyright © 2018 Informa UK Limited, trading as Taylor & Francis Group
Examination (MMSE) and Montreal Cognitive Assessment (MoCA), at two test thresholds: MMSE <25/30 and <27/30, and MoCA <22/30 and <26/30. Using Markov chain Monte Carlo (MCMC) methods, we fitted a bivariate network meta-analysis model incorporating constraints on increasing test threshold, and accounting for the correlations between multiple test accuracy measures from the same study. Results: We developed and successfully fitted a model comparing multiple tests/threshold combinations while imposing threshold constraints. Using this model, we found that MoCA at threshold <26/30 appeared to have the best true positive rate, whereas MMSE at threshold <25/30 appeared to have the best true negative rate. Conclusion: The combined analysis of multiple tests at multiple thresholds allowed for more rigorous comparisons between competing diagnostics tests for decision making. Copyright © 2018 The Authors

The clinical utility of a 30-minute neuropsychological assessment battery in inpatient stroke rehabilitation

Author(s): Jaywant A.; Toglia J.; O'Dell M.W.; Gunning F.M.
Source: Journal of the Neurological Sciences; Jul 2018; vol. 390 ; p. 54-62
Publication Type(s): Article

Abstract: Cognitive assessment is an important component of inpatient stroke rehabilitation. Few studies have empirically evaluated the clinical utility of specific neuropsychological measures in this setting. We investigated the psychometric properties and clinical utility of a 30-minute neuropsychological battery developed by the National Institute of Neurologic Disorders and Stroke (NINDS) and the Canadian Stroke Network (CSN). Clinical data were analyzed from 100 individuals with mild-moderate stroke severity on an acute inpatient rehabilitation unit who completed the NINDS-CSN battery at admission. The battery comprised the Symbol-Digit Modalities Test (SDMT), Trail Making Test, Controlled Oral Word Association Test, Animal Naming, and the Hopkins Verbal Learning Test-Revised. We evaluated the battery's distribution of scores, frequency of impaired performance, internal consistency, and ability to predict rehabilitation gain and independence in cognitively-based instrumental activities of daily living (IADL) at discharge. Results indicated that the NINDS-CSN battery was sensitive to cognitive impairment, demonstrated moderately strong internal consistency, and predicted discharge IADL. The SDMT demonstrated the strongest sensitivity to impairment and predictive validity. The NINDS-CSN battery is a clinically useful assessment battery in acute inpatient stroke rehabilitation. Complex attention and processing speed performance may be most informative in predicting amount of rehabilitation gain and IADL functioning at discharge. Copyright © 2018 Elsevier B.V.

Predictors of cognitive impairment assessed by Mini Mental State Examination in community-dwelling older adults: relevance of the step test

Author(s): Muscari A.; Spiller I.; Bianchi G.; Fabbri E.; Forti P.; Zoli M.; Magalotti D.; Pandolfi P.
Source: Experimental Gerontology; Jul 2018; vol. 108 ; p. 69-76
Publication Type(s): Article

Abstract: Background: Several predictors of cognitive impairment assessed by Mini Mental State Examination (MMSE) have previously been identified. However, which predictors are the most relevant and what is their effect on MMSE categories remains unclear. Methods: Cross-sectional and longitudinal study using data from 1116 older adults (72.6 +/- 5.6 years, 579 female), 350 of whom were followed for 7 years. At baseline, the following variables were collected: personal data, marital status, occupation, anthropometric measures, risk factors, previous cardiovascular events, self-rated health and physical activity during the last week. Furthermore, routine laboratory tests, abdominal echography and a step test (with measurement of the time needed to ascend and descend two steps
20 times) were performed. The associations of these variables with cross-sectional cognitive deficit (MMSE < 24) and longitudinal cognitive decline (decrease of MMSE score over 7 years of follow-up) were investigated using logistic regression models. Results: Cross-sectional cognitive deficit was independently associated with school education <= 5 years, prolonged step test duration, having been blue collar or housewife (P <= 0.0001 for all) and, with lower significance, with advanced age, previous stroke and poor recent physical activity (P < 0.05). Longitudinal cognitive decline was mainly associated with step test duration (P = 0.0001) and diastolic blood pressure (P = 0.0002). The MMSE categories mostly associated with step test duration were orientation, attention, calculation and language, while memory appeared to be poorly or not affected. Conclusions: In our cohort of older adults, step test duration was the most relevant predictor of cognitive impairment. Copyright © 2018 Elsevier Inc.

Development and validation of the Pediatric Stroke Quality of Life Measure.

**Author(s):** Fiume, Andrea; Deveber, Gabrielle; Jang, Shu-Hyun; Fuller, Colleen; Viner, Shani

**Source:** Developmental Medicine & Child Neurology; Jun 2018; vol. 60 (no. 6); p. 587-595

**Publication Type(s):** Academic Journal

**Abstract:** Aim: To develop and validate a disease-specific parent proxy and child quality of life (QoL) measure for patients aged 2 to 18 years surviving cerebral sinovenous thrombosis (CSVT) and arterial ischaemic stroke (AIS). Method: Utilizing qualitative and quantitative methods, we developed a 75-item Pediatric Stroke Quality of Life Measure (PSQLM) questionnaire. We mailed the PSQLM and a standardized generic QoL measure, Pediatric Quality of Life Inventory (PedsQL), to 353 families. Stroke type, age at stroke, and neurological outcome on the Pediatric Stroke Outcome Measure were documented. We calculated the internal consistency, validity, and reliability of the PSQLM. Results: The response rate was 29%, yielding a sample of 101 patients (mean age 9y 9mo [SD 4.30]; 69 AIS [68.3%], 32 CSVT [31.7%]). The internal consistency of the PSQLM was high (Cronbach’s α=0.94-0.97). Construct validity for the PSQLM was moderately strong (r=0.3-0.4; p<0.003) and, as expected, correlation with the PedsQL was moderate, suggesting the PSQLM operationalizes QoL distinct from the PedsQL. Test-retest reliability at 2 weeks was very good (intraclass correlation coefficient [ICC] 0.85-0.95; 95% confidence interval 0.83-0.97) and good agreement was established between parent and child report (ICC 0.63-0.76). Interpretation: The PSQLM demonstrates sound psychometric properties. Further research will seek to increase its clinical utility by reducing length and establishing responsiveness for descriptive and longitudinal evaluative assessment. What This Paper Adds: A pediatric stroke-specific quality of life (QoL) measurement tool for assessments based on perceptions of importance and satisfaction. Moderate-to-high reliability and validity established for a new clinical scale evaluating QoL among children with stroke. Perceived QoL measured using the Pediatric Stroke Quality of Life Measure appears lower in children with neurological impairment.

Using technology to overcome the language barrier: the Cognitive Assessment for Aphasia App.

**Author(s):** Wall, Kylie Janine; Cumming, Toby Borland; Koenig, Sebastian Thomas;

**Source:** Disability & Rehabilitation; Jun 2018; vol. 40 (no. 11); p. 1333-1344

**Publication Type(s):** Academic Journal

**Abstract:** Purpose: We developed and explored the feasibility and user acceptance of the Cognitive Assessment for Aphasia App: a non-immersive virtual reality cognitive assessment for stroke survivors, designed to be inclusive of individuals with aphasia. Methods: Participants were assessed on a battery of pen-and-paper cognitive tests and the Cognitive Assessment for Aphasia App. Feasibility was explored by quantifying missing data for test completion, determining user acceptance for the app by measuring participants’ preferred testing method, enjoyment and
perceived task difficulty and time-taken to complete the test. Results: Sixty-four stroke participants (35 with aphasia, 29 without aphasia) and 32 controls were recruited. Only one participant with aphasia was unable to complete all the Cognitive Assessment for Aphasia App tasks, whereas 13 participants were unable to complete all pen-and-paper tasks. Only 14% of participants preferred the pen-and-paper tests, and preference did not significantly differ between groups. Ninety-five percent of participants were neutral or enjoyed the app and 4% perceived it to be very difficult. Higher age was negatively associated with user acceptance measures. Conclusion: The study shows preliminary evidence for the Cognitive Assessment for Aphasia App to be a feasible cognitive assessment for stroke survivors with and without aphasia. The app is currently being validated in stroke. Implications for rehabilitation: The Cognitive Assessment for Aphasia App is a feasible tool for assessing post-stroke cognition in acute, inpatient rehabilitation and community settings. In research trials examining cognition, individuals with aphasia are often excluded. The Cognitive Assessment for Aphasia App permits the inclusion of these individuals, enhancing generalizability. The Cognitive Assessment for Aphasia App provides an alternative method to assess cognition that is quicker and preferred over standard neuropsychological tests.

Comparison of montreal cognitive assessment (moca) with mini mental state examination (mmse) on association between homocysteine and cognitive status in epilepsy patients with phenytoin monotherapy

Author(s): Natham, Rajendran; Amirthalingam, Palanisamy; Arunachalam, Ganesvaran

Source: Asia Pacific Journal of Counselling and Psychotherapy; Jun 2018 ; p. No

Publication Type(s): Journal Peer Reviewed Journal

Abstract: Mini Mental State Examination (MMSE) has been used as a tool to detect cognitive impairment in patients treated with antiepileptic drugs, however fail to detect mild cognitive impairment in these patients. Studies report Montreal Cognitive Assessment (MOCA) is more sensitive than MMSE in detecting cognitive status in patients with stroke, parkinsonism, cardiovascular disease and epilepsy. Homocysteine has been implicated in the modulation of cognitive impairment in epilepsy but could not be established clearly as most studies followed MMSE. To investigate the relationship between homocysteine and cognitive status the present study employed MOCA in comparison with MMSE in epilepsy population with phenytoin monotherapy. Our findings suggest MOCA is more sensitive than MMSE in demonstrating the relationship between homocysteine and cognitive impairment in epilepsy. (PsycINFO Database Record (c) 2018 APA, all rights reserved) (Source: journal abstract)

A cognitive psychometric model for assessment of picture naming abilities in aphasia

Author(s): Walker, Grant M.; Hickok, Gregory; Fridriksson, Julius

Source: Psychological Assessment; Jun 2018; vol. 30 (no. 6); p. 809-826

Publication Type(s): Journal Peer Reviewed Journal Journal Article

Available at Psychological Assessment - from ProQuest PsycARTICLES - NHS

Abstract: Picture naming impairments are a typical feature of stroke-induced aphasia. Overall accuracy and rates of different error types are used to make inferences about the severity and nature of damage to the brain’s language network. Currently available assessment tools for picture naming accuracy treat it as a unidimensional measure, while assessment tools for error types treat items homogeneously, contrary to findings from psycholinguistic investigations of word production. We created and tested a new cognitive psychometric model for assessment of picture naming responses, using cognitive theory to specify latent processing decisions during the production of a naming attempt, and using item response theory to separate the effects of item difficulty and
participant ability on these internal processing decisions. The model enables multidimensional assessment of latent picture naming abilities on a common scale, with a relatively large cohort for normative reference. We present the results of 4 experiments testing our interpretation of the model’s parameters, as they apply to picture naming predictions, lexical properties of the items, statistical properties of the lexicon, and participants’ scores on other tests. We also created a website for researchers and clinicians to analyze item-level data using our model, providing estimates of latent abilities and percentile scores, as well as credible intervals to help gauge the reliability of the estimated model parameters and identify meaningful changes. To the extent that the model is successful, the estimated parameter values may aid in treatment decisions and progress monitoring, or they may help elucidate the functional properties of brain networks. (PsycINFO Database Record (c) 2018 APA, all rights reserved) (Source: journal abstract)

Impact statement

Public Significance Statement

Successful picture naming requires multiple cognitive abilities. Assessment of picture naming abilities in stroke patients can be improved by considering the target items’ influences on rates of different error types. (PsycINFO Database Record (c) 2018 APA, all rights reserved)

A feasibility study of prisms and therapy in attention loss after stroke (Spatial)

**Author(s):** Checketts M.; Bowen A.; Turton A.; Moule P.; Hulme S.; Vail A.

**Source:** European Stroke Journal; May 2018; vol. 3 (no. 1); p. 606-607

**Publication Type(s):** Conference Abstract

**Abstract:** Background and Aims: Unilateral Spatial Neglect (USN) is a cognitive impairment of awareness of one side. This study investigates a brief intervention (Prism Adaptation Training (PAT)) within UK NHS occupational therapy (OT) to determine the feasibility and acceptability of PAT and of conducting a larger randomised controlled trial (RCT). The ultimate purpose is to enable people with USN to better engage in OT to maximise independence in activities of daily living. Method: Mixed methods design: pragmatic, feasibility, multi-centre, stratified RCT with nested process evaluation and proof of concept exploration. RCT Participants: 60 adult stroke survivors, 1-4wks post-admission with neglect, recruited from 6 sites; 40 carers. Treatment condition is OT with PAT; control condition is OT without PAT, delivered 5 times weekly for 3 weeks. Randomisation: random allocation into one of two study arms in a 3:1 (treatment: control) ratio, stratified by site. Researchers will be blind to group allocation. Proof of concept: we will video the first session to examine the immediate effect of PAT on OT engagement. Feasibility outcomes: recruitment, fidelity, acceptability, attrition. Participant outcomes: standardised neglect tests and extended activities of daily living. Process evaluation: 12 patients and 12 therapists will undergo qualitative interviews (after outcome assessments) to help us understand their experiences of PAT, including acceptability of PAT, plus the best setting for recruitment and application of PAT. Results: This study is in set up. Funding is secured, an application for ethical approval is underway and sites are expected to open January 2019. Conclusion: TBA (see above).

How physical therapists instruct patients with stroke: an observational study on attentional focus during gait rehabilitation after stroke.

**Author(s):** Kal, Elmar; van den Brink, Henrieke; Houdijk, Han; van der Kamp, John;

**Source:** Disability & Rehabilitation; May 2018; vol. 40 (no. 10); p. 1154-1165

**Publication Type(s):** Academic Journal

**Abstract:** Purpose: People without neurological impairments show superior motor learning when they focus on movement effects (external focus) rather than on movement execution itself (internal focus). Despite its potential for neurorehabilitation, it remains unclear to what extent external focus
strategies are currently incorporated in rehabilitation post-stroke. Therefore, we observed how physical therapists use attentional focus when treating gait of rehabilitating patients with stroke. Methods: Twenty physical therapist-patient couples from six rehabilitation centers participated. Per couple, one regular gait-training session was video-recorded. Therapists' statements were classified using a standardized scoring method to determine the relative proportion of internally and externally focused instructions/feedback. Also, we explored associations between therapists' use of external/internal focus strategies and patients' focus preference, length of stay, mobility, and cognition. Results: Therapists' instructions were generally more external while feedback was more internal. Therapists used relatively more externally focused statements for patients with a longer length of stay ($B=-0.239, p=0.013$) and for patients who had a stronger internal focus preference ($B=-0.930, p=0.035$). Conclusions: Physical therapists used more external focus instructions, but more internally focused feedback. Also, they seem to adapt their attentional focus use to patients' focus preference and rehabilitation phase. Future research may determine how these factors influence the effectiveness of different attentional foci for motor learning post-stroke.

Over-focused? The relation between patients' inclination for conscious control and single- and dual-task motor performance after stroke.

Author(s): Denneman, R.P.M.; Kal, E.C.; Houdijk, H.; Kamp, J. van der

Source: Gait & Posture; May 2018; vol. 62 ; p. 206-213

Publication Type(s): Academic Journal

Abstract: Background: Many stroke patients are inclined to consciously control their movements. This is thought to negatively affect patients' motor performance, as it disrupts movement automaticity. However, it has also been argued that conscious control may sometimes benefit motor performance, depending on the task or patient's motor or cognitive capacity. Aim: To assess whether stroke patients' inclination for conscious control is associated with motor performance, and explore whether the putative association differs as a function of task (single- vs dual) or patient's motor and cognitive capacity. Methods: Univariate and multivariate linear regression analysis were used to assess associations between patients' disposition to conscious control (i.e., Conscious Motor Processing subscale of Movement-Specific Reinvestment Scale; MSRS-CMP) and single-task (Timed-up-and-go test; TuG) and motor dual-task costs (TuG while tone counting; motor DTC%). We determined whether these associations were influenced by patients' walking speed (i.e., 10-m-walk test) and cognitive capacity (i.e., working memory, attention, executive function). Results: Seventy-eight clinical stroke patients (<6 months post-stroke) participated. Patients' conscious control inclination was not associated with single-task TuG performance. However, patients with a strong inclination for conscious control showed higher motor DTC%. These associations were irrespective of patients' motor and cognitive capacities. Conclusion: Patients' disposition for conscious control was not associated with single task motor performance, but was associated with higher motor dual task costs, regardless of patients' motor or cognitive abilities. Clinical Relevance: Therapists should be aware that patients' conscious control inclination can influence their dual-task performance while moving. Longitudinal studies are required to test whether reducing patients' disposition for conscious control would improve dual-tasking post-stroke.

Converting MMSE to MoCA and MoCA 5-minute protocol in an educationally heterogeneous sample with stroke or transient ischemic attack.

Author(s): Wong, Adrian; Black, Sandra E.; Yiu, Stanley Y. P.; Au, Lisa W. C.; Lau, Alexander Y. L.

Source: International Journal of Geriatric Psychiatry; May 2018; vol. 33 (no. 5); p. 729-734

Publication Type(s): Academic Journal
Abstract: Background: The Montreal Cognitive Assessment (MoCA) is psychometrically superior over the Mini-mental State Examination (MMSE) for cognitive screening in stroke or transient ischemic attack (TIA). It is free for clinical and research use. The objective of this study is to convert scores from the MMSE to MoCA and MoCA-5-minute protocol (MoCA-5 min) and to examine the ability of the converted scores in detecting cognitive impairment after stroke or TIA. Methods: A total of 904 patients were randomly divided into training (n = 623) and validation (n = 281) samples matched for demography and cognition. MMSE scores were converted to MoCA and MoCA-5 min using (1) equipercentile method with log-linear smoothing and (2) Poisson regression adjusting for age and education. Receiver operating characteristics curve analysis was used to examine the ability of the converted scores in differentiating patients with cognitive impairment. Results: The mean education was 5.8 (SD = 4.6; ranged 0-20) years. The entire spectrum of MMSE scores was converted to MoCA and MoCA-5 min using equipercentile method. Relationship between MMSE and MoCA scores was confounded by age and education, and a conversion equation with adjustment for age and education was derived. In the validation sample, the converted scores differentiated cognitively impaired patients with area under receiver operating characteristics curve 0.826 to 0.859. Conclusion: We provided 2 methods to convert scores from the MMSE to MoCA and MoCA-5 min based on a large sample of patients with stroke or TIA having a wide range of education and cognitive levels. The converted scores differentiated patients with cognitive impairment after stroke or TIA with high accuracy.

The effects of computer based cognitive rehabilitation in patients with visuospatial neglect following stroke, brain tumor, brain injury or operation sequelae: A systematic review

Author(s): Svaerke K.; Niemeijer M.; Mogensen J.; Christensen H.
Source: European Stroke Journal; May 2018; vol. 3 (no. 1); p. 618
Publication Type(s): Conference Abstract

Abstract: Background and Aims: Objectives: To identify and evaluate existing literature concerning the effects of computer based cognitive rehabilitation (CBCR) on visuospatial neglect after four types of acquired brain injury. Method: Databases Medline, EMBASE, PsycINFO, and CINAHL were searched with search strings developed for this review. Authors of relevant literature were contacted to detect supplementary unpublished data or articles not found by searching databases. Selection criteria: Initial inclusion criteria were: Studies investigating effects of CBCR on visuospatial neglect in one of four types of acquired brain injury, studies in which it was possible to judge the effect of CBCR compared to a passive or active control group, and studies that were both randomized and controlled. No studies met the initial inclusion criteria. Instead, studies were selected for a discussion of the limitations of the current literature if they included CBCR training in rehabilitation of visuospatial neglect following acquired brain injury, but failed to meet certain agreed original inclusion criteria. Results: No studies were identified that investigated the effects of CBCR in the rehabilitation of visuospatial neglect after acquired brain injury compared to a control group in a randomized, controlled setting. Conclusion: Based on existing literature, it is not possible to conclude on the effects of CBCR in the rehabilitation of visuospatial neglect after acquired brain injury. Future studies need to be controlled and properly randomized, and compare CBCR to both passive and active control groups to clarify its effectiveness.

Pre-stroke physical activity could influence cognition in patients with subacute stroke

Author(s): Reinholdsson M.; Stibrant Sunnerhagen K.
Source: European Stroke Journal; May 2018; vol. 3 (no. 1); p. 369-370
Publication Type(s): Conference Abstract
Abstract: Background and Aims: Physical activity pre-stroke has been proven to be effective as prevention. No previous study has described how pre-stroke physical activity influence cognitive function after stroke. The aim was to investigate the influence of pre-stroke physical activity in patients with subacute stroke. Method: Data from 820 patients in Swedish stroke registers was used and analyses with logistic regression was performed with Montreal Cognitive Assessment (MoCA) as dependent variable. Pre-stroke age, sex, smoking, diabetes, physical activity measured with Saltin-Grimby Physical Activity Level Scale (SGPALS) and protective treatments (statin and hypertension treatment) were independent variables. Results: Mean age of 73 years, 44.4% were women, 93.9 % with had ischemic stroke. Most patients had mild stroke (80.4%). Half (51.1%) of the patients reported pre-stroke physical inactivity. In total 481 (58.7%) patients were assessed with MoCA out of whom 215 patients (44.6 %) had normal cognition. The most common cause to not assess with MoCA was dementia or severe cognitive deficit in 62 patients (7.6%). Patients who reported light or moderate physical activity levels were more likely to present normal cognitive function in a model also including age as a predictor (physical activity OR=1.86, CI=1.29-2.70, age OR=1.04, CI=1.03-11.06). The model predicted 13.5% of the cognition outcome. Conclusion: This study suggests that pre-stroke physical activity and younger age can result in better cognitive function during subacute phase after stroke. Increased levels of exercise and physical activity can decrease cognitive dysfunction for adults after stroke, even though the effects are limited.

Screening for cognitive impairment with the montreal cognitive assessment in Spanish patients with minor stroke or transient ischaemic attack: A validation study

Author(s): Ramirez-Moreno J.M.; Aguirre J.J.; Munoz-Vega P.; Bartolome-Alberca S.; Roa A.M.; Constantino A.B.; Guerrero E.

Source: European Stroke Journal; May 2018; vol. 3 (no. 1); p. 474

Publication Type(s): Conference Abstract

Abstract: Background and Aims: Non-disabling cerebrovascular events, which include mild ischaemic stroke and transient ischaemic attack (TIA), generally result in either short-lasting or mild neurological symptoms, but these patients are at an increased risk of a recurrent cerebrovascular event. The patients therefore receive considerable medical attention and treatment for physical symptoms and risk factors. However, their cognitive function is often neglected. We aimed to establish the cut-off point of the Montreal Cognitive Assessment (MoCA) in screening for mild cognitive impairment (MCI) within 90 days of TIA. Method: A total of 50 patients were recruited. They received the MoCA test. MCI was defined clinically by a formal neuropsychological test battery (NEURONORMA). Results: The average age of recruited patients was 57.7+/−8.0 years, the majority of patients being men (70.0%) and all patients with greater equal or than primary school level of education. Thirty-seven (74.0%) subjects were classified into MCI group; 29 (58%). The number of domain affected was: one, 14(28%); two, 9(18%); three, 8(16%) and four, 6(12%). The optimal cut-off point for MoCA in discriminating patients with MCI from those with no MCI was 25 (sensitivity 76.9%, specificity 77.8%, positive predictive value 55.6%, negative predictive value 90.3%) and the Receiver operating characteristic curve analysis, 0.831 (95%CI 0.715-0.947). Conclusion: More than half of the sample had cognitive impairment as determined by the formal battery of neuropsychological tests. A MoCA cut-off score of 25 is optimally sensitive and specific for detecting MCI after mild stroke or TIA in the subacute stroke phase. Therefore, it should be implemented in routine clinical practice.

The effects of computer based cognitive rehabilitation in patients with symptoms of visuospatial neglect or hemianopsia after stroke: A randomized, controlled, unblinded cross-over pilot-study

Author(s): Svaerke K.; Omkvist K.; Havsteen I.; Christensen H.
Source: European Stroke Journal; May 2018; vol. 3 (no. 1); p. 118-119

Publication Type(s): Conference Abstract

Abstract: Background and Aims: To address the effects of Computer Based Cognitive Rehabilitation (CBCR) in patients with visuospatial neglect and/or hemianopia in the subacute phase after stroke. Method: CBCR was delivered by a commercially available program: 'Scientific Braintraining PRO' designed to train visuospatial attention and mental rotation. Fourteen patients were randomly assigned to early or late CBCR intervention targeting visuospatial symptoms in a cross-over design. All patients were included within 40 days of stroke onset. The early intervention group (EI group) received CBCR starting immediately after inclusion for three weeks, and the late intervention group (LI group) started a 3-week CBCR intervention 3 weeks after inclusion. Attention was assessed by the CABPad Butterfly test at baseline, 3 weeks and 6 weeks. Results: Groups were balanced on baseline characteristics. The EI group showed a significant reduction in neglect score between baseline and after training (p=0.018), while the neglect score did not change significantly in the LI group, neither during the waiting list period nor during training, though an insignificant trend in this direction was observed. The LI group did not improve during their no-training period (p=0.237) nor during their CBCR intervention period (p=0.116). The difference in improvement during training periods was not significant between the EI and LI group (p=0.259). Conclusion: CBCR improved visuospatial symptoms after stroke significantly, especially when administered early in the subacute phase after stroke. The study was small and confirmation is needed. (Figure presented).

Can cognitive functions assessed at very early stage of stroke onset predict ADL dependence 3 months later?

Author(s): Abzhandadze T.; Rafsten L.; Stibrant Sunnerhagen K.

Source: European Stroke Journal; May 2018; vol. 3 (no. 1); p. 210

Publication Type(s): Conference Abstract

Abstract: Background and Aims: Early prediction of stroke related outcomes have become important due to decreased length of the hospital stay. The aim of the study was to investigate if cognitive functions assessed with the Montreal Cognitive Assessment (MoCA) given 36 hours post stroke can predict dependence in activities of daily living (ADL) 3 month later. Method: Data were extracted from two databases: the Gothenburg Very Early Supported Discharge Study (GOTVED) and the Swedish Stroke Register - Riksstroke. Neurological functions were assessed with the National institute of Health Stroke Scale (NIHSS) upon admittance to the hospital. Cognitive function and ADL were assessed with the MoCA and the Barthel Index (BI), respectively, within 36 hours of admission. Data about patients' ADL ability 3 month post stroke were extracted from Riksstroke's database - 3 month follow-up module. Results: Data were available for 369 patients (42% females, mean age 69 years). Three month post stroke 16% of the patients were dependent in ADL. One-half of these patients had very mild neurological deficits (NIHSS <=2) at the admittance to the hospital and 90% of the patients had cognitive impairments (MoCA <=25) 36 hours post stroke. The MoCA scores individually predicted ADL dependence at 3 months post stroke (Nagelkerke R2=0.12, p<0.001, AUC=0.74). The MoCA scores adjusted for age and ADL ability within 36 hours of admission, increased its predictive value for ADL dependence 3 month later (Nagelkerke R2=0.26, p<0.01, AUC=0.80). Conclusion: The predictive value of the MoCA for ADL dependence 3 month post stroke is limited.

Post-traumatic stress disorder after mild stroke and transient ischaemic attack: Psychiatric comorbidity and symptom cluster distribution

Author(s): Chun H.Y.Y.; Whiteley W.; Dennis M.; Mead G.; Carson A.
**Source:** European Stroke Journal; May 2018; vol. 3 (no. 1); p. 207

**Publication Type(s):** Conference Abstract

**Abstract:** Background and Aims: Post-traumatic stress disorder (PTSD) is distressing and may be common after stroke and transient ischaemic attack (TIA). A better understanding of the overlap between PTSD with other common post-stroke neuropsychiatric sequelae?depression, anxiety, cognitive impairment can help us develop better psychological support to patients post-stroke/TIA. Method: We followed up mild stroke and TIA patients at three months using diagnostic psychiatric interview (SCID-DSM-IV) and telephone Montreal Cognitive Assessment (tMOCA). Results: Of 175 participants (mean age 70; 40% women; 65% stroke; 35% TIA), 11/175, 6% (95%CI 3-11%) met the diagnostic criteria for PTSD. Almost half of all PTSD cases (5/11) were also diagnosed with a depressive episode. All PTSD cases (11/11) were co-morbid with one or more anxiety disorders (phobic disorder or generalized anxiety disorder). Median tMOCA score was 19 and the same in PTSD and non-PTSD cases. PTSD symptom clusters C) persistent avoidance and numbing of general responsiveness, and D) increased arousal were present in over 10% of our stroke and TIA cohort. Conclusion: Clinical diagnosis of PTSD is present in around 6% of mild stroke and TIA patients at 3 months. There is considerable overlap between PTSD with depression and anxiety disorders. PTSD symptoms are common even in those without PTSD diagnosis. Psychological support for stroke and TIA should consider targeting these common symptom clusters.

**A comparative study of cognitive status in stroke survivors with and without type 2 diabetes mellitus**

**Author(s):** Madarshahian M.R.; Madarshahian F.; Safaie yazdi N.; Safaie yazdi A.; Roohbakhsh far O.

**Source:** European Stroke Journal; May 2018; vol. 3 (no. 1); p. 296

**Publication Date:** May 2018

**Publication Type(s):** Conference Abstract

**Abstract:** Background and Aims: Stroke is one of the leading causes of disability in the world. A high proportion of stroke survivors as well as type 2 diabetic patients had met the cognitive impairment. This study compared cognitive status in stroke survivors with and without diabetes. Method: This comparative study was conducted on 30 consecutive stroke survivors from a neurology and stroke clinic. They were divided into two groups: stroke survivors with diabetes (n=15) and without diabetes (n=15). The inclusion criteria were the age of over 50 years old, a history of stroke more than one year, history of diabetes more three years and also more than 5 years schooling. Data on the patients’ demographic information gathered using a questionnaire, and Mini mental Status Exam (MMSE) were applied to assess cognitive status. Two groups according to sex, age, education, blood pressure and systemic diseases were group matched. Results: The mean score of MMSE in stroke survivors without diabetes was significantly higher than with diabetes group (P=0.03). A significant negative correlation was noted between MMSE scores and duration of diabetes in the diabetic group (r=-0.2, P=0.03). A significant difference was noted in the mean score of MMSE according to sex (P=0.03) in diabetic group. Conclusion: Stroke with diabetes may worsen cognitive function in survivors. Caregivers should pay special attention to these patients according their sex and duration of diabetes.

**Cognition and physical functioning in relation to incident stroke**

**Author(s):** Heshmatollah A.; Ikram D.M.K.; Mutlu D.U.; Ikram P.M.A.; Koudstaal P.P.J.

**Source:** European Stroke Journal; May 2018; vol. 3 (no. 1); p. 92

**Publication Type(s):** Conference Abstract
Abstract: Background and Aims: Patients, who suffer a stroke, are subsequently at increased risk of cognitive and physical impairment. In contrast, it remains unknown whether persons with poorer cognitive and physical impairment are at an increased risk of stroke.

Method: From the population-based Rotterdam Study, 8519 stroke-free non-demented participants underwent assessment of cognition and physical functioning between 2002-2005 using Mini-Mental State Examination, Verbal fluency test, 15-Word learning test, Letter-digit substitution test, Stroop test, Purdue pegboard test and questionnaires on basic and instrumental activities of daily living (BADL and IADL). Global cognition (G-factor) was derived using principal component analysis. Incident stroke was assessed through continuous monitoring of medical records until 01-01-2016. Cox proportional-hazards models were constructed to estimate hazards ratios for incidence stroke (any stroke, hemorrhagic, ischemic or unspecified) per unit decrease in a cognitive or physical test. We adjusted for age, sex, cardiovascular risk factors and apolipoprotein e4 carriership. Results: Among 8519 persons (mean age 66.0 years; 57.8% women), 489 suffered a stroke during mean follow-up of 8.7 years. Per SD decrease in G-factor was associated with a higher risk of stroke (HR 1.22, 95% CI:1.08-1.37). Worse scores on IADL (HR 1.11, 95% CI: 1.02-1.20), BADL (HR 1.18, 95% CI:1.07-1.29) and 15-Word learning test, Stroop reading and color naming task and Purdue pegboard test were significantly associated with a higher risk of stroke. Conclusion: Worse cognition and physical functioning are associated with a higher risk of stroke, suggesting that both vascular and neurodegenerative pathologies are involved in the development of stroke.

Who should undergo a comprehensive cognitive assessment after a stroke? The grecogvasc cognitive risk score

Author(s): Godefroy O.; Yaiche H.; Barbay M.; Taillia H.; Nedelec-Ciceri C.; Varvat J.; Mas J.L.

Source: European Stroke Journal; May 2018; vol. 3 (no. 1); p. 91-92

Publication Type(s): Conference Abstract

Abstract: Background and Aims: To validate the ability of a specifically developed cognitive risk score to identify patients at risk of post-stroke neurocognitive disorders (NCD) and who are eligible for a comprehensive cognitive assessment. Method: After assessing 404 patients (infarct: 91.3%) and 1003 healthy controls in the GRECogVASC cohort with the NINDS-CSN battery 6 months post-stroke, we used multivariable logistic regression and bootstrap analyses to determine factors associated with NCD. Independent, internally validated factors were included in a cognitive risk score. Results: Cognitive impairment was present in 170 of the 320 patients with a Rankin score >=1. The backward logistic regression selected 4 factors (>=73% of the permutations): NIHSS score on admission>=7 (OR [95% CI]=2.73 [1.29-4.3]; p=0.005), multiple strokes (3.78 [1.6-8]; p=0.002), adjusted MMSE score (MMSEadj) <=27 (6.69 [3.9-11.6]; p=0.0001) and Fazekas score <=2 (2.34 [1.3-4.2]; p=0.004). The cognitive risk score computed using these four factors provided good calibration, discrimination (over-optimism corrected C =0.793) and goodness of fit (Hosmer-Lemeshow test: p=0.99). A combination of Rankin score>=1, cognitive risk score ge;1 and MMSEadj ge;21 selected 230 (56.9%) of the 404 patients for a comprehensive assessment. This strategy yielded good sensitivity (96.5%) and moderate specificity (43%; PPV: 0.66; NPV: 0.91), and was more accurate than the sole use of screening tests (MMSEadj: p=0.03; raw MMSE score: p=0.0001; MoCA score: p=0.008). Conclusion: The GRECogVASC cognitive risk score comprises four easily documented factors; this strategy helps to identify patients at risk of post-stroke NCD and who must therefore undergo a comprehensive assessment.

Clinical and patient reported outcomes at six months in a London stroke population

Author(s): Ozkan H.; Browning S.; Mitchell J.; Simister R.
Background and Aims: Although stroke is a major cause of chronic disability little is known about the pattern and extent of cognitive, functional and patient reported disability at follow up post stroke. The Stroke Investigation Group in North and central London (SIGNaL) registry captures clinical and patient reported outcomes for all patients presenting with stroke to the University College London Hospitals (UCLH) HASU. The objective of this work is to describe in detail patient performance at follow up for all stroke presentations to a single centre and to identify those factors most associated with determining clinical outcome. Method: The service admits 1000 patients per year with acute stroke. The SIGNaL registry captures all data relating to baseline assessment, early follow up at 30 days and from a detailed clinical, patient reported and functional assessment at six months. This latter assessment is performed using a locally developed battery of tests that include assessment of cognition, motor function, language and anxiety as well as standard measures of global performance such as MRS. Results: Since the start of the six months follow up assessment in October 2017 we have collected detailed outcome data on more than 75% of the patient population. Data collection is ongoing and findings from the first 500 patients will be presented, analysed according to stroke sub-type and stroke severity at presentation, baseline treatment received and pre-morbid functional status. An evaluation of the utility of each of the tools in the assessment battery will also be performed. Conclusion: Performance in the brief memory and executive test, but not montreal cognitive assessment, is associated with structural brain changes in chronic obstructive pulmonary disease patients

Author(s): Burrage D.; Bajaj M.P.K.; Ruickbie S.; Baker E.H.; Dodd J.W.; Barrick T.; Jones P.W.

Performance in the brief memory and executive test, but not montreal cognitive assessment, is associated with structural brain changes in chronic obstructive pulmonary disease patients

Author(s): Burrage D.; Bajaj M.P.K.; Ruickbie S.; Baker E.H.; Dodd J.W.; Barrick T.; Jones P.W.

Source: European Stroke Journal; May 2018; vol. 3 (no. 1); p. 221

Publication Type(s): Conference Abstract

Abstract: Background and Aims: COPD is associated with cognitive dysfunction, which may be related to structural brain changes as a result of cerebral small vessel disease. The aim of this study was to identify if cognitive dysfunction was related to structural brain changes in a cohort of COPD patients. Method: This was a prospective cohort study of COPD patients with no history of stroke or dementia. Participants underwent assessment of COPD severity, cardiovascular risk, and completed cognitive assessment including Test of Premorbid Function (TOPF[UK]), Montreal Cognitive Assessment (MoCA) and Brief Memory and Executive Test (BMET). Participants went on to complete structural brain 3T MRI to evaluate white matter hyperintensities, and whole brain, grey and white matter and CSF volumes. Bivariate and partial correlation analyses were performed to determine the association of cognitive performance with structural brain changes. Results: 56 patients were recruited (mean+-SD age 69+-8). 28 participants (50%) had cognitive impairment according to published BMET cut-offs (age-adjusted cut off score <=13/16). 34 participants (61%) had cognitive impairment according MoCA score (cut off score <26/30). 53 patients completed structural brain 3T MRI. After adjusting for premorbid function (TOPF[UK]) using partial correlation, BMET score was positively correlated with normalised whole brain volume (r=0.373, p=0.01) and normalised grey matter volume (r=0.365, p=0.012). MoCA score was not associated with any brain volume parameter. Conclusion: Impaired cognitive performance on the BMET, but not MoCA, was associated with reduced whole brain and grey matter volume in a cohort patients with COPD.

Cognitive decline, primary healthcare service use and receipt of informal care within 5 years post-stroke

Author(s): Rohde D.; Mellon L.; Hickey A.; Gaynor E.; Large M.; Brewer L.; Hall P.; Bennett K.
Abstract: Background and Aims: The aim of this study was to profile cognitive decline 5 years post-stroke, and to explore associations with primary healthcare service use and informal care. Method: Patients from the Action on Secondary Prevention Interventions and Rehabilitation in Stroke (ASPIRE-S) cohort were followed up at 6 months and 5 years post-stroke. Cognitive impairment was assessed using the Montreal Cognitive Assessment (MoCA), with cognitive decline defined as a decrease of at least 2 points. Primary healthcare service use was defined as the number of general practitioner visits in the previous 12 months (0 to 4 or 5 or more visits). Informal care was defined as any unpaid care received by stroke patients from family members, neighbours or friends. Results: One hundred patients had cognitive assessment at both 6 months and five years post-stroke. Cognitive decline was evident in 66 (66.0%) patients at 5 years. Increasing age was significantly associated with cognitive decline [OR (95% CI): 1.05 (1.01, 1.09)]. Controlling for age, cognitive decline was associated with a greater number of GP visits in the previous 12 months [OR (95% CI): 4.73 (1.27, 17.61)], but not with likelihood of receiving informal care [OR (95% CI): 1.20 (0.35, 4.07)]. Conclusion: Cognitive decline is evident in a significant number of patients five years post-stroke, and is associated with increased use of primary healthcare services. Further research is required to explore predictors and outcomes of cognitive decline post-stroke.

Prevalence and short-term changes of cognitive dysfunction in young stroke patients

Author(s): Pinter D.; Gattringer T.; Niederkorn K.; Horner S.; Fandler S.; Eppinger S.; Krenn K.

Abstract: Background and Aims: Studies assessing the prevalence and course of post-stroke cognitive deficits in young stroke patients are rare. We therefore assessed cognitive function in a sample of young stroke patients (18 to 55 years) within the first week after hospital admission (baseline, BL) and at three months follow-up (FU). Method: In this prospective single-center study, patients underwent a comprehensive clinical and cognitive assessment, examining general cognitive function, processing speed, attention, executive function and word fluency twice. Results: From February 2016 to December 2017, we consecutively examined 130 young stroke patients (54% males; mean age: 43.7 years). Within this period, 68 patients attended the FU assessment (52% males; mean age: 42.1 +/- 10.4 years). At BL (N=130), deficits (defined by 1.5 standard deviations below standardized mean) were seen in general cognitive function (41.7%), processing speed (55.0%), attention (45.2%), executive function (48.4%) and word fluency (40.7%). 27% showed impairment in four or more domains. A similar frequency of deficits was present in the subgroup with FU assessment which significantly improved in most domains of cognitive performance within three months, except for word fluency. Nevertheless, considerable cognitive deficits were still present three months after stroke in almost one third of patients (processing speed: 30.9%, executive function: 28.4%; word fluency: 43.6%). Eight (12%) patients suffered from depression at FU. Conclusion: Our study indicates a high prevalence of cognitive deficits in young stroke patients which underscores the importance of poststroke cognitive assessment. Potential implications of these deficits (e.g. difficulties to return to work) deserve further investigations.

Post stroke cognitive impairment and stroke etiology - Acute and after six months

Author(s): Simonsen S.A.; West A.S.; Andersen A.V.; Iversen H.K.; Wolfram F.; Jennum P.

Abstract: Background and Aims: Studies assessing the prevalence and course of post-stroke cognitive deficits in young stroke patients are rare. We therefore assessed cognitive function in a sample of young stroke patients (18 to 55 years) within the first week after hospital admission (baseline, BL) and at three months follow-up (FU). Method: In this prospective single-center study, patients underwent a comprehensive clinical and cognitive assessment, examining general cognitive function, processing speed, attention, executive function and word fluency twice. Results: From February 2016 to December 2017, we consecutively examined 130 young stroke patients (54% males; mean age: 43.7 years). Within this period, 68 patients attended the FU assessment (52% males; mean age: 42.1 +/- 10.4 years). At BL (N=130), deficits (defined by 1.5 standard deviations below standardized mean) were seen in general cognitive function (41.7%), processing speed (55.0%), attention (45.2%), executive function (48.4%) and word fluency (40.7%). 27% showed impairment in four or more domains. A similar frequency of deficits was present in the subgroup with FU assessment which significantly improved in most domains of cognitive performance within three months, except for word fluency. Nevertheless, considerable cognitive deficits were still present three months after stroke in almost one third of patients (processing speed: 30.9%, executive function: 28.4%; word fluency: 43.6%). Eight (12%) patients suffered from depression at FU. Conclusion: Our study indicates a high prevalence of cognitive deficits in young stroke patients which underscores the importance of poststroke cognitive assessment. Potential implications of these deficits (e.g. difficulties to return to work) deserve further investigations.
Abstract: Background and Aims: Cognitive impairment (CI) is common after stroke and is related to poor functional outcome and increased mortality. Data regarding association to stroke etiology and particular small vessel disease (SVD) are sparse. Method: An observational study in acute stroke patients followed for six months. CI was assessed with Montreal Cognitive Assessment (MoCA) and Trial Marking Test part A and B (TMT-A, TMT-B). Etiology was classified according to TOAST; large artery atherosclerosis (LAA), cardioembolism (CE), small vessel occlusion (SVO), other determined etiology (OD) and undetermined etiology (UD). A newly defined total SVD score was calculated in all TOAST groups based on MRI. Age and stroke severity were included as confounders. Results: We included 110 patients and 73 completed follow-up. Median age: 68 years (range 36-88), men: 56%, ischemic strokes: 90%. The cognitive function improved over time, MoCA: mean difference 1.5 (95% confidence interval 1.0-2.0, p<0.001), TMT-A: mean difference 5.5 (95% confidence interval 2.5-8.5, p<0.001) and TMT-B: mean difference 19.5 (95% confidence interval 7.0-37.5, p<0.01). CI at follow-up, assessed with MoCA, was more frequent in patients with LAA, CE and UD etiology compared to SVO etiology (logistic regression: p=0.02 for each comparison). CI increased with increasing SVD score both in the acute state (TMT-B p>0.01) and at follow-up (TMT-A p=0.01). Conclusion: CI improved during the first six months after a stroke. Patients with SVO (TOAST) etiology were least affected by CI. Independent of the TOAST criteria, CI increased with increasing SVD score.

Longitudinal evaluation of cognition after stroke - A systematic review

Author(s): Saa J.P.; Carey L.; Tse T.; Baum C.; Cumming T.; Josman N.; Rose M.

Source: European Stroke Journal; May 2018; vol. 3 (no. 1); p. 548-549

Publication Type(s): Conference Abstract

Abstract: Background and Aims: Cognition is one of the areas more commonly affected by stroke, however the trajectory of recovery of cognitive function is relatively unexplored. The aim of this review was to identify studies that have investigated cognition longitudinally post-stroke and to identify the instruments used. Method: A targeted search was conducted to identify longitudinal studies and clinical trials reporting cognitive outcomes on adults (18+) who sustained a hemorrhagic or ischemic stroke. Seven databases were examined: PsycINFO, Embase, MEDLINE, Pubmed, Web of Science, and CINAHL. Studies on pediatric, adolescents, animal studies, and investigations on SAH, and TIA were excluded. Results: A total of 1,072 papers were identified, sixty-two papers met our inclusion criteria. In a preliminary analysis, we identified 172 instruments evaluating 82 different cognitive functions longitudinally. Memory, attention, and executive function were the cognitive domains more commonly assessed. The MMSE was the most frequently used instrument, with 33 studies (53%) using this assessment serially. Other findings indicate that most longitudinal and follow-up studies (76%) do not assess cognition beyond 12-months post-stroke; and that 73% of these papers used more than one assessment to evaluate cognition at multiple time points. There were no studies using performance-based assessments longitudinally. Conclusion: Our results show that there is large variability in both the cognitive assessments used and the domains they target. Studies looking at post-stroke cognitive function beyond the one-year mark are scarce. These issues, combined with non-representative samples, dropouts, and practice effects, make identifying the true trajectory of post-stroke cognition from the current literature extremely difficult.

Associations between cognitive impairment, vulnerability and mortality post-stroke: Findings from a five-year follow-up of the aspires cohort

Author(s): Rohde D.; Mellon L.; Conway O.; Hickey A.; Gaynor E.; Large M.; Hall P.; Brewer L.

Source: European Stroke Journal; May 2018; vol. 3 (no. 1); p. 477-478

Publication Type(s): Conference Abstract
**Abstract:** Background and Aims: While previous research has examined vulnerability as a predictor of mortality in general older population samples, no study to date has explored vulnerability as a predictor of mortality in a post-stroke cohort. The aim of this study was to examine predictors of mortality in patients five years post-stroke, focusing on cognitive impairment and vulnerability in addition to cardiovascular risk factors. Method: Patients from the ASPIRE-S (Action on Secondary Prevention Interventions and Rehabilitation in Stroke) cohort were followed 5 years post-ischaemic stroke. Cardiovascular risk factors were assessed at 6 months post-stroke. Cognitive impairment was assessed using a cut-off of <26 on the Montreal Cognitive Assessment. Vulnerability was defined as a score of -3 on the Vulnerable Elders Scale. Mortality and date of death were ascertained using hospital records, death notifications and contact with general practitioners. Predictors of mortality were explored using multivariate Cox proportional hazard models. Adjusted hazard ratios (HR) and 95% confidence intervals (CI) are presented. Results: Sixty-three of 256 patients (24.6%) assessed at six months poststroke had died within 5 years. Cognitive impairment [HR (95% CI): 2.19 (1.42, 3.39)], vulnerability [HR (95% CI): 5.23 (2.92, 9.36)], atrial fibrillation [HR (95% CI): 2.31 (1.80, 2.96)] and dyslipidaemia [HR (95% CI): 1.90 (1.10, 3.27)] were associated with increased risk of 5-year mortality. Conclusion: Vulnerability, cognitive impairment, atrial fibrillation and dyslipidaemia at six months were associated with increased risks of mortality five years post-ischaemic stroke. Identification and management of these risk factors should be emphasised in post-stroke care.

**Adherence to secondary prevention after stroke-the nor-coast study**

**Author(s):** Gynnild M.; Ellekjaer H.; Rosstad T.; Naess H.

**Source:** European Stroke Journal; May 2018; vol. 3 (no. 1); p. 233

**Publication Type(s):** Conference Abstract

**Abstract:** Background and Aims: Effectiveness of secondary prevention after stroke is influenced by adherence to treatment and adherence is often suboptimal. We aim to determine the degree of adherence to secondary preventive medication after stroke, identify factors that may impact the adherence and explore associations between adherence and the subsequent risk of post-stroke cognitive impairment (PCI) and new vascular events. Method: Nor-COAST is an ongoing multicenter, prospective cohort study with focus on PCI. Inclusion criteria are acute stroke hospitalized from May 2015 to March 2017. Follow-ups are performed at 3 and 18 months with assessment of cognitive and physical function, cerebral MRI and blood samples. Results: 817 participants have been included during the recruitment period. Adherence to antihypertensives, statins, antithrombotic and antidiabetic treatment after 3 and 18 months will be evaluated by using medication lists, the 4-item Morisky Medication Adherence Scale and achievement of guideline-defined treatment goals for blood pressure, lipid status and haemoglobin A1c. Information on follow-up routines in primary health care will also be obtained. The Norwegian Cardiovascular Disease Registry will give information about vascular events in the period. Conclusion: The study will give insight into associations between adherence to preventive measures, achievement of treatment goals and risk of vascular events and PCI, and contribute to valuable knowledge useful for patient care and further research, such as intervention studies to improve adherence and cognitive function after stroke.

**The queen square cognitive assessment for stroke (QS-CAS): Improving on the montreal cognitive assessment (MOCA)**

**Author(s):** Chan E.; Garritsen E.; Altendorff S.; Cipolotti L.; Werring D.

**Source:** European Stroke Journal; May 2018; vol. 3 (no. 1); p. 477

**Publication Type(s):** Conference Abstract
Abstract: Background and Aims: The MoCA is a popular cognitive screening tool. However, studies comparing MoCA performance with neuropsychological assessments have shown that it lacks sensitivity to stroke-relevant domains (e.g. visual memory and speed of processing) and insufficiently assesses key domains (e.g. attention/working memory and executive functions). The aim of the study was to examine whether the test accuracy of the MoCA can be improved with additional tailored screening items. Method: 142 patients with sub-acute stroke were administered the QSCAS which is an assessment tool that consists of the MoCA and additional newly developed tailored screening items assessing visual memory and speed of processing, as well as attention/working memory and executive functions. Performance on the QS-CAS was compared with performance on neuropsychological assessment. Results: 20% of patients were classified as "cognitively intact" on the traditional MoCA alone (>25). Of those patients, 72% failed on the additional attention/working memory screening items, 52% on the speed of processing items, 35% on the visual memory items and 32% on the executive screening items. In addition, 54% of patients who scored full marks on the visuospatial/executive items of the MoCA (5/5) failed on at least one of the additional executive screening items. Poor performance on the tailored screening items was strongly correlated with poor performance on neuropsychological assessment in the corresponding domain. Conclusion: Our findings show that the QS-CAS improves the test accuracy of the MoCA. Supplementing the MoCA with our additional tailored screening items may be a time- and cost-efficient way of improving detection of post-stroke cognitive deficits.

The effects of music-supported therapy on motor, cognitive, and psychosocial functions in chronic stroke.

Author(s): Fujioka, Takako; Dawson, Deirdre R; Wright, Rebecca; Honjo, Kie; Chen, Joyce L;

Source: Annals of the New York Academy of Sciences; May 2018

Abstract: Neuroplasticity accompanying learning is a key mediator of stroke rehabilitation. Training in playing music in healthy populations and patients with movement disorders requires resources within motor, sensory, cognitive, and affective systems, and coordination among these systems. We investigated effects of music-supported therapy (MST) in chronic stroke on motor, cognitive, and psychosocial functions compared to conventional physical training (GRASP). Twenty-eight adults with unilateral arm and hand impairment were randomly assigned to MST (n = 14) and GRASP (n = 14) and received 30 h of training over a 10-week period. The assessment was conducted at four time points: before intervention, after 5 weeks, after 10 weeks, and 3 months after training completion. As for two of our three primary outcome measures concerning motor function, all patients slightly improved in Chedoke-McMaster Stroke Assessment hand score, while the time to complete Action Research Arm Test became shorter in the MST group. The third primary outcome measure for well-being, Stroke Impact Scale, was improved for emotion and social communication earlier in MST and coincided with the improved executive function for task switching and music rhythm perception. The results confirmed previous findings and expanded the potential usage of MST for enhancing quality of life in community-dwelling chronic-stage survivors.
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