Rehabilitation
Current Awareness Bulletin
April 2019

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Community-based participatory research remodelling occupational therapy to foster older adults’ social participation.

Author(s): Turcotte, Pier-Luc; Carrier, Annie; Levasseur, Mélanie

Source: Canadian journal of occupational therapy. Revue canadienne d'ergotherapie; Mar 2019 ; p. 8417419832338

Background: Occupational therapists who provide community-based services are well positioned to foster older adults' social participation. However, community occupational therapists rarely address social participation and require support to change their practice.

Purpose: This study initiated a remodelling of community occupational therapy services by (a) selecting practices fostering older adults' social participation and (b) identifying factors that could affect their integration.

Method: A community-based participatory research study was conducted in a large Canadian city. Four focus group meetings and seven individual interviews were held with 28 key informants.

Findings: A continuum of emerging practices was identified, including personalized, group-based, and community-based interventions. Potential enablers of these practices included clinical support, better communication, and user involvement. Organizational and systemic barriers were related to the institutional culture and performance indicators.

Implications: These results point to innovative ways to foster older adults' social participation and identify potential enablers and barriers affecting their integration.

Title: The Development of a New Computer-Adaptive Test to Evaluate Strain in Caregivers of Individuals With TBI: TBI-CareQOL Caregiver Strain.

Citation: Archives of Physical Medicine & Rehabilitation; Apr 2019; vol. 100

Author(s): Carlozzi, Noelle E.; Kallen, Michael A.; Ianni, Phillip A.; Hahn, Elizabeth A.; French, Louis M.; Lange, Rael T.; Brickell, Tracey A.; Hanks, Robin; Sander, Angelle M.

Objective: To develop a new measure of caregiver strain for use in caregivers of individuals with traumatic brain injury (TBI), Traumatic Brain Injury Caregiver Quality of Life (TBI-CareQOL) Caregiver Strain. Design Qualitative data, literature reviews, and cross-sectional survey study.

Setting: Three TBI Model Systems rehabilitation hospitals, an academic medical center, and a military medical treatment facility.

Participants: Caregivers (N=560) of civilians (n=344) or service members/veterans (SMVs) with TBI (n=216).

Interventions: Not applicable.

Main Outcome Measure: TBI-CareQOL Caregiver Strain Item Bank.

Results: Exploratory and confirmatory factor analyses, a graded response model (GRM) and differential item functioning supported the retention of 33 items in the final measure. GRM calibration data was used to inform the selection of a 6-item static short form, and to program the TBI-CareQOL Caregiver Strain computer-adaptive test (CAT). CAT simulation analyses indicated a 0.97 correlation between the CAT scores and the full item-bank. Three-week test-retest reliability was strong (r =0.83).

Conclusions: The new TBI-CareQOL Caregiver Strain CAT and corresponding 6-item short form were developed using established rigorous measurement development standards; this
is the first self-reported measure developed to evaluate caregiver strain in caregivers of individuals with TBI.

**Highlights:** • The Traumatic Brain Injury Caregiver Quality of Life (TBI-CareQOL) measurement system includes new and existing self-report measures. • Measures were developed specific to caring for someone with traumatic brain injury. • Generic measures also evaluate important quality of life constructs for caregivers.

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**Title:** Electrical Stimulation in the Treatment of Hemiplegic Shoulder Pain: A Meta-Analysis of Randomized Controlled Trials.

**Citation:** American Journal of Physical Medicine & Rehabilitation; Apr 2019; vol. 98 (no. 4); p. 280-286

**Author(s):** Huaide Qiu; Jiahui Li; Ting Zhou; Hongxing Wang; Jianan Li

**Objective:** The aim of the study was to determine the effect of electrical stimulation in the treatment of hemiplegic shoulder pain.

**Design:** Eight databases were systematically searched for randomized controlled trials with a treatment duration of at least 2 wks comparing electrical stimulation with sham stimulation or no stimulation for patients with hemiplegic shoulder pain. Shoulder pain on the hemiplegic side after stroke at baseline was required at study selection. The overall effects of electrical stimulation were calculated using a meta-analytic method.

**Results:** Six studies were included. The pooled data indicated that electrical stimulation may have a positive effect for patients with hemiplegic shoulder pain on pain reduction (n = 193, standardized mean difference = -1.89, 95% confidence interval = -3.05 to -0.74) and pain-free external rotation (n = 164, weighted mean difference = 18.92, 95% confidence interval = 7.00 to 30.84). Meta-analysis also showed better recovery of activities of daily living independence in patient groups receiving electrical stimulation (n = 167, weighted mean difference = 8.96, 95% confidence interval = 5.26 to 12.66).

**Conclusions:** Electrical stimulation may be an effective pain management methodology for hemiplegic shoulders and may contribute to pain-free range of external rotation as well as activities of daily living recovery. However, these results should be interpreted with caution, given the low number of selected studies and risk of potential bias.

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**Title:** Depression Characterization and Race Among Stroke Survivors Receiving Inpatient Rehabilitation.

**Citation:** American Journal of Physical Medicine & Rehabilitation; Apr 2019; vol. 98 (no. 4); p. 325-330

**Author(s):** Pugh, Terrence; Hirsch, Mark A.; Nguyen, Vu Q. C.; Rhoads 3rd, Charles F.; Harris, Gabrielle M.; Qing Yang; Thomas, J. George; Guerrier, Tami; Hamm, Deanna; Pereira, Carol; Jia Yao; Prvu Bettger, Janet A.

**Abstract:** Race and ethnicity play a significant role in poststroke outcomes. This brief report describes the presence of depression among stroke survivors who received inpatient rehabilitation and whether depression differs by race. Data from eRehabData and electronic medical records were analyzed for patients who received rehabilitation after an acute ischemic or hemorrhagic stroke. Of 1501 stroke patients, 61.3% were white, 33.9% were African American, and 4.8% were of other race/ethnic backgrounds. By retrospective clinical review, depression was documented for 29.7% of stroke patients. Premorbid versus new
onset of poststroke depression was documented for 13.4% and 21.6% of whites, 7.5% and 11.5% of African American, and 0% and 16.7% of patients of other race/ethnic groups. Compared with whites, African American and people of other races had a lower odds of poststroke depression (African American adjusted odds ratio = 0.52, 95% confidence interval = 0.41-0.68; other races odds ratio = 0.37, 95% confidence interval = 0.19-0.71), after adjusting for all other significant risk factors identified in the bivariate analysis (sex, hyperlipidemia, cognitive deficit, neglect). Depression was documented for one in three stroke survivors who received inpatient rehabilitation and highest among whites especially for prestroke depression. Addressing depression in rehabilitation care needs to consider individual patient characteristics and prestroke health status.


Citation: American Journal of Physical Medicine & Rehabilitation; Apr 2019; vol. 98 (no. 4); p. 339-340
Author(s): Mehrholz, Jan

Title: Use of a Gaming Platform for Balance Training After a Stroke: A Randomized Trial.

Citation: Archives of Physical Medicine & Rehabilitation; Apr 2019; vol. 100 (no. 4); p. 591-597
Author(s): Hsieh, Hsieh-Chun

Objective: To evaluate a personal computer (PC) gaming platform as a means of improving postural balance in stroke patients.
Participants Stroke patients (N=54) were enrolled and randomly divided into experimental and control groups.
Design: The experimental group underwent 12 weeks of rehabilitation involving playing PC games with the proposed gaming platform, whereas the control group played PC games with a computer mouse in the standing position. Interventions The experimental PC gaming platform allowed trunk movements in 3 directions, including lateral, downward, or upward reaching.
Main Outcome Measures: Balance control was assessed before and after the intervention with the Midot Posture Scale Analyzer (a pressure platform) by measuring the center of pressure during quiet stance. The Berg Balance Scale, Fullerton Advanced Balance Scale, and timed Up and Go tests were used to evaluate functional balance.
Results: Analysis of covariance was used to assess how the PC games improve balance abilities. There were significant differences between the experimental and control groups in the results of sway kinematics and functional balance tests. The experimental group showed greater improvement than the control group.
Conclusion: This new gaming platform with adaptive PC games could be a useful therapy to stroke rehabilitation in patients with postural imbalance.
Title: Economic Evaluation of Activities of Daily Living Retraining During Posttraumatic Amnesia for Inpatient Rehabilitation Following Severe Traumatic Brain Injury.

Citation: Archives of Physical Medicine & Rehabilitation; Apr 2019; vol. 100 (no. 4); p. 648-655

Author(s): Mortimer, Duncan; Trevena-Peters, Jessica; McKay, Adam; Ponsford, Jennie

Objective: To evaluate the cost-effectiveness of structured activities of daily living (ADL) retraining during posttraumatic amnesia (PTA) plus treatment as usual (TAU) vs TAU alone for inpatient rehabilitation following severe traumatic brain injury (TBI).

Design: Trial-based economic evaluation from a health-system perspective. Setting Inpatient rehabilitation center.

Participants: Participants (N=104) admitted to rehabilitation and in PTA for >7 days following severe TBI. Interventions: Structured ADL retraining during PTA plus TAU vs TAU alone. Structured ADL retraining was manualized to minimize the risk of agitation and maximize functional improvement, following principles of errorless and procedural learning and targeting individualized therapy goals. TAU included physiotherapy and/or speech therapy during PTA plus ADL retraining after PTA emergence.

Main Outcome Measures: FIM total scores at baseline, PTA emergence, hospital discharge, or final follow-up (2mo postdischarge) where FIM total scores were calculated as the sum of 5 FIM motor self-care items and a FIM meal-preparation item.

Results: Structured ADL retraining during PTA significantly increased functional independence at PTA emergence (mean difference: 4.90, SE: 1.4, 95% confidence interval [CI]: 1.5, 8.3) and hospital discharge (mean difference: 5.22, SE: 1.4, 95% CI: 1.8, 8.7). Even in our most pessimistic scenario, structured ADL retraining was cost-saving as compared to TAU (mean: -$7762; 95% CI: -$8105, -$7419). Together, these results imply that structured ADL retraining dominates (less costly but no less effective) TAU when effectiveness is evaluated at PTA emergence and hospital discharge.

Conclusions: Structured ADL retraining during PTA yields net cost-savings to the health system and offers a cost-effective means of increasing functional independence at PTA emergence and hospital discharge.

Title: Effect of Transcutaneous Electrical Nerve Stimulation on Spasticity in Adults With Stroke: A Systematic Review and Meta-analysis.

Citation: Archives of Physical Medicine & Rehabilitation; Apr 2019; vol. 100 (no. 4); p. 751-768

Author(s): Mahmood, Amreen; Veluswamy, Sundar Kumar; Hombali, Aditi; Mullick, Aditi; N, Manikandan; Solomon, John M.

Objectives: (1) To determine the effect of transcutaneous electrical nerve stimulation (TENS) on poststroke spasticity. (2) To determine the effect of different parameters (intensity, frequency, duration) of TENS on spasticity reduction in adults with stroke. (3) To determine the influence of time since stroke on the effectiveness of TENS on spasticity.

Data Sources: PubMed, PEDro, CINAHL, Web of Science, CENTRAL, and EMBASE databases were searched from inception to March 2017. Study Selection: Randomized controlled trial (RCT), quasi-RCT, and non-RCT were included if (1) they evaluated the effects of TENS for the management of spasticity in participants with acute or subacute or
chronic stroke using clinical and neurophysiological tools; and (2) TENS was delivered either alone or as an adjunct to other treatments.

**Data Extraction:** Two authors independently screened and extracted data from 15 of the 829 studies retrieved through the search using a pilot tested pro forma. Disagreements were resolved through discussion with other authors. Quality of studies was assessed using Cochrane risk of bias criteria.

**Data Synthesis:** Meta-analysis was performed using a random-effects model that showed (1) TENS along with other physical therapy treatments was more effective in reducing spasticity in the lower limbs compared to placebo TENS (SMD −0.64; 95% confidence interval [95% CI], −0.98 to −0.31; P = .0001; I²=17%); and (2) TENS, when administered along with other physical therapy treatments, was effective in reducing spasticity when compared to other physical therapy interventions alone (SMD −0.83; 95% CI, −1.51 to −0.15; P = .02; I²=27%). There were limited studies to evaluate the effectiveness of TENS for upper limb spasticity.

**Conclusion:** There is strong evidence that TENS as an adjunct is effective in reducing lower limb spasticity when applied for more than 30 minutes over nerve or muscle belly in chronic stroke survivors (review protocol registered at PROSPERO: CRD42015020151).

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**Title:** Outcome measures in post-stroke arm rehabilitation trials: do existing measures capture outcomes that are important to stroke survivors, carers, and clinicians?

**Citation:** Clinical Rehabilitation; Apr 2019; vol. 33 (no. 4); p. 737-749

**Author(s):** Duncan Millar, Julie; van Wijck, Frederike; Pollock, Alex; Ali, Myzoon

**Objective:** We sought to (1) identify the outcome measures currently used across stroke arm rehabilitation randomized trials, (2) identify and compare outcomes important to stroke survivors, carers and clinicians and (3) describe where existing research outcome measures capture outcomes that matter the most to stroke survivors, carers and clinicians and where there may be discrepancies.

**Methods:** First, we systematically identified and extracted data on outcome measures used in trials within a Cochrane overview of arm rehabilitation interventions. Second, we conducted 16 focus groups with stroke survivors, carers and clinicians using nominal group technique, supplemented with eight semi-structured interviews, to identify these stakeholders’ most important outcomes following post-stroke arm impairment. Finally, we described the constructs of each outcome measure and indicated where stakeholders’ important outcomes were captured by each measure.

**Results:** We extracted 144 outcome measures from 243 post-stroke arm rehabilitation trials. The Fugl-Meyer Assessment Upper Extremity section (used in 79/243 trials; 33%), Action Research Arm Test (56/243; 23%), and modified Ashworth Scale (53/243; 22%) were most frequently used. Stroke survivors (n = 43), carers (n = 10) and clinicians (n = 58) identified 66 unique, important outcomes related to arm impairment following stroke. Between one and three outcomes considered important by the stakeholders were captured by the three most commonly used assessments in research.

**Conclusion:** Post-stroke arm rehabilitation research would benefit from a reduction in the number of outcome measures currently used, and better alignment between what is measured and what is important to stroke survivors, carers and clinicians.
Title: Early prediction of falls after stroke: a 12-month follow-up of 490 patients in The Fall Study of Gothenburg (FallsGOT).

Citation: Clinical Rehabilitation; Apr 2019; vol. 33 (no. 4); p. 773-783

Author(s): Samuelsson, Carina M.; Hansson, Per-Olof; Persson, Carina U.

Objective: To identify the incidence of falls and factors present shortly after stroke, which are associated with the occurrence of falls over the first 12 months after stroke onset, following discharge from inpatient rehabilitation.

Design: Prospective follow-up study. Setting: Stroke unit and outpatient department. Subjects: A total of 490 individuals with acute stroke.

Methods: Postural control was assessed using the Swedish modified version of the Postural Assessment Scale for Stroke Patients. Data on self-reported falls were collected using a standardized questionnaire at three months after discharge and six and 12 months after stroke onset. Associations between characteristics during the acute phase after a stroke and falls after six and 12 months were investigated using univariable and multivariable regression analyses.

Main measures: The endpoint was a self-reported fall.

Results: Within three months after discharge, 38 of 165 respondents (23%) had experienced at least one fall. Within six and 12 months after stroke onset, respectively, 108 of 376 (29%) and 140 of 348 (40%) of the respondents had experienced at least one fall. Poor postural control (odds ratio 3.92, 95% confidence interval 2.07–7.45, P < 0.0001) and using a walking aid (odds ratio 2.84, 95% confidence interval 1.71–4.72, P < 0.0001) were predictors of falls after discharge within 12 months after stroke onset. The same variables were independent predictors of falls within six months.

Conclusion: Poor postural control and using a walking aid in the acute phase after a stroke are associated with falls after discharge from a stroke unit within 12 months after stroke onset.

Title: The efficacy of problem solving therapy to reduce post stroke emotional distress in younger (18-65) stroke survivors.

Citation: Disability & Rehabilitation; Apr 2019; vol. 41 (no. 7); p. 753-762

Author(s): Chalmers, Charlotte; Leathem, Janet; Bennett, Simon; McNaughton, Harry; Mahawish, Karim

Purpose: To investigate the efficacy of problem solving therapy for reducing the emotional distress experienced by younger stroke survivors.

Method: A non-randomized waitlist controlled design was used to compare outcome measures for the treatment group and a waitlist control group at baseline and post-waitlist/post-therapy. After the waitlist group received problem solving therapy an analysis was completed on the pooled outcome measures at baseline, post-treatment, and three-month follow-up.

Results: Changes on outcome measures between baseline and post-treatment (n = 13) were not significantly different between the two groups, treatment (n = 13), and the waitlist control group (n = 16) (between-subject design). The pooled data (n = 28) indicated that receiving problem solving therapy significantly reduced participants levels of depression and anxiety and increased quality of life levels from baseline to follow up (within-subject design), however, methodological limitations, such as the lack of a control group reduce the validity of this finding.
Conclusion: The between-subject results suggest that there was no significant difference between those that received problem solving therapy and a waitlist control group between baseline and post-waitlist/post-therapy. The within-subject design suggests that problem solving therapy may be beneficial for younger stroke survivors when they are given some time to learn and implement the skills into their day to day life. However, additional research with a control group is required to investigate this further. This study provides limited evidence for the provision of support groups for younger stroke survivors post stroke, however, it remains unclear about what type of support this should be. Implications for Rehabilitation: Problem solving therapy is no more effective for reducing post stroke distress than a wait-list control group. Problem solving therapy may be perceived as helpful and enjoyable by younger stroke survivors. Younger stroke survivors may use the skills learnt from problem solving therapy to solve problems in their day to day lives. Younger stroke survivors may benefit from age appropriate psychological support; however, future research is needed to determine what type of support this should be.

Title: Hybrid Rehabilitation Therapies on Upper-Limb Function and Goal Attainment in Chronic Stroke.

Citation: OTJR: Occupation, Participation & Health; Apr 2019; vol. 39 (no. 2); p. 116-123
Author(s): Hung, Chung-shan; Hsieh, Yu-wei; Wu, Ching-yi; Chen, Yu-ju; Lin, Keh-chung; Chen, Chia-ling; Yao, Kaiping Grace; Liu, Chien-ting; Horng, Yi-shiung

Abstract: This study examined the treatment effects between unilateral hybrid therapy (UHT; unilateral robot-assisted therapy [RT] + modified constraint-induced movement therapy) and bilateral hybrid therapy (BHT; bilateral RT + bilateral arm training) compared with RT. Thirty patients with chronic stroke were randomized to UHT, BHT, or RT groups. Preliminary efficacy was assessed using the Fugl-Meyer Assessment (FMA), the Chedoke Arm and Hand Activity Inventory (CAHAI), and the goal attainment scaling (GAS). Possible adverse effects of abnormal muscle tone, pain, and fatigue were recorded. All groups showed large improvements in motor recovery and individual goals. Significant between-group differences were found on GAS favoring the hybrid groups but not on FMA and CAHAI. No adverse effects were reported. Hybrid therapies are safe and applicable interventions for chronic stroke and favorable for improving individual functional goals. Treatment effects on motor recovery and functional activity might be similar among the three groups.

Title: Abandoned to the strains of daily life: a qualitative study of the long-term experiences in partners to persons after a mild to moderate stroke.

Citation: Disability & Rehabilitation; Mar 2019; vol. 41 (no. 6); p. 649-655
Author(s): Ytterberg, Charlotte; von Koch, Lena; Erikson, Anette

Purpose: To describe the experiences of everyday life over 6 years after stroke, from the perspectives of partners to persons after stroke.

Materials and methods: Semi structured individual interviews were conducted with seven partners to persons who had had stroke. The interviews were recorded and then transcribed verbatim. The participants comprised two men and five women aged 60-82 years. The data were collected and analysed using a grounded theory approach.
**Results:** One core category Living in strained everyday circumstances and three categories Feelings of anxiety, Living a demanding day to day life, and Adjusting to a changed role emerged from the analysis. The participants had developed strategies and new ways to boost their energy level in order to find the strength needed for their everyday life.

**Conclusion:** This study shows that the everyday lives of partners to people who have had a stroke are characterised by feelings of strain and anxiety and that they need possibilities for different kinds of long-term support. Our findings may contribute to increased knowledge among health workers and increased readiness to offer support or referral to other meeting places such as peer support groups.

**Implications for rehabilitation:** The everyday lives of partners to people who have had a stroke are characterised by feelings of strain and anxiety. Partners to people who have had a stroke need possibilities for different kinds of long-term support. Possibilities for relief among partners to persons after stroke may be organised for example within the municipality or by patient organisations and other voluntary networks such as peer support groups.

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**Title:** A survey of the current practice of intramuscular Botulinum toxin injections for hemiplegic shoulder pain in the UK.

**Citation:** Disability & Rehabilitation; Mar 2019; vol. 41 (no. 6); p. 720-726

**Author(s):** Holmes, Richard J.; Connell, Louise A.

**Purpose:** To describe the current UK practice for the use of intramuscular Botulinum Toxin type A injections to treat hemiplegic shoulder pain.

**Method:** A UK-based cross-sectional study using an online survey. Participants (n = 68) were medical and non-medical practitioners recruited via the membership of the British Society for Rehabilitation Medicine and the British Neurotoxin Network. Data was analysed using descriptive statistics and content analysis.

**Results:** The majority of respondents would consider Botulinum Toxin type A for hemiplegic shoulder pain (86.8%), though most of these respondents inject for this goal infrequently (83.1%). Pectoralis major was most commonly selected to achieve this goal. Barriers to this intervention included difficulties determining the cause of pain (29.4%), difficulty isolating muscles (27.9%), and a lack of evidence (25%). The doses reported regularly deviated from guidelines and a substantial range in the volumes suggested was observed. Clinicians were mostly reliant on unstandardised measures to assess outcomes.

**Conclusions:** Current UK practice of Botulinum Toxin type A injections for hemiplegic shoulder pain associated with spasticity is highly variable. There are large gaps between current practice and available evidence with regards to muscle selection and doses used. A number of areas for further investigation have been identified to progress current understanding of this intervention. Implications for rehabilitation: There are wide variations in practice for this complex intervention and clinicians should consider that their individual decision-making could be based on their own beliefs rather than available evidence. Pectoralis major is most commonly injected to treat hemiplegic shoulder pain, but further evaluation is required to address whether it is the most effective. Clinicians most often use a limitation of shoulder abduction and external rotation, flexor patterning of the upper limb, and pain on passive movement to identify when hemiplegic shoulder pain is due to spasticity over other causes. Further research is needed to identify which patients are most likely to benefit from this intervention and at what stage post-stroke its use is most optimal.
Title: Web-based physiotherapy for people affected by multiple sclerosis: a single blind, randomized controlled feasibility study.

Citation: Clinical Rehabilitation; Mar 2019; vol. 33 (no. 3); p. 473-484
Author(s): Paul, Lorna; Renfrew, Linda; Freeman, Jennifer; Murray, Heather; Weller, Belinda; Mattison, Paul; McConnachie, Alex; Heggie, Robert; Wu, Olivia; Coulter, Elaine H.

Objective: To examine the feasibility of a trial to evaluate web-based physiotherapy compared to a standard home exercise programme in people with multiple sclerosis.


Participants: A total of 90 people with multiple sclerosis (Expanded Disability Status Scale 4–6.5).

Interventions: Participants were randomized to a six-month individualized, home exercise programme delivered via web-based physiotherapy (n = 45; intervention) or a sheet of exercises (n = 45; active comparator).

Outcome measures: Outcome measures (0, three, six and nine months) included adherence, two-minute walk test, 25 foot walk, Berg Balance Scale, physical activity and healthcare resource use. Interviews were undertaken with 24 participants and 3 physiotherapists.

Results: Almost 25% of people approached agreed to take part. No intervention-related adverse events were recorded. Adherence was 40%–63% and 53%–71% in the intervention and comparator groups. There was no difference in the two-minute walk test between groups at baseline (Intervention-80.4(33.91)m, Comparator-70.6(31.20)m) and no change over time (at six-month Intervention-81.6(32.75)m, Comparator-74.8(36.16)m). There were no significant changes over time in other outcome measures except the EuroQol-5 Dimension at six months which decreased in the active comparator group. For a difference of 8(17.4)m in two-minute walk test between groups, 76 participants/group would be required (80% power, P > 0.05) for a future randomized controlled trial.

Conclusion: No changes were found in the majority of outcome measures over time. This study was acceptable and feasible by participants and physiotherapists. An adequately powered study needs 160 participants.

Title: A systematic review of measures of adherence to physical exercise recommendations in people with stroke.

Citation: Clinical Rehabilitation; Mar 2019; vol. 33 (no. 3); p. 535-545
Author(s): Levy, Tamina; Laver, Kate; Killington, Maggie; Lannin, Natasha; Crotty, Maria

Objective: To review methods for measuring adherence to exercise or physical activity practice recommendations in the stroke population and evaluate measurement properties of identified tools.

Data sources: Two systematic searches were conducted in eight databases (MEDLINE, CINAHL, PsycINFO, Cochrane Library of Systematic Reviews, Sports Discus, PEDro, PubMed and EMBASE). Phase 1 was conducted to identify measures. Phase 2 was conducted to identify studies investigating properties of these measures.

Review methods: Phase 1 articles were selected if they were published in English, included participants with stroke, quantified adherence to exercise or physical activity
recommendations, were patient or clinician reported, were defined and reproducible measures and included patients >18 years old. In phase 2, articles were included if they explored psychometric properties of the identified tools. Included articles were screened based on title/abstract and full-text review by two independent reviewers.

**Results:** In phase 1, seven methods of adherence measurement were identified, including logbooks (n = 16), diaries (n = 18), ‘record of practice’ (n = 3), journals (n = 1), surveys (n = 2) and questionnaires (n = 4). One measurement tool was identified, the Physical Activity Scale for Individuals with Physical Disabilities (n = 4). In phase 2, no eligible studies were identified.

**Conclusion:** There is not a consistent measure of adherence that is currently utilized. Diaries and logbooks are the most frequently utilized tools.

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**Title:** Language as a Predictor of Motor Recovery: The Case for a More Global Approach to Stroke Rehabilitation.

**Citation:** Neurorehabilitation & Neural Repair; Mar 2019; vol. 33 (no. 3); p. 167-178

**Author(s):** Anderlini, Deanna; Wallis, Guy; Marinovic, Welber

**Abstract:** Stroke is the third leading cause of death in the developed world and the primary cause of adult disability. The most common site of stroke is the middle cerebral artery (MCA), an artery that supplies a range of areas involved in both language and motor function. As a consequence, many stroke patients experience a combination of language and motor deficits. Indeed, those suffering from Broca's aphasia have an 80% chance of also suffering hemiplegia. Despite the prevalence of multifaceted disability in patients, the current trend in both clinical trials and clinical practice is toward compartmentalization of dysfunction. In this article, we review evidence that aphasia and hemiplegia do not just coexist, but that they interact. We review a number of clinical reports describing how therapies for one type of deficit can improve recovery in the other and vice versa. We go on to describe how language deficits should be seen as a warning to clinicians that the patient is likely to experience motor impairment and slower motor recovery, aiding clinicians to optimize their choice of therapy. We explore these findings and offer a tentative link between language and arm function through their shared need for sequential action, which we term fluency. We propose that area BA44 (part of Broca's area) acts as a hub for fluency in both movement and language, both in terms of production and comprehension.

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**Title:** Is Unilateral Spatial Neglect Associated With Motor Recovery of the Affected Upper Extremity Poststroke? A Systematic Review.

**Citation:** Neurorehabilitation & Neural Repair; Mar 2019; vol. 33 (no. 3); p. 179-187

**Author(s):** Doron, Noa; Rand, Debbie

**Background and Purpose:** Individuals with stroke often present symptoms of multiple domains, such as weakness of the affected upper extremity (UE) and unilateral spatial neglect (USN), which are both associated with poor functional outcome. The aims of this systematic review were to search and review studies that investigated (1) the relationship between USN and affected UE sensorimotor recovery poststroke and (2) the effectiveness of sensorimotor interventions to improve the affected UE in patients with USN.

**Methods:** An electronic search of databases (MEDLINE, EMBASE, CINAHL and Cochrane CENTRAL) was conducted using a combination of the following terms: stroke, USN, and
affected UE. Studies meeting the inclusion criteria were rated using a modified version of the Quality Index, and relevant data were extracted.

**Results:** A total of 850 studies were identified, and 14 were included; 13 studies assessed correlations between USN and the affected UE capacity/recovery, and 1 study assessed an intervention to improve the UE of individuals with USN. An association between presence of USN and UE capacity/recovery was found in most studies and USN did not interfere with recovery of the affected UE in the single experimental study.

**Conclusions:** USN is associated with poor UE motor capacity and less UE recovery poststroke. Therefore, these impairments should be considered when planning rehabilitation and discharge. Because USN is a well-researched phenomenon, the lack of studies and insufficient evidence related to UE interventions in individuals with USN was unexpected. These interventions should be developed and researched to improve UE and overall functional outcome poststroke.

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**Title:** Factors affecting rehabilitation and use of upper limb after stroke: views from healthcare professionals and stroke survivors.

**Citation:** Topics in Stroke Rehabilitation; Mar 2019; vol. 26 (no. 2); p. 94-100

**Author(s):** Meadmore, Katie L.; Hallewell, Emma; Freeman, Chris; Hughes, Ann-Marie

**Background:** Training of the upper limb (UL) is limited in stroke rehabilitation, and about 50% of stroke survivors do not regain useful function in their upper limb.

**Objectives:** This study explored what factors affect rehabilitation and use of upper limb after stroke from a stroke survivor and healthcare professional perspective to better understand low engagement in UL rehabilitation in the chronic stages of stroke.

**Method:** Eight chronic stroke survivors and 21 healthcare professionals took part in semi-structured interviews or in one of three focus groups, respectively.

**Results:** Thematic analysis revealed three main themes: Availability of resources, Healthcare professional-patient relationship, and Psychosocial factors. Availability of resources and Healthcare professional-patient relationship indicated that due to resource pressures and a lack of communication and education, positive upper limb rehabilitation behaviors (e.g. engaging and integrating the upper limb in daily activity) were not always established in the early stages post-stroke. Psychosocial factors illustrated the cognitive and psychological barriers to sustained engagement with upper limb rehabilitation.

**Conclusion:** The findings indicate that stroke survivors and healthcare professionals have very similar understandings of barriers to UL activity, and positive upper limb rehabilitation behaviors are not always established early in recovery post-stroke. Increased resources and healthcare professional-patient relationships seem key factors to establishing positive perceptions of UL rehabilitation. Addressing psychosocial issues and resource limitations may help sustain engagement with UL rehabilitation.

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**Title:** Cognitive, Emotional, and Physical Functioning as Predictors of Paid Employment in People With Stroke, Traumatic Brain Injury, and Spinal Cord Injury.

**Citation:** American Journal of Occupational Therapy; Apr 2019; vol. 73 (no. 2); p. 1-15

**Author(s):** Wong, Alex W. K.; Chen, Cynthia; Baum, M. Carolyn; Heaton, Robert K.; Goodman, Berrit; Heinemann, Allen W.
Objective: Our objective was to examine demographic, cognitive, emotional, and physical factors that predict return to paid employment for people after neurological injury.

Method: Four hundred eighty adults with stroke (n = 149), traumatic brain injury (n = 155), and spinal cord injury (n = 176) completed an occupational outcome questionnaire and physical, emotional, and cognitive assessments at three rehabilitation facilities.

Results: Odds of employment were predicted by being married or partnered, having more education, requiring fewer prompts for task sequencing, and having higher inhibitory control (but were not predicted by specific type of injury). Participants who returned to work within 3 mo were more likely to work with the same employer and to take a full-time position than those who returned later.

Conclusion: Executive functioning, in particular sequencing and inhibitory control, strongly predicts employment and highlights the importance of cognitive strategy training during occupational therapy with people who have sustained neurological injuries.

Title: Development and Validation of the Occupational Therapy Engagement Scale for Patients with Stroke.

Citation: Occupational Therapy International; Mar 2019; p. 1-10

Author(s): Wu, Tzu-Yi; Lien, Bella Ya-Hui; Lequerica, Anthony H.; Lu, Wen-Shian; Hsieh, Ching-Lin

Background/Aim: Almost all interventions in occupational therapy require the active engagement of the patients. However, no scale has been specifically designed for assessing engagement in occupational therapy. The purposes of this study were to develop the occupational therapy engagement scale (OTES) and to examine its unidimensionality, reliability, and predictive validity.

Methods: The OTES was developed through the review of similar scales, eight experts' opinions, cognitive interviews, and pilot testing. The unidimensionality was verified with Rasch model fitting and principal component analysis. The Rasch reliability was also estimated. Pearson's correlation coefficient (r) was used to validate the predictive validity by examining the association between the Rasch scores of the OTES and patients' performance of activities of daily living (ADL).

Results: A total of 253 patients with stroke were rated by 22 therapists using the OTES. The mean age of the patients was 62.3±13.2 years old, and 65.2% of the patients were male. The infit and outfit MNSQ of the 12 items of the OTES ranged from 0.62 to 1.34. The unexplained variance of the first dimension of the principal component analysis was 4.0%. The mean person reliability of the OTES was 0.88. Pearson's r between the OTES and patients' ADL performance was 0.37.

Conclusions: The results of Rasch analysis supported that the items of the OTES were unidimensional. The OTES had sufficient person reliability and predictive validity in patients with stroke.

Title: Incidence and circumstances of falls among community-dwelling ambulatory stroke survivors: A prospective study.

Citation: Geriatrics & Gerontology International; Mar 2019; vol. 19 (no. 3); p. 240-244

Author(s): Goto, Yuto; Otaka, Yohei; Suzuki, Ken; Inoue, Seigo; Kondo, Kunitsugu; Shimizu, Eiji
**Aim:** To elucidate the incidences and circumstances of falls and fall-related injuries, and to explore the physical characteristics of community-dwelling ambulatory stroke survivors who experienced falls.

**Methods:** A total of 144 community-dwelling ambulatory survivors of hemiparetic stroke (mean age 68.0 years [SD 10.4 years]) who were undergoing rehabilitation in an adult daycare center participated in this prospective study. The mean duration from stroke onset was 5.21 years (SD 3.15 years). The occurrence of falls was collected for 1 year with a fall diary. The incidence rates of falls and fall-related injuries, and the detailed circumstances of falls were descriptively analyzed. The characteristics of fallers were explored by comparing background information, motor impairments and results of physical function tests, including the 10-m walk test, Timed Up and Go test and five-times-sit-to-stand test, between fallers and non-fallers.

**Results:** The incidence rates of falls and fall-related fractures were 0.88 per person-year and 2.8 per 100 person-years, respectively. Falls occurred more frequently during daytime and in winter. Falls were caused most often by losing balance while walking indoors, especially on the way to the toilet. After falling, 34.1% of individuals who fell could not stand up by themselves. The time of the five-times-sit-to-stand test was significantly longer in fallers than in non-fallers (P < 0.05).

**Conclusions:** The incidence rate of falls was high among community-dwelling ambulatory survivors of hemiparetic stroke. Appropriate approaches, including mastering the skills to cope with falling, are required, especially for individuals with reduced lower limb muscle strength. Geriatr Gerontol Int 2019; 19: 240–244.

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**Title:** Cost-effectiveness of a high-intensity rapid access outpatient stroke rehabilitation program.

**Citation:** International Journal of Rehabilitation Research; Mar 2019; vol. 42 (no. 1); p. 56-62

**Author(s):** Tam, Alan; Mac, Stephen; Isaranuwatchai, Wanrudee; Bayley, Mark

**Abstract:** A common strategy to improve cost-effectiveness in healthcare is to offer outpatient care instead of in-hospital care. Toronto Rehabilitation Institute developed an outpatient high-intensity fast-track (FT) stroke rehabilitation program aimed at discharging inpatient stroke rehabilitation patients earlier or bypassing inpatient rehabilitation altogether. This cost-effectiveness analysis compares FT rehabilitation within 1 week of discharge with no FT in a single healthcare payer system. Patient costs and outcomes over a 12-week time horizon were included. Using individual-level FT data from April 2015 to March 2016, incremental cost-effectiveness ratios (ICERs) (with 95% confidence interval) were estimated using regression. Subgroup analysis was completed for patients entering FT directly from inpatient rehabilitation and acute stroke care. Uncertainty was assessed using a cost-effectiveness acceptability curve with a range of willingness-to-pay values ($0–1000 per inpatient day saved). ICER (95% confidence interval) estimate for patients entering FT from inpatient rehabilitation was $404 ($270–620) per inpatient day saved. ICER estimate for direct from acute care admissions was $37 ($20–55) per day saved. At willingness-to-pay of $698 (cost of one alternate level of care day in acute care awaiting rehabilitation), the probability of FT being cost-effective was 99.2 and 100% for patients from inpatient rehabilitation and acute stroke care, respectively. From a single healthcare payer perspective, FT is a cost-effective method of providing appropriate rehabilitation intensity for stroke patients early on, and likely to provide savings to the healthcare system upstream through fewer days awaiting rehabilitation admission.
Title: Stroke survivor activity during subacute inpatient rehabilitation: how active are patients?

Citation: International Journal of Rehabilitation Research; Mar 2019; vol. 42 (no. 1); p. 82-84
Author(s): Selenitsch, Natasha A.; Gill, Stephen D.

Abstract: Being active following stroke is recommended, but inactivity is common. The current study aimed to observe stroke survivors physical, social and cognitive activities in a large regional inpatient rehabilitation centre. Patients were observed over 8 separate days at 10-min intervals between 8 a.m. and 8 p.m. Patients were engaged in any form of activity 59.9% of the time and in therapy 4.6% of the time. Patients were inactive and alone 34.3% of the time. Activity levels were weakly associated with patients’ functional abilities (Spearman’s ρ ≤0.39). Independent walkers spent a higher proportion of the day physically active (37.5%) compared with nonindependent walkers (30.6%) (P =0.019). Days since stroke was not correlated with patient activity levels. Initiatives to increase activity during inpatient rehabilitation appear to be warranted.

Title: Hemiplegic shoulder pain in people with stroke: present and the future.

Citation: Pain Management; Mar 2019; vol. 9 (no. 2); p. 107-110
Author(s): Kumar, Praveen

Title: Searching for the "Active Ingredients" in Physical Rehabilitation Programs Across Europe, Necessary to Improve Mobility in People With Multiple Sclerosis: A Multicenter Study.

Citation: Neurorehabilitation and neural repair; Mar 2019 ; p. 1549568319834893
Author(s): Kalron, Alon; Feys, Peter; Dalgas, Ulrik; Smedal, Tori; Freeman, Jennifer; Romberg, Anders; Conyers, Helen; Elorriaga, Ira; Gebara, Benoit; Merilainen, Johanna; Heric-Mansrud, Adnan; Jensen, Ellen; Jones, Kari; Knuts, Kathy; Maertens de Noordhout, Benoit; Martic, Andrej; Normann, Britt; O Eijnde, Bert; Rasova, Kamila; Santoyo Medina, Carme; Baert, Ilse

Background: Physical rehabilitation programs can lead to improvements in mobility in people with multiple sclerosis (PwMS).

Objective: To identify which rehabilitation program elements are employed in real life and how they might affect mobility improvement in PwMS.

Methods: Participants were divided into improved and nonimproved mobility groups based on changes observed in the Multiple Sclerosis Walking Scale-12 following multimodal physical rehabilitation programs. Analyses were performed at group and subgroup (mild and moderate-severe disability) levels. Rehabilitation program elements included setting, number of weeks, number of sessions, total duration, therapy format (individual, group, autonomous), therapy goals, and therapeutic approaches.

Results: The study comprised 279 PwMS from 17 European centers. PwMS in the improved group received more sessions of individual therapy in both subgroups. In the mildly disabled group, 60.9% of the improved received resistance training, whereas, 68.5% of the nonimproved received self-stretching. In the moderately-severely disabled group,
31.4% of the improved, received aerobic training, while 50.4% of the nonimproved received passive mobilization/stretching.

**Conclusions:** We believe that our findings are an important step in opening the black-box of physical rehabilitation, imparting guidance, and assisting future research in defining characteristics of effective physical rehabilitation.

**Title:** Adapted dance used in subacute rehabilitation post-stroke: impacts perceived by patients, relatives and rehabilitation therapists.

**Citation:** Disability and rehabilitation; Mar 2019; p. 1-10

**Author(s):** Beaudry, Lucie; Fortin, Sylvie; Rochette, Annie

**Purpose:** To examine the perceived impacts of an adapted-dance group intervention when added to intensive functional rehabilitation post-stroke.

**Method:** In this exploratory qualitative case study, semi-structured interviews were analyzed using a deliberative inductive logic and referring to the International Classification of Functioning, Disability and Health. Participants were patients in rehabilitation post-stroke (≤25 days) (n = 6), relatives (n = 4) and rehabilitation therapists (n = 12). Selection was on a voluntary basis. The intervention added to the patients' rehabilitation program consisted of 55-minute bi-weekly sessions for 10 weeks.

**Results:** Three categories of perceived positive impacts emerged from the data: (1) mobility, (2) mental functions and personal factors (emotional functions, motivation and self-efficacy) and (3) interpersonal interactions and social life. A fourth category of perceived impacts involving exercise tolerance was both positive, in terms of general physical endurance, and negative, in terms of a feeling of increased fatigue.

**Conclusion:** Such an adapted-dance intervention holds promise in subacute rehabilitation post-stroke. Its main strength lies in its perceived positive impact on mental functions, personal factors, and interpersonal and social interactions. Implications for rehabilitation An adapted-dance group intervention could offer an innovative means of contributing to intensive functional rehabilitation post-stroke by potentially generating positive perceived impacts on emotional functions, motivation and self-efficacy, as well as on interpersonal and social interactions. Adapted dance could be added to inpatients' rehabilitation with only minor impacts on fatigue.

**Title:** Long-term physical activity in people with multiple sclerosis: exploring expert views on facilitators and barriers.

**Citation:** Disability and rehabilitation; Mar 2019; p. 1-13

**Author(s):** Riemann-Lorenz, Karin; Wienert, Julian; Streber, René; Motl, Robert W; Coote, Susan; Heesen, Christoph

**Purpose:** To explore the views of experts on facilitators and barriers of long-term physical activity among people with multiple sclerosis living in different European countries.

**Methods:** We conducted semi-structured telephone or face to face interviews with twelve multiple sclerosis and physical activity experts (scientists, practitioners, patient representatives) from five European countries. Interviews were audio-recorded, transcribed verbatim and analyzed using thematic analysis.
**Results**: We identified 20 themes and categorized them into environmental and personal factors. The most frequently mentioned and intensively discussed themes were environmental factors. The themes were structured according to possible intervention level: organizational, interpersonal and intrapersonal level themes. Themes at the organizational level comprised availability, access and quality of exercise/physical activity options; health system characteristics like services and organization, health professionals and information provision. The interpersonal level comprised social support and peer support. Disease related factors were the most frequently mentioned intrapersonal level theme. In our study, more codes were obtained for environmental factors than for personal factors.

**Conclusions**: The results suggested that environmental factors may need to be addressed in particular to increase long-term physical activity adherence. This study will inform the design of a survey questionnaire assessing possible barriers and facilitators among people with multiple sclerosis.

**Implications for Rehabilitation**: Long-term physical activity among people with multiple sclerosis is subject to a number of modifiable determinants: personal and environmental factors. Multiple sclerosis exercise experts emphasized the importance of environmental factors on the organizational and interpersonal level. Future physical activity interventions should be guided by a social-ecological perspective. Addressing environmental and personal factors simultaneously to reach optimal long-term outcomes should be considered in future interventions.

**Title**: Do patients with severe poststroke communication difficulties have a higher incidence of falls during inpatient rehabilitation? A retrospective cohort study.

**Citation**: Topics in stroke rehabilitation; Mar 2019 ; p. 1-6

**Author(s)**: Sullivan, Rebecca; Harding, Katherine

**Background**: Falls in hospital are common and serious complications of stroke. Associations have been found between communication disorders and increased rates of falls, but have received relatively little consideration as a risk factor for falls among stroke survivors.

**Objectives**: To investigate whether there is an association between severe communication impairment and falls among patients receiving inpatient rehabilitation after stroke.

**Methods**: A retrospective audit of 149 records of consecutive patients admitted to an inpatient rehabilitation facility after stroke over a two-year period was conducted. The relationship between falls and severe communication impairment was explored using (1) direct comparison of falls in patients with and without functional communication for the inpatient ward environment and (2) multivariate logistic regression to examine factors that may predict falls, including presence or absence of functional communication. In each analysis, falls were examined both as a binary outcome (fall or no fall), and the rate of falls per day.

**Results**: The 32 patients in the sample (21.7%) who were unable to communicate their basic needs were almost twice as likely to fall in hospital as those with functional communication (RR 1.94, 95% CI 1.15 to 3.24). Several commonly assessed factors were not significant predictors of falls (including falls history, polypharmacy, and cognitive impairment) in this population. Lack of functional communication was the strongest independent predictor of falls rate.

**Conclusions**: Findings suggest that severe communication disorders may be under recognized as a falls risk factor after stroke.
Title: Home-based technologies for stroke rehabilitation: A systematic review.

Citation: International journal of medical informatics; Mar 2019; vol. 123 ; p. 11-22

Author(s): Chen, Yu; Abel, Kingsley Travis; Janecek, John T; Chen, Yunan; Zheng, Kai; Cramer, Steven C

Background: Many forms of home-based technology targeting stroke rehabilitation have been devised, and a number of human factors are important to their application, suggesting the need to examine this information in a comprehensive review.

Objective: The systematic review aims to synthesize the current knowledge of technologies and human factors in home-based technologies for stroke rehabilitation.

Methods: We conducted a systematic literature search in three electronic databases (IEEE, ACM, PubMed), including secondary citations from the literature search. We included articles that used technological means to help stroke patients conduct rehabilitation at home, reported empirical studies that evaluated the technologies with patients in the home environment, and were published in English. Three authors independently conducted the content analysis of searched articles using a list of interactively defined factors.

Results: The search yielded 832 potentially relevant articles, leading to 31 articles that were included for in-depth analysis. The types of technology of reviewed articles included games, telerehabilitation, robotic devices, virtual reality devices, sensors, and tablets. We present the merits and limitations of each type of technology. We then derive two main human factors in designing home-based technologies for stroke rehabilitation: designing for engagement (including external and internal motivation) and designing for the home environment (including understanding the social context, practical challenges, and technical proficiency).

Conclusion: This systematic review presents an overview of key technologies and human factors for designing home-based technologies for stroke rehabilitation.

Sources Used:

The following databases are used in the creation of this bulletin: Amed, Cinahl & Medline.

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