International Bobath Instructors Training Association
An international association for adult neurological rehabilitation

I B I T A

Literature Abstracts 2008 compiled by the Education Committee of IBITA

(Lynn Fearnhead)

Subject: ***Mobility*** ***Upper limb function*** ***Trunk*** ***General***

MOBILITY

1. Neurorehabil Neural Repair. 2008 Sep-Oct;22(5):468-76.
   Rehabilitation of balance after stroke with multi sensorial training: a single-blind randomized controlled study.
   Yelnik AP, Le Breton F, Colle FM, Bonan IV, Hugeron C, Egal V, Lebomin E, Regnaux JP, Pérennou D, Vicaut E.

OBJECTIVE: To compare 2 rehabilitation strategies to improve balance after stroke: (1) a multi sensorial approach based on higher intensity of balance tasks and exercise during visual deprivation and (2) a conventional neurodevelopmental theory-based treatment (NDT) that used a general approach for sensorimotor rehabilitation.
METHODS: This prospective, multicenter, randomized, parallel-group study measured outcomes with blinded assessors. Sixty-eight patients able to walk without human assistance were entered from 3 to 15 months (mean, 7 months) after a first hemispheric stroke. They received 20 sessions in 4 weeks of NDT or multi sensorial rehabilitation. On day 0, day 30, and day 90, assessment included the Berg Balance Scale (BBS), posturography, gait (velocity, double stance phase, climbing 10 steps, amount of walking per day), the Functional Independence Measure, and the Nottingham Health Profile.
RESULTS: All subjects improved significantly in balance and walking parameters. Regarding the main dependent variable (BBS on day 30), no difference between groups was found. Analysis of secondary outcomes suggested small differences in favor of the experimental group, but the differences are not likely to be clinically relevant.
CONCLUSION: No evidence was found for the superiority of a multi sensorial rehabilitation program in ambulatory patients with impairments beyond the time of inpatient therapy. Additional studies are recommended.

Comment:
Well-controlled trial. Evidence of chronic hemiplegic change in functional parameters. Appendix B describes the NDT programme and Appendix C the multi sensorial programme.

2. Neurorehabil Neural Repair. 2008 Nov-Dec;22(6):649-60.
   Rehabilitation of gait speed after stroke: a critical review of intervention approaches.
   Dickstein R.

PURPOSE: Walking speed is a cardinal indicator of post stroke gait performance; however, no consensus exists regarding the optimal treatment method(s) for its enhancement. The most widely accepted criterion for establishing the contribution of treatment to walking speed is the gain in speed. The actual speed, however, at the end of the intervention (final speed) may be more important for functional community ambulation. This review examines the contribution of the prevailing methods for gait rehabilitation to final walking speed.

METHOD: Walking speed information was derived from studies included in meta-analyses, systematic reviews, and clinical practice guidelines. Recent references, not included in the mentioned sources, were incorporated in cases when gait speed was an outcome variable. Final speed was assessed by the reported speed values and by inferring the capacity for functional community walking at the end of the intervention period.
RESULTS: Similar outcomes for final walking speed were found for the different prevailing treatment methods. Treatment gains were likewise comparable and generally insufficient for upgrading patients' functional community walking capacity.
CONCLUSIONS: Different treatment methods exist for post stroke gait rehabilitation. Their availability, mode of application, and costs vary, yet outcomes are largely similar. Therefore, choosing an appropriate method may be guided by a pragmatic approach. Simple "low technology" and conventional exercise to date is at least as efficacious as more complex strategies such as treadmill and robotic-based interventions.

Comment:
This comprehensive review indicates that the various exercise therapy regimens reviewed led to speed gains that ranged between 0.04 and 0.20 m/sec. These were by and large statistically significant in the cited studies. However, in the majority of studies, functional walking capacity was "restricted" before treatment and remained restricted at its end. One can see the challenge of achieving functional change. There is no doubt that evidence is accumulating regarding the underlying requirements for community walking:

1. Perry et al (1995) gait speed classification <.4m/s household ambulation: .4m/s -.8m/s limited community ambulation and > .8m/s full community ambulation and
2. Schmidt 'et al (2007) research "Improvements in speed-based gait classifications are meaningful" and
3. Patterson et al (2007)"Determinants of walking function after stroke: differences by deficit severity" which concluded that " short distance walking after stroke is related to balance, cardiovascular fitness and paretic leg strength whereas long distance walking ability differs by gait deficit severity with balance playing a greater role in those who walk more slowly and cardiovascular fitness in those who walk more quickly".
4. Milot et al (2008, 2007, 2006) and Nadeau et al (1999) showed that weakness of the paretic plantar flexor muscles, which entail a high level of effort, is the primary cause limiting gait speed in individuals with chronic hemiparesis. They also showed that for a similar cadence, the levels of effort of hemiparetic individuals were greater than those of the able-bodied. There is some evidence (Milot 2008) that as they become stronger, hemiparetic participants favoured a reduction of their levels of effort during walking instead of substantially increasing their gait speed.

Dickstein concluded that "considering the high prevalence of individuals with hemiparesis who live in the community, it may be beneficial to redirect research efforts toward the enhancement of long-term maintenance of gait performance in the community"

3. Clinical Rehabilitation 2008; 22: 556-563
   Mobility beyond the clinic: the effect of environment on gait and its measurement in community-ambulant stroke survivors.
   Donovan K, Lord SE, McNaughton HK, Weatherall M

OBJECTIVE: To explore the impact of a complex community environment on gait parameters (speed, step length and cadence) for community-dwelling participants with a previous stroke, and compare outcome measures commonly used in a clinical environment.
DESIGN: Repeated measurement of participants in different environments.
SETTING: One clinic and two community environments (suburban street and shopping mall).

SUBJECTS: Thirty community-dwelling stroke participants with chronic stroke who were classified according to gait speed (20-50 m/min [.33-.83 m/s] on 10-metre timed walk) as marginal community walkers.
OUTCOME MEASURES: During a six-minute walk test (6MWT) a step activity monitor (SAM) and odometer were used to calculate gait speed, step length and cadence. The 10-metre timed walk (10MTW) was measured in a clinic environment.
ANALYSIS: A mixed linear model examined differences in gait measurements in the different environments. Bland-Altman analysis illustrated agreement between gait speed measures (6MWT and 10MTW).
RESULTS: A statistically significant, but not a clinically significant difference in gait speed between some environments was found. Gait speed was slowest in the mall and fastest in the street with a difference of only 2.1 m/min between these environments (95% confidence interval (CI) _3.8 to _0.5, P50.01). Comparison of clinic 10MTW and street 6MWT showed wide limits of agreement (_18.5 to 16.9 m/min) which improved for clinic 6MWT and street 6MWT comparisons (_5.7 to 8.9 m/min).
CONCLUSION: Despite residual gait deficit, the gait parameters of these chronic stroke survivors did not deteriorate markedly under challenging conditions. The 6MWT is recommended as a clinical measure for community ambulation.

4. J Am Geriatr Soc. 2008 Jun;56(6):976-85.
Comparison of effect of aerobic cycle training and progressive resistance training on walking ability after stroke: a randomized sham exercise-controlled study.
Lee MJ, Kilbreath SL, Singh MF, Zeman B, Lord SR, Raymond J, Davis GM.

OBJECTIVES: To determine whether changes in strength or cardiorespiratory fitness after exercise training improve walking ability in individuals who have had a stroke.
DESIGN: A sham exercise-controlled, randomized two-by-two factorial design, in which the two factors investigated were cycle training (AEROBIC) and resistance training (STRENGTH).
SETTING: University exercise laboratory.
PARTICIPANTS: Fifty-two individuals with a history of stroke (aged 63+/-9; time since stroke, 57+/-54 months).
INTERVENTION: Participants undertook 30 exercise sessions over 10 to 12 weeks. Depending on group allocation, individuals underwent aerobic cycling plus sham progressive resistance training (PRT) (n=13), sham cycling plus PRT (n=13), aerobic cycling plus PRT (n=14), or sham cycling plus sham PRT (n=12). MEASUREMENTS: Primary outcomes were 6-minute walk distance, habitual and fast gait velocities, and stair climbing power. Secondary outcomes included measures of cardiorespiratory fitness; muscle strength, power, and endurance; and psychosocial attributes.
RESULTS: Neither AEROBIC nor STRENGTH improved walking distance or gait velocity significantly more than sham exercise, although STRENGTH significantly improved participants' stair climbing power by 17% (P=.009), as well as their muscle strength, power, and endurance; cycling peak power output; and self-efficacy. Conversely, AEROBIC improved indicators of cardiorespiratory fitness only. Cycling plus PRT produced larger effects than either single modality for mobility and impairment outcomes.
CONCLUSION: Single-modality exercises targeted at existing impairments do not optimally address the functional deficits of walking but do ameliorate the underlying impairments. The underlying cardiovascular and musculoskeletal impairments are significantly modifiable years after stroke with targeted robust exercise.

Comment:
This well designed clinical trial reinforces the concept that specificity of functional rehabilitation is a key requirement. The study supports the conclusions of van de Port IG, Wood-Dauphinee S, Lindeman E, Kwakkel G. Effects of exercise training programs on walking competency after stroke: a systematic review. Am J Phys Med Rehabil. 2007 Nov;86(11):935-51."Meta-analysis showed a significant medium effect of gait-oriented training interventions on both gait speed and walking

distance, whereas a small, non significant effect size was found on balance. Cardiorespiratory fitness programs had a non significant medium effect size on gait speed. No significant effects were found for programs targeting lower-limb strengthening."

UPPER LIMB FUNCTION

5: Arch Phys Med Rehabil. 2008 Sep;89(9):1693-700.
Estimating minimal clinically important differences of upper-extremity measures early after stroke.
Lang CE, Edwards DF, Birkenmeier RL, Dromerick AW.

OBJECTIVE: To estimate minimal clinically important difference (MCID) values of several upper-extremity measures early after stroke.
DESIGN: Data in this report were collected during the Very Early Constraint-induced Therapy for Recovery of Stroke trial, an acute, single-blind randomized controlled trial of constraint-induced movement therapy. Subjects were tested at the prerandomization baseline assessment (average days poststroke, 9.5d) and the first posttreatment assessment (average days poststroke, 25.9d). At each time point, the affected upper extremity was evaluated with a battery of 6 tests. At the second assessment, subjects were also asked to provide a global rating of perceived changes in their affected upper extremity. Anchor-based MCID values were calculated separately for the affected dominant upper extremities and the affected nondominant upper extremities for each of the 6 tests.
SETTING: Inpatient rehabilitation hospital.
PARTICIPANTS: Fifty-two people with hemiparesis poststroke.
INTERVENTIONS: Not applicable.
MAIN OUTCOME MEASURES: Estimated MCID values for grip strength, composite upper-extremity strength, Action Research Arm Test (ARAT), Wolf Motor Function Test (WMFT), Motor Activity Log (MAL), and duration of upper-extremity use as measured with accelerometry.
RESULTS: MCID values for grip strength were 5.0 and 6.2 kg for the affected dominant and nondominant sides, respectively. MCID values for the ARAT were 12 and 17 points, for the WMFT function score were 1.0 and 1.2 points, and for the MAL quality of movement score were 1.0 and 1.1 points for the 2 sides, respectively. MCID values were indeterminate for the dominant (composite strength), the nondominant (WMFT time score), and both affected sides (duration of use) for the other measures.
CONCLUSIONS: Our data provide some of the first estimates of MCID values for upper-extremity standardized measures early after stroke. Future studies with larger sample sizes are needed to refine these estimates and to determine whether MCID values are modified by time poststroke.

Comment:
This is useful, both clinically and for research purposes.

6: Neurorehabil Neural Repair. 2008 Sep-Oct;22(5):494-504.
Functional outcomes can vary by dose: learning-based sensorimotor training for patients stable poststroke.
Byl NN, Pitsch EA, Abrams GM.

OBJECTIVE: This study aimed to determine whether the dose of learning-based sensorimotor training (LBSMT) significantly enhances gains in upper limb function in patients stable post stroke.
METHODS: A total of 45 subjects stable poststroke participated in a 6-8-week LBSMT program of varied dosage: group I (n = 18; 1x/week, 1.5 hours/visit); group II (n = 19, 3x/week, 0.75 hours/visit); and group III (n = 8; 4x/week, 3 hours/visit). All subjects reinforced their training with home-based practice. The primary outcome measures were functional independence, strength, sensory discrimination, and fine motor skills.

RESULTS: Across all individual subjects, significant gains were measured on the 4 dependent variables (improvement ranging from 9.0% to 38.9%; P < .001). Group III made greater gains than groups I and II on functional independence, sensory discrimination, and fine motor skills, with a significant linear trend by dose for functional independence (P < .001). Only 2-3 subjects in groups I and II, respectively, would need to be treated at the high dosage of group III for one more subject to achieve >50% gain in functional independence.
CONCLUSIONS: Learning-based sensorimotor training based on the principles of neuroplasticity was associated with improved function in patients stable poststroke. The gains were dose specific with the greatest change measured in subjects participating in the high-intensity treatment group.

Comment:
In this study, as in the CIMT studies, there were fairly stringent inclusion criteria.- "the subjects had to be able to walk independently at least 100 ft with or without an assistive device, partially open and close the involved hand, elevate the affected arm at least 45? against gravity, and flex the elbow 90? against gravity".
However the emphasis on normal sensory, sensorimotor, graded and quality of fine motor movements distinguished LBSMT from the task-oriented, forced use paradigm of CIMT. The focus was on normal selective fine motor movements rather than gross motor movements. "The quality of movement was emphasized even if only part of the task could be completed. Forced, gross synergistic movements were discouraged. Many fine motor activities were performed with the eyes closed."
This study is valuable because of it's graded sensorimotor activities. Not enough attention has been paid to the development of a progressive programme of sensory reeducation.

7. Clin Rehabil. 2008 May;22(5):436-47.
Short- and long-term outcome of constraint-induced movement therapy after stroke:a randomized controlled feasibility trial.
Dahl AE, Askim T, Stock R, Langørgen E, Lydersen S, Indredavik B.

OBJECTIVE: Constraint-induced movement therapy (CIMT) is a method to improve motor function in the upper extremity following stroke. The aim of this trial was to determine the effect and feasibility of CIMT compared with traditional rehabilitation in short and long term.
DESIGN: A randomized controlled trial.
SETTING: An inpatient rehabilitation clinic.
SUBJECTS: Thirty patients with unilateral hand impairment after stroke.
INTERVENTION: Six hours arm therapy for 10 consecutive weekdays, while using a restraining mitten on the unaffected hand.
MAIN MEASURES: The patients were assessed at baseline, post-treatment and at six-month follow-up using the Wolf Motor Function Test as primary outcome measure and the Motor Activity Log, Functional Independence Measure and Stroke Impact Scale as secondary measurements.
RESULTS: The CIMT group (n=18) showed a statistically significant shorter performance time (4.76 seconds versus 7.61 seconds, P= 0.030) and greater functional ability (3.85 versus 3.47, P= 0.037) than the control group (n=12) on the Wolf Motor Function Test at post-treatment assessment. There was a non-significant trend toward greater amount of use (2.47 versus 1.97, P= 0.097) and better quality of movement (2.45 versus 2.12, P=0.105) in the CIMT group according to the Motor Activity Log. No such differences were seen on Functional Independence Measure at the same time. At six-month follow-up the CIMT group maintained their improvement, but as the control group improved even more, there were no significant differences between the groups on any measurements.
CONCLUSIONS: CIMT seems to be an effective and feasible method to improve motor function in the short term, but no long-term effect was found.

Comment:
The results of this well designed study agree with other studies that regarding short term improvement using CIMT. With CIMT, patients are selected only if they have some minimal amount of voluntary control of the paretic hand, resulting in a low inclusion rate eg the EXCITE trial had an inclusion rate of only (6%) The results further indicate that both intensity and task specificity are the main drivers to overcome learned non-use. However their results contrast with the EXCITE trial regarding retention of the improvement. (Lancet Neurol. 2008 Jan;7(1):33-40.Retention of upper limb function in stroke survivors who have received constraint-induced movement therapy: the EXCITE randomised trial. Wolf SL, Winstein CJ, Miller JP, Thompson PA, Taub E, Uswatte G, Morris D, Blanton S, Nichols-Larsen D, Clark PC.)

8. Arch Phys Med Rehabil. 2008 Aug;89(8):1589-93.
Hemiplegic shoulder pain syndrome: frequency and characteristics during inpatient stroke rehabilitation.
Dromerick AW, Edwards DF, Kumar A.

OBJECTIVE: To clarify the pathophysiology of hemiplegic shoulder pain by determining the frequency of abnormal shoulder physical diagnosis signs and the accuracy of self-report. DESIGN: Prospective inception cohort. SETTING: Academic inpatient stroke rehabilitation service.
PARTICIPANTS: Consecutive admissions (N=46) to stroke rehabilitation service.
INTERVENTIONS: Not applicable.
MAIN OUTCOME MEASURES: The Neer test, Speed test, acromioclavicular shear test, Rowe test, and palpation for point tenderness.
RESULTS: Participants were enrolled at a mean time to evaluation of 18.9+/-14.1 days after stroke. Weakness of shoulder flexion, extension, or abduction was present in 94% of subjects, and neglect was found in 29%. Pain was present by self-report in 37%. The most common finding, which was found in nearly all persons with abnormalities in the study physical examination maneuvers, was bicipital tendon tenderness (54%), followed by supraspinatus tenderness (48%). The Neer sign was positive in 30%; 28% had the triad of bicipital tenderness, supraspinatus tenderness, and the Neer sign. Self-reported pain was a poor predictor of abnormalities elicited on the examination maneuvers, even in those without neglect.
CONCLUSIONS: Our data implicate 2 vertical stabilizers of the humerus in early onset hemiplegic shoulder pain, the long head of the biceps and the supraspinatus. Our results also suggest that simple questioning of stroke rehabilitation inpatients about shoulder pain may not be adequate for clinical care or research purposes, even in the absence of neglect.

Comment:
This study contributes to a more specific evaluation of this common impairment.

TRUNK

9. Neurorehabil Neural Repair. 2008 Mar-Apr;22(2):173-9.
Time course of trunk, arm, leg, and functional recovery after ischemic stroke.
Verheyden G, Nieuwboer A, De Wit L, Thijs V, Dobbelaere J, Devos H, Severijns D, Vanbeveren S, De Weerdt W.

BACKGROUND: Patterns of recovery provide useful information concerning the potential of physical recovery over time and therefore the setting of realistic goals for rehabilitation programs.
OBJECTIVE: To compare the time course of trunk recovery with the patterns of recovery of arm, leg, and functional ability.
METHODS: Consecutive stroke patients were recruited in 2 acute neurology wards. Participants were evaluated at 1 week, 1 month, and 3 and 6 months after stroke. Patients were assessed with the Trunk Impairment Scale, Fugl-Meyer arm and leg test, and Barthel Index.

RESULTS: Thirty-two patients were included in the study. There were no dropouts. Repeated measures analysis of the recovery patterns of motor and functional performance revealed the most striking improvement for all measures from 1 week to 1 month (P value between .0021 and <.0001) and a significant improvement from 1 month to 3 months after stroke (P value ranges from .0008 to <.0001). No significant improvement was found between 3 and 6 months after stroke for any of the measures. Statistical analysis revealed no significant difference between time course of trunk, arm, leg, and functional recovery (P = .2565). No significant differences in level of motor and functional recovery were found at the different time points.
CONCLUSIONS: Separate analyses of motor and functional recovery patterns after stroke confirm the importance of the first month for recovery. Contrary to common belief, the time course of recovery of the trunk is similar to the recovery of arm, leg, and functional ability.

10. J Neurol Phys Ther. 2008 Mar;32(1):14-20.
Altered trunk position sense and its relation to balance functions in people post-stroke.
Ryerson S, Byl NN, Brown DA, Wong RA, Hidler JM.

OBJECTIVE: To determine whether trunk position sense is impaired in people with poststroke hemiparesis.
BACKGROUND: Good trunk stability is essential for balance and extremity use during daily functional activities and higher level tasks. Dynamic stability of the trunk requires adequate flexibility, muscle strength, neural control, and proprioception. While deficits of trunk muscle strength have been identified in people post-stroke, it is not clear whether they have adequate postural control and proprioception to ensure a stable foundation of balance to enable skilled extremity use. Trunk position sense is an essential element of trunk postural control. Even a small impairment in trunk position sense may contribute to trunk instability. However, a specific impairment of trunk position sense has not been reported in people post-stroke.
SUBJECTS: Twenty subjects with chronic stroke and 21 non-neurologically impaired subjects participated in the study.
MAIN OUTCOME MEASURES: Trunk repositioning error during sitting forward flexion movements was assessed using an electromagnetic movement analysis system, Flock of Birds. Subjects post-stroke were also evaluated with clinical measures of balance (Berg Balance Scale), postural control (Postural Assessment Scale for Stroke), and extremity motor impairment severity (Fugl-Meyer Assessment-Motor Score).
RESULTS: There were significant differences in absolute trunk repositioning error between stroke and control groups in both the sagittal (P = 0.0001) and transverse (P = 0.0012) planes. Mean sagittal plane error: post-stroke: 6.9 +/- 3.1 degrees, control: 3.2 +/- 1.8 degrees; mean transverse plane error: post-stroke 2.1 +/- 1.3 degrees, control: 1.0 +/- 0.6 degrees. There was a significant negative correlation between sagittal plane absolute repositioning error and the Berg Balance Scale score (r = -0.49, P = 0.03), transverse plane absolute repositioning error and Berg Balance Scale score (r =-0.48, P = 0.03), and transverse plane repositioning error and the Postural Assessment Scale for Stroke score (r = -0.52, P = 0.02)
CONCLUSIONS: Subjects with poststroke hemiparesis exhibit greater trunk repositioning error than age-matched controls. Trunk position sense retraining, emphasizing sagittal and transverse movements, should be further investigated as a potential poststroke intervention strategy to improve trunk balance and control.

GENERAL

11. Neurorehabil Neural Repair. 2008 Mar-Apr;22(2):122-35.
Conceptualizing functional cognition in stroke.
Donovan NJ, Kendall DL, Heaton SC, Kwon S, Velozo CA, Duncan PW.

BACKGROUND: Up to 65% of individuals demonstrate poststroke cognitive

impairments, which may increase hospital stay and caregiver burden. Randomized stroke clinical trials have emphasized physical recovery over cognition. Neuropsychological assessments have had limited utility in randomized clinical trials. These issues accentuate the need for a measure of functional cognition (the ability to accomplish everyday activities that rely on cognitive abilities, such as locating keys, conveying information, or planning activities).
OBJECTIVE: The aim of the study was to present the process used to establish domains of functional cognition for development of computer adaptive measure of functional cognition for stroke.
METHODS: Functional cognitive domains involved in identifying relevant neuropsychological constructs from the literature were conceptualized and finalized after advisory panel feedback from experts in neurology, neuropsychology, aphasiology, clinical trials, and epidemiology.
RESULTS: The following 17 domains were proposed: receptive aphasia, expressive aphasia, agraphia, alexia, calculation, visuospatial, visuoperceptual, visuoconstruction, attention, language usage, executive functions, orientation, processing speed, memory, working memory, mood, awareness and abstract reasoning. The advisory panel recommended retaining the first 12 domains. Recommended changes included: to address only encoding and retrieval of recent information in the memory domain; to add domains for limb apraxia and poststroke depression; and to keep orientation as a separate domain or reclassify it under memory or attention. The final 10 domains included: language, reading and writing, numeric/calculation, limb praxis, visuospatial function, social use of language, emotional function, attention, executive function, and memory.
CONCLUSION: Conceptualizing domains of functional cognition is the first step in developing a computer adaptive measure of functional cognition for stroke. Additional steps include developing, refining, and field-testing items, psychometric analysis, and computer adaptive test programming.

Comment:
Even at this early of development this table will prove useful to the clinician to distinguish the different cognitive impairments.

Table 3. Final Domains of Functional Cognition and Their Operational Definitions.

Final Domains of Function Cognition	Operational Definitions for Domain
1. Language	Ability to understand and/or produce spoken language.
2. Reading and Writing	Ability to read printed material and write words and numbers.
3. Numeric/Calculation	Ability to process numerical information and/or perform mathematical calculations.
4. Limb Praxis	Ability to perform skilled purposeful limb movements in the presence of motor function.
5. Visuospatial Function	Ability to perceive and process visual information in one's environment.
6. Social Use of Language	Ability to use language to interact with others, including use of appropriate content, expression or comprehension of pitch, loudness or rate that conveys the speaker's emotional intent (prosody), management of a conversational topics (cohesion), and interplay between speakers (turn-taking).
7. Emotional Function	Awareness of emotional state of oneself and others and the ability to manage those emotions in terms of both personal emotional management and the management of emotions in interpersonal interactions. Also encompasses self-awareness of deficits and abilities (anosognosia) and the presence of emotional dysfunction (ie, depression).
8. Attention	A variety of functions that include: selectivity, focusing, sustaining concentration or vigilance, switching, and modulating the intensity of attention.

9.	Executive Function	The group of cognitive processes responsible for guiding, directing, and managing cognitive, emotional, and behavioral functions, during novel tasks such as organizing thoughts and activities, prioritizing tasks, managing time efficiently, and decision making.
10.	Memory	The capacity to retain a variety of information, for varying durations, and use it for adaptive purposes

12. Neurorehabil Neural Repair 2008; 22; 458
Motor Imagery to Enhance Recovery After Subcortical Stroke: Who Might Benefit, Daily Dose, and Potential Effects.
Simmons L, Sharma N, Baron J-C, Pomeroy VM.

BACKGROUND: Motor imagery may enhance motor recovery after stroke.
OBJECTIVES: To estimate the proportion of patients able to perform motor imagery, the feasibility of delivery of motor imagery training (MIT), and the effects of MIT on motor recovery in an exploratory study.
METHODS: An immediate pretreatment and post-treatment single-group design was used to study 10 patients after subcortical stroke with neuromuscular weakness in the upper limb. MIT that included upper limb activities reflecting everyday tasks was provided for 10 consecutive working days. Measures included assessment of chaotic motor imagery, patient report of tolerability of MIT, Motricity Index (MI), Nine Hole Peg Test (9HPT), and quality of movement (MAL-QOM). MIT dose was changed in response to patient feedback. Graphed motor function scores were inspected visually for clinically important changes.
RESULTS: Four of the 10 patients were unable to perform motor imagery. Patient opinion was positive about the content and shaped daily dose of MIT given in two 20-minute periods separated by a 10-minute rest. Clinically important changes in motor scores were found. Four patients increased MI score (range 8-16), 3 patients increased 9HPT score (range 0.02- 0.04 pegs/second), and 4 patients increased MAL-QOM score (range 0.63-1.29).
CONCLUSIONS: MIT was received positively by patients, but 40% were unable to perform imagery and interindividual variations were found on motor function.

Comment:
Though there were only 10 participants in the study it is of great clinical interest because the use of motor imagery is so well described ie "we see into the black box" including an appendix of the Motor Imagery Assessment

PARTICIPATION

13. J Rehabil Res Dev. 2008;45(2):323-8.
Adaptive physical activity improves mobility function and quality of life in chronic hemiparesis.
Macko RF, Benvenuti F, Stanhope S, Macellari V, Taviani A, Nesi B, Weinrich M, Stuart M.

This study investigated the effects of an adaptive physical activity (APA) program on mobility function and quality of life (QOL) in chronic stroke patients. Twenty subjects with chronic hemiparesis completed a 2-month, combined group, class-home exercise regimen that emphasized mobility training. APA improved Berg Balance Scale scores (35 +/- 2 vs 45 +/- 2, $p = 0.001$), 6-minute walk distances (114 +/- 15 vs 142 +/- 7 m, $p < 0.001$), and Short Physical Performance Battery scores (3.2 +/- 0.4 vs 5.2 +/- 0.6, $p < 0.001$). Barthel Index scores increased (75 +/- 4 vs 84 +/- 4, $p < 0.001$), but Lawton scores were unchanged. Geriatric Depression Scale ($p < 0.01$) and Stroke Impact Scale (SIS), Mobility, Participation, and Recovery improved with APA ($p < 0.03$). APA has the potential to improve gait, balance, and basic but not instrumental activities of daily living profiles in individuals with chronic stroke. Improved depression and SIS scores suggest APA improves stroke-specific outcomes related to QOL.

Comment:
This agrees with the well designed study by Langhammer et al "Exercise and health related quality of life during the first year following acute stroke: a randomized controlled trial. Brain Injury 2008 Feb ; 22(2) : 135-145. who concluded that the regular exercise group with self initiated training seemed to enhance HRQOL more than the intensive group with scheduled intensive training. The degree of motor function , balance walking capacity and independence of ADL is important of r perceived HRQoL."

14. Age Ageing. 2008 May;37(3):270-6.
Predicting people with stroke at risk of falls.
Ashburn A, Hyndman D, Pickering R, Yardley L, Harris S.

BACKGROUND: falls are common following a stroke, but knowledge about predicting future fallers is lacking.
OBJECTIVE: to identify, at discharge from hospital, those who are most at risk of repeated falls.
METHODS: consecutively hospitalized people with stroke (independently mobile prior to stroke and with intact gross cognitive function) were recruited. Subjects completed a battery of tests (balance, function, mood and attention) within 2 weeks of leaving hospital and at 12 months post hospital discharge.
RESULTS: 122 participants (mean age 70.2 years) were recruited. Fall status at 12 months was available for 115 participants and of those, 63 [55%; 95% confidence interval (CI) 46-64] experienced one or more falls, 48 (42%; 95% CI 33-51) experienced repeated falls, and 62 (54%) experienced near-falls. All variables available at discharge were screened as potential predictors of falling. Six variables emerged [near-falling in hospital, Rivermead leg and trunk score, Rivermead upper limb score, Berg Balance score, mean functional reach, and the Nottingham extended activities of daily living (NEADL) score]. A score of near-falls in hospital and upper limb function was the best predictor with 70% specificity and 60% sensitivity.
CONCLUSION: participants who were unstable (near-falls) in hospital with poor upper limb function (unable to save themselves) were most at risk of falls.

15. Neurorehabil Neural Repair. 2008 May-Jun;22(3):288-97.
Short-term changes in and predictors of participation of older adults after stroke following acute care or rehabilitation.
Desrosiers J, Demers L, Robichaud L, Vincent C, Belleville S, Ska B; BRAD Group.

BACKGROUND: Stroke can lead to restrictions in participation in daily activities and social roles. Although considered an important rehabilitation outcome, little is known about participation after stroke and its predictors, and about the differences associated with the types of services provided following stroke.
OBJECTIVE: The aims of this study were 1) to follow and compare changes in participation of older adults discharged home after stroke from acute care or postacute rehabilitation, and 2) to identify the best predictors of participation after stroke from physical, cognitive, perceptual, and psychological ability measures taken shortly after discharge.
METHODS: Level of participation in daily activities and social roles of 197 older adults who had a stroke was evaluated at 2 to 3 weeks (T1), 3 months (T2), and 6 months (T3) after being discharged home from acute care (n = 86) or rehabilitation (n = 111). Physical, cognitive, perceptual, and psychological abilities were assessed at T1.
RESULTS: A significant increase in participation was found over time for both groups, mainly in the first 3 months. The best predictors of participation differed between the groups and between the daily activities and social roles domains. Walking and acceptance of the stroke or fewer depressive symptoms were the best predictors of the level of participation after stroke.

CONCLUSIONS: Participation was not optimal at discharge because it continued to increase after the return home. The importance of psychological factors in participation after stroke is undeniable. Many predictors are amenable to interventions.

Comment:
Participation should be assessed when the person has returned to his or her living environment after the stroke and has had the opportunity to resume his or her activities and social roles. We need follow-up post discharge to more accurately measure participation. TUG is an appropriate measure of mobility (participation) for older adults (vs 6 minute walk test). See also J Rehabil Med. 2008 Apr;40(4):291-7.A national survey of occupational therapists' practices related to participation post-stroke.Korner-Bitensky N, Desrosiers J, Rochette A.
They concluded that more could be done to enhance successful community reintegration post-stroke interventions in terms of leisure and social aspects of participation.