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Abstracts alphabetically ordered by author

Andre J.M., Beis J.M., Morin N. and Paysant J., 2000,
Buccal hemineglect. Arch Neurol, . **57**(12): p. 1734-41.

OBJECTIVES: To determine whether the peripersonal and intrapersonal buccal space can be affected by a hemispheric stroke and to evaluate the clinical signs resulting from buccal neglect. METHODS: A prospective study comparing 2 groups of patients with hemiplegia, 1 with a right hemispheric lesion and the other with a left hemispheric lesion. Patients were selected consecutively on the basis of specific criteria at least 1 month after stroke. RESULTS: Buccal hemineglect was usually concomitant with other hemineglect phenomena resulting from lesions of the right hemisphere (10 of 12 in right lesions and 1 of 12 in left lesions). Clinical signs associated with this condition consisted of impaired swallowing (retention, defective insalivation, presence of food debris in the left hemibuccal space, loss of saliva from the left side of the mouth, and choking); loss of the ability to perceive salty, sweet, or acid tastes; and impaired buccal representation. These problems were usually incorrectly diagnosed initially. Outcome was usually favorable, but functional disorders persisted in some patients for more than 18 months. The underlying attention and representation mechanisms are discussed with reference to experimental lesions of the postarcuate (area 6) cortex in rhesus monkeys. The area around the mouth may be considered to be, as in monkeys, a peripersonal space, ie, probably of little functional importance. The lesion may involve area 6 or its projections to the thalamus or posterior parietal cortex. CONCLUSIONS: Buccal hemineglect, which is likely to cause social embarrassment, should be considered whenever the oral phase of swallowing is impaired in a context of neglect syndromes. Prophylactic measures and rehabilitation can reduce the impact and complications of the condition (food bolus).

Asplund K., Gustafson Y., Jacobsson C., Bucht G., Wahlin A., Peterson J., Blom J.O. and Angquist K.A., 2000,
Geriatric-based versus general wards for older acute medical patients: a randomized comparison of outcomes and use of resources. J Am Geriatr Soc, . **48**(11): p. 1381-8.

BACKGROUND: The effects of residence in an acute geriatrics-based ward (AGW) with emphasis on early rehabilitation and discharge planning for older patients with acute medical illnesses were assessed. Outcome and use of resources were compared with those of patients treated in general medical wards (MWs). A per-protocol rather than intention-to- treat analysis was performed. METHODS: A randomized trial with 3-months follow-up. A total of 190 patients aged 70 years and older were randomized to an acute geriatrics-based ward, and 223 patients were randomized to general medical wards. RESULTS: The two groups were comparable at inclusion. However, after care in the AGW, 71% of patients could be discharged directly home compared with 64% of those treated in MWs (relative risk 1.17; 95% CI, 0.93-1.49). The length of stay was shorter in the AGW (mean 5.9 vs 7.3 days; P = .002). The proportion of patients in geriatric or other hospital wards or in nursing homes did not differ, but the proportion of AGW patients in sheltered living tended to be lower (P = .085). At the follow-up, case fatality, ADL function, psychological well-being, need for daily personal assistance, drug consumption, need for readmission to hospital, and total health care costs after discharge did not differ between the two groups. Poor global outcome was observed in 37% of AGW and 34% of MW patients. CONCLUSIONS: A geriatric approach with greater emphasis on early rehabilitation and discharge planning in the AGW shortened the length of hospital stay and may have reduced the need for long-term institutional living. This occurred despite patients in an acute geriatric ward not having better medical or functional outcome than older acute patients treated in general medical wards.

Avdiunina I.A., Popova L.M., Dokuchaeva N.V., Bragina L.K. and Dokuchaeva N.F., 2000,
[Videofluoroscopy study of swallowing in neurogenic dysphagia]. Anesteziol Reanimatol, (4): p. 64-8.

Videofluoroscopy (VFS) was for the first time used for examining swallowing in 49 patients with nervous diseases. Disturbances in each phase of swallowing act are analyzed with evaluation of the time parameters and defects, causes of aspiration in neurogenic dysphagia are discussed, and cricopharyngeal insufficiency is described. Neurogenic dysphagia is characterized by a combination of disorders which determine the degree of dysphagia. The most severe swallowing disorders were observed in patients with multiple foci in the brain stem and in diphtheritic polyneuropathies. The authors conclude that VFS is the optimal method for the diagnosis of neurogenic dysphagia.

Aviv J.E., 2000,
Clinical assessment of pharyngolaryngeal sensitivity. Am J Med, . **108 Suppl 4a**: p. 68S-72S.

The purpose of this article is to review the ongoing clinical research on assessment of laryngeal and pharyngeal sensitivity with particular emphasis on the technique of endoscopic air pulse stimulation of the laryngopharyngeal mucosa. Studies of laryngopharyngeal sensation in healthy controls and in stroke patients with dysphagia are presented initially. What then follows is a detailed description of a study comparing modified barium swallow and pharyngolaryngeal sensory testing as predictors of aspiration pneumonia after stroke. Finally, the combination of laryngopharyngeal sensory testing with endoscopic swallowing evaluations, termed flexible endoscopic evaluation of swallowing with sensory testing, and its implications in the office or bedside evaluation of the patient with dysphagia are discussed.

Barba R., Martinez-Espinosa S., Rodriguez-Garcia E., Pondal M., Vivancos J. and Del Ser T., 2000,
Poststroke dementia : clinical features and risk factors. Stroke, . **31**(7): p. 1494-501.

BACKGROUND AND PURPOSE: The goal of the present study was to examine a series of putative risk factors of poststroke dementia (PSD), especially those factors usually associated with cerebrovascular disease and degenerative dementia, in a series of 251 consecutive unselected stroke patients. METHODS: A standard protocol was prospectively applied at admission and 3 months after stroke; this protocol included clinical, functional, and cognitive assessments, hemogram and serum biochemistry, ECG and CT exams, apolipoprotein E and angiotensin-converting enzyme genotype, and neuropsychological examination. After a neuropsychological examination and an interview with a relative, the following diagnostic criteria were used: the Diagnostic and Statistical Manual of Mental Disorders (DSM)-IV for dementia after stroke, DSM-III-R for previous dementia and dementia stage, and Association Internationale pour la Recherche et l'Enseignement en Neurologie (NINDS-AIREN) for vascular dementia. RESULTS: Seventy-five cases (30%) demonstrated dementia at 3-month follow up; 25 of them (10%) had demonstrated dementia before the stroke. Dementia was unrelated to type (ischemic/hemorrhagic) or location of stroke, vascular factors (hypertension, diabetes, ischemic heart disease, or hypercholesterolemia), apolipoprotein E or angiotensin-converting enzyme genotype, and serum homocysteine. Age (odds ratio [OR] 1.1, 95% CI 1.03 to 1.2), previous nephropathy (OR 6.1, 95% CI 1.5 to 24.3), atrial fibrillation (OR 4.4, 95% CI 1. 4 to 13.9), low Canadian Neurological Scale score at discharge (OR 0. 5, 95% CI 0.4 to 0.6), and previous mental decline assessed by the shortened Spanish version of the Informant Questionnaire on Cognitive Decline in the Elderly (SS-IQCODE; OR 1.2, 95% CI 1.1 to 1. 4) were the correlates of dementia in logistic regression analyses. The same risks factors were found when cases with previous dementia and with hemorrhagic stroke were excluded. CONCLUSIONS: Dementia is frequent after ischemic or hemorrhagic stroke. Age, nephropathy, atrial fibrillation, previous mental decline, and stroke severity independently contribute to the risk.

Bascunana H., Villarreal I., Alfonso S., Terre R. and Bernabeu M., 2000,
[Agitation in head injury. II. Treatment with antidepressant, sympathomimetic, beta blocker , dopaminergic and other drugs]. Rev Neurol, . **30**(11): p. 1044-7.

OBJECTIVE: To review the literature of the past 20 years, using the articles indexed in MEDLINE, on the drug treatment of agitation in traumatic head injury. DEVELOPMENT: The treatment of agitation in traumatic head injury should be based on well-designed, randomised, placebo-controlled studies which justify any particular decision regarding drug use. However, care of the agitated traumatic head injury patient is based on the management of other related disorders, on the response of similar patient populations and clinical experience based on empirical observation. Amongst the drugs available, carbamazepine is the most widely used for post-traumatic agitation, followed by antidepressants and as a third option propranolol. We discuss other drugs which are used less frequently in post-traumatic agitation. CONCLUSIONS: Many drugs are used and there is little agreement on the subject. However, with regard to certain characteristics of the agitation, different pharmacological treatments may be recommended.

Bascunana H., Villarreal I., Alfonso S., Bernabeu M. and Terre R., 2000,
[Agitation in head injury. I. Definition and treatment with anxiolytic neuroleptics and antiepileptic drugs]. Rev Neurol, . **30**(9): p. 850-4.

OBJECTIVE: To carry out a bibliographic review of articles indexed in MEDLINE over the past 20 years concerning

the pharmacological treatment of agitation in head injury. DEVELOPMENT: Head injury may cause different behaviour changes, of which agitation is the most dramatic. The incidence of agitation after severe head injury varies from 11% to 50% depending on the study involved. This incidence is high enough to warrant specific management. Drug treatment has variable results. When there is imminent danger of harm to the patient himself or to others, or when aggressive behaviour makes medical management difficult, the benzodiazepines have been found useful. Antipsychotic drugs are only indicated in head injury when the agitation causes a clinical emergency, and in such a case the more potent drugs such as haloperidol are best, since they have less sedative effect. They are also effective when the clinical features are similar to those of classical schizophrenia. Antiepileptic drugs have been used successfully for treating agitation-aggressiveness, specially in paroxystic behaviour disorders. We also consider other treatments used for posttraumatic agitation. CONCLUSION: There is no general agreement amongst doctors as to the best treatment for posttraumatic agitation in head injury. However, with regard to certain characteristics of agitation different drugs may be recommended for treatment.

Bath P.M., Bath F.J. and Smithard D.G., 2000,
Interventions for dysphagia in acute stroke. Cochrane Database Syst Rev, . **2**.

BACKGROUND: It is unclear how dysphagic patients should be fed and treated after acute stroke. OBJECTIVES: The objective of this review was to assess the effect of different management strategies for dysphagic stroke patients, in particular how and when to feed, whether to supplement nutritional intake, and how and whether to treat dysphagia. SEARCH STRATEGY: We searched the Cochrane Stroke Group trials register, Medline, Embase, ISI, and existing review articles. We contacted researchers in the field and equipment manufacturers. Date of the most recent searches: March 1999. SELECTION CRITERIA: Unconfounded truly or quasi randomised controlled trials in dysphagic patients with acute/subacute (within 3 months) stroke. DATA COLLECTION AND ANALYSIS: Three reviewers independently applied the trial inclusion criteria. Two reviewers assessed trial quality and extracted the data. MAIN RESULTS: Percutaneous endoscopic gastrostomy (PEG) versus nasogastric tube (NGT) feeding: two trials (49 patients) suggest that PEG reduces end-of-trial case fatality (Peto Odds Ratio, OR 0.28, 95% CI 0.09 to 0.89) and treatment failures (OR 0.10, 95% CI 0.02 to 0.52), and improves nutritional status, assessed as weight (Weighted Men Difference, WMD +4.1 kg, 95% CI -4.3 to +12.5), mid-arm circumference (WMD +2.2 cm, 95% CI -0.5 to +4.9) or serum albumin (WMD + 7.0 g/l, 95% CI +4.9 to +9.1) as compared with NGT feeding; two larger studies are ongoing. Timing of feeding: no completed trials; one large study is ongoing. Swallowing therapy for dysphagia: two trials (85 patients) suggest that formal swallowing therapy does not significantly reduce end-of-trial dysphagia rates (OR 0.55, 95% CI 0.18 to 1.66). Drug therapy for dysphagia: one trial (17 patients); nifedipine did not alter end-of-trial case fatality or the frequency of dysphagia. Nutritional supplementation: one trial (42 patients) found a non-significant trend to a lower case fatality, and significantly increased energy and protein intake; one large trial is ongoing and data is awaited from two other studies. Fluid supplementation: one trial (20 patients) found that supplementation did not alter the time to resolution of dysphagia. REVIEWER'S CONCLUSIONS: Too few studies have been performed, and these have involved too few patients. PEG feeding may improve outcome and nutrition as compared with NGT feeding. Further research is required to assess how and when patients are fed, and the effect of swallowing or drug therapy on dysphagia.

Bechara A., Tranel D. and Damasio H., 2000,
Characterization of the decision-making deficit of patients with ventromedial prefrontal cortex lesions. Brain, . **123**(Pt 11): p. 2189-202.

On a gambling task that models real-life decisions, patients with bilateral lesions of the ventromedial prefrontal cortex (VM) opt for choices that yield high immediate gains in spite of higher future losses. In this study, we addressed three possibilities that may account for this behaviour: (i) hypersensitivity to reward; (ii) insensitivity to punishment; and (iii) insensitivity to future consequences, such that behaviour is always guided by immediate prospects. For this purpose, we designed a variant of the original gambling task in which the advantageous decks yielded high immediate punishment but even higher future reward. The disadvantageous decks yielded low immediate punishment but even lower future reward. We measured the skin conductance responses (SCRs) of subjects after they had received a reward or punishment. Patients with VM lesions opted for the disadvantageous decks in both the original and variant versions of the gambling task. The SCRs of VM lesion patients after they had received a reward or punishment were not significantly different from those of controls. In a second experiment, we investigated whether increasing the delayed punishment in the

disadvantageous decks of the original task or decreasing the delayed reward in the disadvantageous decks of the variant task would shift the behaviour of VM lesion patients towards an advantageous strategy. Both manipulations failed to shift the behaviour of VM lesion patients away from the disadvantageous decks. These results suggest that patients with VM lesions are insensitive to future consequences, positive or negative, and are primarily guided by immediate prospects. This 'myopia for the future' in VM lesion patients persists in the face of severe adverse consequences, i.e. rising future

Behrman A.L., Cauraugh J.H. and Light K.E., 2000,
Practice as an intervention to improve speeded motor performance and motor learning in Parkinson's disease. J Neurol Sci, . **174**(2): p. 127-36.

Individuals with Parkinson's disease have difficulty initiating and performing complex, sequential movements. Practice generally leads to faster initiation and execution of movements in healthy adults, however, whether practice similarly improves motor performance in patients with Parkinson's disease remains controversial. To assess the effects of practice on motor performance, patients with Parkinson's disease and control subjects practiced two, rapid arm-reaching tasks with different levels of movement complexity for 120 trials each over 2 days. Response programming was studied by analyzing the overall reaction time latency of each movement and its fractionated sub- components, premotor and motor time. Practice effects were investigated by comparing pretest performance to immediate and delayed retention test performances (10-min and 48-h rest intervals, respectively). Both patients with Parkinson's disease and control subjects improved speeded performance of sequential targeting tasks by practice and retained the improvement across both retention test intervals. Finding a learning effect for persons with Parkinson's disease supports practice as an effective rehabilitation strategy to improve motor performance of specific tasks for patients with Parkinson's disease.

Benaim C., Blatt J.L. and Rousseaux M., 2000,
[A tridimensional study of lateral grasping and pointing in spatial neglect]. Rev Neurol (Paris), . **156**(6-7): p. 622-33.

The aim of this study was to analyze the ipsilateral upper limb and head kinematics in patients presenting with spatial neglect, using pointing and grasping to object. Four patients were included and compared to an equivalent number of normal subjects. Head, shoulder, and wrist movements were recorded using a three-dimensional VICON system. Objects to be pointed or grasped were localized in the right or left space facing the subject. Patients presented with a reduction in the mean wrist velocity, which was more obvious when directed to the left side, reduction in the peak velocity, and a severe increase of the time between the peak velocity and the end of the movement. The amplitude and mean velocity of left head movements were comparable in both groups. The analysis of the intersegmental co-ordination showed that the sequence of activation of corporeal segments was similar in patients and controls: head movement, shoulders rotation, upper limb extension. Co-ordination between head and wrist movements was assessed using the cross-correlation method. An increase in time lag and a reduction in crossed correlations between the head and wrist movements was observed in leftward movements of neglect patients, but the co- ordination between the shoulder and wrist movements was preserved. Thus, we demonstrated a global disorder of intentional movements in patients, which was relatively similar in pointing and grasping to object, and predominated on the approach phase, which is associated to important visuo-motor adjustments. This study also demonstrated desynchronization of head and wrist movements, which can be an important problem in neglect patients.

Bergman M.M., 2000,
Successful mastery with a cognitive orthotic in people with traumatic brain injury. Appl Neuropsychol, . **7**(2): p. 76-82.

A multifunction cognitive orthotic (CO), designed for individuals with significant deficits from traumatic brain injury, enables rapid unassisted reliable performance of a targeted task and facilitates transfer of training across subsequent activity tasks for most participants. Consistency in design ensures consistent cues and organization as well as unchanging procedural format as content and tasks vary. Of the 41 participants provided a clinical assessment trial with a CO, 36 (88%) demonstrated rapid achievement of success on the initial task. Thereafter, transfer of training was achieved across subsequent targeted activity tasks by changing only the content, in the context of stable CO design. Many individuals with brain injury can be self-sufficient in performing, unassisted, the essential steps of targeted activities when provided a properly designed compensatory assistive device.

Berod A.C., Klay M., Santos-Eggimann B. and Paccaud F., 2000,
Anxiety, depressive, or cognitive disorders in rehabilitation patients: effect on length of stay. Am J Phys Med Rehabil, . **79**(3): p. 266-73.

OBJECTIVE: To test the hypothesis that anxiety, depressive, or cognitive disorders are associated with an increase in length of stay of physical rehabilitation inpatients. DESIGN: Secondary analysis of a 1-yr prospective data recording. Three treatment and rehabilitation centers in the Canton of Vaud (Switzerland). Ninety-five percent of inpatients admitted from November 15, 1990, to November 14, 1991, agreed to participate. Apart from length of stay, data consisted of demographic and medical data results from the Hospital Anxiety and Depression Scale, Mini-Mental State Score, and Functional Autonomy Measurement System. Multivariate linear regression was used in the analysis. RESULTS: The presence of anxiety or depression altered length of stay in a bivariate analysis, although all effects disappeared in a multivariate approach. Factors that had an independent association with length of stay were gender, length of stay in an acute care hospital before hospitalization, treatment and rehabilitative centers, Functional Autonomy Measurement System mobility score, and Functional Autonomy Measurement System Activities of Daily Living score. Results concerning the association between cognition abilities and length were similar. CONCLUSIONS: Our results recognize that an influence of psychiatric disorders acted on length of stay through a relationship between the psychiatric status and the control variables. If mental state influences physical state, then early intervention studies are desirable. If somatic state induces mental alterations, then interventions directed toward the psychiatric sphere will bring mostly qualitative benefits (amelioration of well-being without remarkable effects on length of stay).

Birbaumer N., Kubler A., Ghanayim N., Hinterberger T., Perelmouter J., Kaiser J., Iversen I., Kotchoubey B., Neumann N. and Flor H., 2000,
The thought translation device (TTD) for completely paralyzed patients. IEEE Trans Rehabil Eng, . **8**(2): p. 190-3.

The thought translation device trains locked-in patients to self- regulate slow cortical potentials (SCP's) of their electroencephalogram (EEG). After operant learning of SCP self-control, patients select letters, words or pictograms in a computerized language support program. Results of five respirated, locked-in-patients are described, demonstrating the usefulness of the thought translation device as an alternative communication channel in motivated totally paralyzed patients with amyotrophic lateral sclerosis.

Burke D., Alexander K., Baxter M., Baker F., Connell K., Diggles S., Feldman K., Horny A., Kokinos M., Moloney D. and Withers J., 2000,
Rehabilitation of a person with severe traumatic brain injury. Brain Inj, . **14**(5): p. 463-71.

A case study report of a long and intensive rehabilitation programme for a young woman after she sustained a severe diffuse axonal injury in a motor vehicle accident is described in detail. The purpose of this paper is to encourage specialist brain injury rehabilitation services to offer extended rehabilitation programmes to patients, even with very severe injuries. Significant functional improvements and enhanced quality of life frequently reward the high cost and hard work involved.

Burns R., Nichols L.O., Martindale-Adams J. and Graney M.J., 2000,
Interdisciplinary geriatric primary care evaluation and management: two- year outcomes. J Am Geriatr Soc, . **48**(1): p. 8-13.

BACKGROUND: The long-term efficacy of interdisciplinary outpatient primary care Geriatric Evaluation and Management (GEM) has not been proven. This article focuses on results obtained during the 2 years of the study. METHODS: In this 2-year randomized clinical trial, at the Veterans Affairs Medical Center, Memphis, TN, 128 veterans, age 65 years and older, were randomized to outpatient GEM or usual care (UC). Two-year follow-up analyses are based on the 98 surviving individuals. Study outcome measurements included health status, function, and quality of life including affect, cognition, and mortality. RESULTS: At 2 years, there were positive intervention effects for eight of 1 outcome measures, five of which had attained significance at 1 year. GEM subjects, compared with UC subjects, had significantly greater improvement in health perception (P = .001), smaller increases in numbers of clinic visits (P = .019) and instrumental activities of daily living (IADL) impairments (P = .006), improved social activity (P.001), greater improvement in Center for Epidemiologic Studies- Depression (CES-D) scores (P = .003), general well-being (P = .001), life satisfaction (P.001),

and Mini-Mental State Exam (MMSE) scores (P = .025). There were no significant treatment effects in activities of daily living (ADL) scores (P = .386), number of hospitalizations (P = .377), or mortality (P = .155). CONCLUSIONS: These findings suggest that a primary care approach that combines an initial interdisciplinary comprehensive assessment with long-term, interdisciplinary outpatient management may improve outcomes for targeted older adults significantly. Findings suggest further that outcomes may continue to improve over time and that the GEM care model provides an effective way to manage health care of older adults.

Caligiuri M.P. and Ellwanger J., 2000,
Motor and cognitive aspects of motor retardation in depression. J Affect Disord, . **57**(1-3): p. 83-93.

BACKGROUND: Motor retardation is a common feature of major depressive disorder having potential prognostic and etiopathological significance. According to DSM-IV, depressed patients who meet criteria for psychomotor retardation, must exhibit motor slowing of sufficient severity to be observed by others. However, overt presentations of motor slowing cannot distinguish slowness due to cognitive factors from slowness due to neuromotor disturbances. METHODS: We examined cognitive and neuromotor aspects of motor slowing in 36 depressed patients to test the hypothesis that a significant proportion of patients exhibit motor programming disturbances in addition to psychomotor impairment. A novel instrumental technique was used to assess motor programming in terms of the subject's ability to program movement velocity as a function of movement distance. A traditional psychomotor battery was combined with an instrumental measure of reaction time to assess the cognitive aspects of motor retardation. RESULTS: The depressed patients exhibited significant impairment on the velocity scaling measure and longer reaction times compared with nondepressed controls. Approximately 40% of the patients demonstrated abnormal psychomotor function as measured by the traditional battery; whereas over 60% exhibited some form of motor slowing as measured by the instruments. Approximately 40% of the patients exhibited parkinsonian-like motor programming deficits. A five-factor model consisting of motor measures predicted diagnosis among bipolar and unipolar depressed patients with 100% accuracy. LIMITATIONS: The ability of motor measures to discriminate bipolar from unipolar patients must be viewed with caution considering the relatively small sample size of bipolar patients. CONCLUSIONS: These findings suggest that a subgroup of depressed patients exhibit motor retardation that is behaviorally similar to parkinsonian bradykinesia and may stem from a similar disruption within the basal ganglia.

Carey D.P., 2000,
Multisensory integration: attending to seen and felt hands. Curr Biol, . **10**(23): p. R863-5.

The neglect of one side of space exhibited by some brain-damaged patients can be ameliorated by cueing the patient to the neglected side of space. A related effect has been found to depend on the hand being seen and felt at the same time. The results add to a growing literature on somatosensory-visual interactions.

Cate Y. and Richards L., 2000,
Relationship between performance on tests of basic visual functions and visual-perceptual processing in persons after brain injury. Am J Occup Ther, . **54**(3): p. 326-34.

OBJECTIVE: In this correlational study of adults receiving occupational therapy who sustained a cerebrovascular accident (CVA), the relationship between basic visual functions (including acuity, visual field deficits, oculomotor skills, and visual attention or scanning) and higher level visual-perceptual processing skills (e.g., visual closure and figure-ground discrimination) was investigated. METHOD: Thirty adults who sustained CVA and 20 adults without a history of CVA were given a basic visual function screening and the Motor-Free Visual Perception Test (MVPT). Scores on the vision screening and the MVPT were correlated statistically. RESULTS: A Pearson product-moment correlation analysis produced a correlation of r = .75 between vision screening scores and scores from the MVPT. CONCLUSION: These results suggest that a positive relation exists between basic visual functions and visual-perceptual processing skills. Further, the results suggest that evaluation of visual-perceptual processing skills must begin with assessment of basic visual functions so that the influence of these basic visual functions on performance in more complex tests can be taken into consideration.

Cauraugh J., Light K., Kim S., Thigpen M. and Behrman A., 2000,
Chronic motor dysfunction after stroke: recovering wrist and finger extension by electromyography-triggered neuromuscular stimulation. Stroke, . **31**(6): p. 1360-4.

BACKGROUND AND PURPOSE: After stroke, many individuals have chronic unilateral motor dysfunction in the upper extremity that severely limits their functional movement control. The purpose of this study was to determine the effect of electromyography-triggered neuromuscular electrical stimulation on the wrist and finger extension muscles in individuals who had a stroke > or = 1 year earlier. METHODS: Eleven individuals volunteered to participate and were randomly assigned to either the electromyography-triggered neuromuscular stimulation experimental group (7 subjects) or the control group (4 subjects). After completing a pretest involving 5 motor capability tests, the poststroke subjects completed 12 treatment sessions (30 minutes each) according to group assignments. Once the control subjects completed 12 sessions attempting wrist and finger extension without any external assistance and were posttested, they were then given 12 sessions of the rehabilitation treatment. RESULTS: The Box and Block test and the force- generation task (sustained muscular contraction) revealed significant findings (P or =1 year after stroke. The treatment program decreased motor dysfunction and improved the motor capabilities in this group of poststroke individuals.

Chen-Sea M.J., 2000,
Validating the Draw-A-Man Test as a personal neglect test. Am J Occup Ther, . **54**(4): p. 391-7.

OBJECTIVES: The purpose of this study was to determine the reliability and validity of a Draw-A-Man Test in measuring personal neglect in patients with right brain stroke. METHOD: Draw-A-Man Test was administered to 51 persons with right cerebrovascular accident (CVA) and 110 age-matched persons without brain insult. A categorical classification was developed based on the man drawn in the test. Participants who showed homogeneous bilateral representation of body parts were considered to not have personal neglect, whereas those who showed unilateral body parts were considered to have personal neglect. The completed tests were used to blindly categorize the persons with and without personal neglect according to the above definition by two raters for calculating interrater reliability. The Klein-Bell ADL (Activities of Daily Living) Scale was also administered to the participants with right CVA to validate the Draw-A-Man Test. RESULTS: This dichotomy--bilateral representation versus unilateral representation--showed a high percentage of agreement between two raters. Rater A classified all 110 "normal" participants as being without personal neglect and classified 13 of the 51 participants with stroke as having personal neglect. Participants demonstrating personal neglect showed significantly poorer ADL performance than did those without personal neglect. ADL performance was also found to be significantly related to somatosensation, motor status of the impaired limbs, and muscle strength of the sound limbs. However, even after controlling the effect of these variables by partial correlation, personal neglect was still highly related to ADL performance. CONCLUSION: The Draw-A-Man Test is a reliable and valid tool for discriminating clients with personal neglect from those without.

Chu C.J. and Jones T.A., 2000,
Experience-dependent structural plasticity in cortex heterotopic to focal sensorimotor cortical damage. Exp Neurol, . **166**(2): p. 403-14.

Structural plasticity following focal neocortical damage in adult rats has recently been found to be sensitive to postinjury rehabilitative training. Experience on a complex motor skills task, the acrobatic task, after unilateral lesions of the forelimb representation region of the sensorimotor cortex (FLsmc) enhanced synaptic structural changes in the cortex contralateral and homotopic to the lesions. Using tissue from this previous study, the present study examined whether a heterotopic region of the sensorimotor cortex of either hemisphere, the hindlimb representation area (HLsmc), would undergo structural changes following unilateral FLsmc lesions and whether these changes would also be sensitive to postinjury training on the acrobatic task. Stereological methods for light and electron microscopy were used to assess structural changes in lesion or sham-operated rats following 28 days of postoperative acrobatic training or simple repetitive exercise (motor controls). In the HLsmc contralateral to the lesions of rats receiving acrobatic training, there was a subtle, but significant, increase in cortical volume and in layer II/III neuropil and dendritic volume per neuron in comparison to shams. In rats receiving simple exercise after the lesions, these changes were not significantly different from shams. Acrobatic training also prevented a loss of cortical volume in the HLsmc adjacent to the lesion in comparison to shams. These data suggest that behavioral training following cortical injury facilitates structural plasticity in behaviorally relevant areas of the

neocortex other than the homotopic cortex contralateral to the lesion. This structural plasticity might be relevant to the development of behavioral compensation after cortical injury.

Cicerone K.D., Dahlberg C., Kalmar K., Langenbahn D.M., Malec J.F., Bergquist T.F., Felicetti T., Giacino J.T., Harley J.P., Harrington D.E., Herzog J., Kneipp S., Laatsch L. and Morse P.A., 2000,
Evidence-based cognitive rehabilitation: recommendations for clinical practice. Arch Phys Med Rehabil, . **81**(12): p. 1596-615.

OBJECTIVE: To establish evidence-based recommendations for the clinical practice of cognitive rehabilitation, derived from a methodical review of the scientific literature concerning the effectiveness of cognitive rehabilitation for persons with traumatic brain injury (TBI) or stroke. DATA SOURCES: A MEDLINE literature search using combinations of these key words as search terms: attention, awareness, cognition, communication, executive, language, memory, perception, problem solving, reasoning, rehabilitation, remediation, and training. Reference lists from identified articles also were reviewed; a total bibliography of 655 published articles was compiled. STUDY SELECTION: Studies were initially reviewed according to the following exclusion criteria: nonintervention studies; theoretical, descriptive, or review papers; papers without adequate specification of interventions; subjects other than persons with TBI or stroke; pediatric subjects; pharmacologic interventions; and non-English language papers. After screening, 232 articles were eligible for inclusion. After detailed review, 61 of these were excluded as single case reports without data, subjects other than TBI and stroke, and nontreatment studies. This screening yielded 171 articles to be evaluated. DATA EXTRACTION: Articles were assigned to 1 of 7 categories according to their primary area of intervention: attention, visual perception and constructional abilities, language and communication, memory, problem solving and executive functioning, multi-modal interventions, and comprehensive- holistic cognitive rehabilitation. All articles were independently reviewed by at least 2 committee members and abstracted according to specified criteria. The 171 studies that passed initial review were classified according to the strength of their methods. Class I studies were defined as prospective, randomized controlled trials. Class II studies were defined as prospective cohort studies, retrospective case- control studies, or clinical series with well-designed controls. Class III studies were defined as clinical series without concurrent controls, or studies with appropriate single-subject methodology. DATA SYNTHESIS: Of the 171 studies evaluated, 29 were rated as Class I, 35 as Class II, and 107 as Class III. The overall evidence within each predefined area of intervention was then synthesized and recommendations were derived based on consideration of the relative strengths of the evidence. The resulting practice parameters were organized into 3 types of recommendations: Practice Standards, Practice Guidelines, and Practice Options. CONCLUSIONS: Overall, support exists for the effectiveness of several forms of cognitive rehabilitation for persons with stroke and TBI. Specific recommendations can be made for remediation of language and perception after left and right hemisphere stroke, respectively, and for the remediation of attention, memory, functional communication, and executive functioning after TBI. These recommendations may help to establish parameters of effective treatment, which should be of assistance to practicing clinicians.

Clare L., Wilson B.A., Carter G., Breen K., Gosses A. and Hodges J.R., 2000,
Intervening with everyday memory problems in dementia of Alzheimer type: an errorless learning approach. J Clin Exp Neuropsychol, . **22**(1): p. 132-46.

Dementia of Alzheimer Type (DAT) is increasingly detected at an earlier stage of the disorder, when interventions to assist with everyday memory difficulties might be most valuable. Some learning is possible in DAT and a number of factors have been identified which may facilitate performance, although applications to everyday memory problems have been limited. The concept of errorless learning has not previously been directly examined in relation to DAT, but might provide a useful additional strategy. In the present study, 6 participants with early stage DAT (MMSE scores 21 - 26) received individually tailored interventions, based on errorless learning principles and targeted at a specific everyday memory problem. Five of the participants showed significant improvement on the target measures, and maintained this improvement up to 6 months later. The results suggest that it is feasible to intervene with everyday memory problems in the early stages

Cubelli R., Marchetti C., Boscolo G. and Della Sala S., 2000,
Cognition in action: testing a model of limb apraxia. Brain Cogn, . **44**(2): p. 144-65.

Assessment of limb apraxia is still suffering from Liepmann's legacy and performance in gesture-processing tests is generally rendered by classifying patients' profile according to the classic clinical labels of ideomotor and ideational apraxia. At odds with other cognitive functions, interpretation of apraxia has suffered from a lack of a reliable model which does justice to its complexity. Recently such a model has been proposed (Rothi et al., 1991, 1997). In this article a modified version of this model is presented and predictions are made according to its functional architecture. Five different patterns of impairment of gesture processing are postulated. To validate the predicted performance profiles, 19 left-hemisphere-damaged patients were assessed by means of an ad hoc battery of four praxis tests. Four of the five predicted apraxia patterns were observed, the fifth being more equivocal. These results support the need to overcome the simplistic dichotomous view of apraxia and confirm the fruitfulness of a model of normal gesture processing in order to understand dissociations in apraxia.

Curran C.A., Ponsford J.L. and Crowe S., 2000,
Coping strategies and emotional outcome following traumatic brain injury: a comparison with orthopedic patients. J Head Trauma Rehabil, . **15**(6): p. 1256-74.

OBJECTIVES: To investigate coping strategies in relation to emotional adjustment in individuals with traumatic brain injury (TBI) 1-5 years postinjury and to compare these with a group of 40 participants who sustained serious orthopedic injuries. DESIGN: Participants completed measures of handicap and coping strategies, and rated their levels of depression, anxiety, and self-esteem on standardized questionnaires. SETTING: Participants had received inpatient rehabilitation at Bethesda Hospital 1-5 years prior to completing questionnaires. They were recruited from a list of consecutive admissions. PARTICIPANTS: 88 TBI individuals were compared with 40 participants who had sustained serious orthopedic injuries without damage to the central nervous system. They had all been involved in motor vehicle or work-related accidents. OUTCOME MEASURES: Beck Depression Inventory (BDI) and State- Trait Anxiety Inventory (STAI). RESULTS: Consistent with previous studies; a significant proportion of the current sample displayed high levels of emotional distress. Results showed few differences between the TBI and orthopedic groups. Coping strategies characterized by worry, wishful thinking, and self-blame were associated with higher levels of depression and anxiety in both groups. Strategies focusing on problem solving and having a positive outlook were related to lower anxiety levels, but to a lesser degree. CONCLUSIONS: This study has provided further evidence that coping strategies are associated with emotional outcome in TBI individuals. There is now a growing empirical basis on which preliminary interventions can be based.

Cusick C.P., Gerhart K.A. and Mellick D.C., 2000,
Participant-proxy reliability in traumatic brain injury outcome research. J Head Trauma Rehabil, . **15**(1): p. 739-49.

OBJECTIVE: To assess reliability between persons with Traumatic Brain Injury (TBI) and their self-selected proxies. DESIGN: Intraclass Correlation Coefficients were used to assess participant-proxy reliability on the Craig Handicap Assessment and Reporting Technique (CHART), the Community Integration Questionnaire (CIQ), and the Functional Independence Measure (FIM). SETTING: Participants had been discharged to the community from inpatient rehabilitation between six months and approximately five years prior to the study's beginning. PARTICIPANTS: 204 persons with moderate to severe TBI and their self- selected proxies. RESULTS: Eighty-seven percent of the items on the three instruments exhibited moderate to high intraclass correlation (ICC), with strongest participant-proxy agreement for questions assessing concrete, observable information. Participant-proxy agreement was poorest when assessing cognitive and money management capacity as well as out-of-home activities. CONCLUSIONS: For many types of items, participant-proxy reliability is sufficient to merit the use of proxies in TBI outcome research when the participants are allowed to select their own proxy.

Daly J.J., Ruff R.L., Haycook K., Strasshofer B., Marsolais E.B. and Dobos L., 2000,
Feasibility of gait training for acute stroke patients using FNS with implanted electrodes. J Neurol Sci, . **179**(S 1-2): p. 103-7.

Following stroke, many patients do not regain a normal, safe gait pattern even after receiving conventional physical

therapy. One promising technique is functional neuromuscular stimulation (FNS) with intramuscular (IM) electrodes (FNS-IM). Five subjects were admitted into the study at 3 weeks to 3 months following the stroke. For each subject, electrodes were placed intramuscularly at the motor point of up to seven lower extremity paretic muscles. Subjects were treated for 6 months, twice weekly with FNS-IM for exercise and gait training. The stimulator and software provided individualized stimulation patterns, with flexible stimulus parameters and activation timings of multiple muscles. Outcome measures were active joint movement, coordination (Fugl-Meyer scale), balance (Tinetti scale), gait (Tinetti scale), activities of daily living (functional independence measure), and therapist and subject satisfaction (survey instrument). Subjects tolerated well the placement of IM electrodes with no adverse effects, and subjects lost no conventional rehabilitation time. Therapists and subjects were satisfied with the FNS-IM system as a rehabilitation tool. Post treatment, subjects demonstrated improvements in impairment and disability in active joint movement, coordination, balance, gait and activities of daily living. Considered together with prior research for chronic stroke subjects, this research suggests that FNS-IM can be successfully and efficaciously utilized for gait training for those with acute stroke.

Daniels S.K., Ballo L.A., Mahoney M.C. and Foundas A.L., 2000,
Clinical predictors of dysphagia and aspiration risk: outcome measures in acute stroke patients. Arch Phys Med Rehabil, . **81**(8): p. 1030-3.

OBJECTIVE: To use an established dysphagia clinical screening system to evaluate outcomes in acute stroke patients. DESIGN: Case-control study. SETTING: Tertiary care center. PARTICIPANTS: Acute stroke patients (n = 56) consecutively referred to a speech pathology service. MAIN OUTCOME MEASURES: Outcomes (ie, pneumonia, dietary status at discharge) in patients who were referred for a videofluoroscopic swallow study (VSS) based on results of a previously validated clinical screening system were compared with outcomes in patients who were not referred for VSS based on the clinical evaluation. RESULTS: Thirty-eight of 56 patients (68%) presented with 2 or more clinical predictors of moderate to severe dysphagia and were further evaluated with VSS, whereas 18 patients (32%) had fewer than 2 clinical features and were not evaluated radiographically. Based on patient outcomes and VSS results, identification of at least 2 clinical predictors significantly distinguished patients with moderate to severe dysphagia from patients with mild dysphagia or normal swallowing. None of the patients in either group developed pneumonia while following recommendations of the clinical or dynamic swallowing evaluation, and 93% of the patients returned to a regular diet. CONCLUSIONS: These data demonstrate that clinical use of this screening system can objectively identify acute stroke patients who warrant further diagnostic studies and can safely determine which patients need no further deglutitive evaluation.

Dennis M., 2000,
Nutrition after stroke. Br Med Bull, . **56**(2): p. 466-75.

Decisions about feeding are amongst the most difficult to face those managing stroke patients. About a fifth of patients with acute stroke are malnourished on admission to hospital. Moreover, patients' nutritional status often deteriorates thereafter because of increased metabolic demands which cannot be met due to feeding difficulties. Poor nutritional intake may result from: (i) reduced conscious level; (ii) an unsafe swallow (iii) arm or facial weakness; (iv) poor mobility; or (v) ill fitting dentures. Malnutrition is associated with poorer survival and functional outcomes, although these associations may not be causal. Patients often receive support with oral supplements or enteral tube feeding via nasogastric or percutaneous endoscopic gastrostomy. Although these probably improve nutritional parameters, it is unclear whether they improve patients' outcomes. Also the optimal timing, type and method of enteral feeding is uncertain. Large randomised trials are now in progress to identify the optimum feeding policies for stroke patients.

Deouell L.Y. and Soroker N., 2000,
What is extinguished in auditory extinction? Neuroreport, . **11**(13): p. 3059-62.

Extinction is a frequent sequel of brain damage, whereupon patients disregard (extinguish) a contralesional stimulus, and report only the more ipsilesional stimulus, of a pair of stimuli presented simultaneously. We investigated the possibility of a dissociation between the detection and the identification of extinguished phonemes. Fourteen right hemisphere damaged patients with severe auditory extinction were examined using a paradigm that separated the localization of stimuli and the identification of their phonetic content. Patients reported the identity of left-sided phonemes, while extinguishing

them at the same time, in the traditional sense of the term. This dissociation suggests that auditory extinction is more about acknowledging the existence of a stimulus in the contralesional hemispace than about the actual processing of the stimulus.

Despres C., Lamoureux D. and Beuter A., 2000,
Standardization of a neuromotor test battery: the CATSYS system. Neurotoxicology, . **21**(5): p. 725-35.

Interindividual and intraindividual variability in neuromotor behaviors is expected and normal. Early changes in neuromotor behaviors associated with neurodegenerative disorders or neurotoxic effects are often subtle and fluctuating in their characteristics. Therefore, their detection at an early stage is particularly difficult without precise recording instruments. The CATSYS system developed by Danish Product Development (DPD) is a portable device recording four measures of neuromotor control including tremor, reaction time, hand coordination and postural sway. The aim of this study is to develop a set of normative data. One hundred and fifty healthy men and women were divided into five age groups: (1) 20 to 29 years (n=30); (2) 30 to 39 years (n=30); (3) 40 to 49 years (n=30); (4) 50 to 59 years (n=30); (5) 60 to 70 years (n=30). All participants were free of neurological deficits at the time of testing and they were tested individually for approximately 30 min. Hand coordination was measured with prono- supination and finger-tapping movements executed at constant and accelerated rhythms. Reaction time was assessed in both hands using a hand held switch activated by the thumb. Postural tremor was quantified in both hands during 24.6 sec. by asking the subject to hold a stylus horizontally at 10 cm in front of his/her navel. The stylus contained a biaxial accelerometer. Postural sway was tested by asking the subject to stand on a force platform for 75 sec. under four conditions: (1) eyes open; (2) eyes closed; (3) eyes open standing on a foam pad; and (4) eyes closed standing on a foam pad. ANOVAs and multiple comparison tests were performed and the results were examined taking into account age, gender and experimental condition effects.

Dick M.B., Hsieh S., Dick-Muehlke C., Davis D.S. and Cotman C.W., 2000,
The variability of practice hypothesis in motor learning: does it apply to Alzheimer's disease? Brain Cogn, . **44**(3): p. 470-89.

Based on Schmidt's (1975) variability of practice hypothesis, this study examined acquisition and transfer of a gross motor skill, namely tossing, in 58 patients with Alzheimer's disease (AD) and 58 healthy older adults under constant, blocked, and random practice conditions. While healthy older adults were able to learn the tossing task equally well under the three practice conditions, only AD patients receiving constant practice showed significant improvements. Tests of intermediate transfer yielded the expected random practice advantage in healthy controls but not AD patients. None of the practice conditions facilitated intermediate transfer in AD patients; however, constant practice did benefit these impaired individuals on tests of near transfer. These results indicate that the variability of practice hypothesis does not extend to AD patients. As motor learning and transfer were clearly a function of constant practice, future attempts to retrain basic activities of daily living in AD patients should emphasize consistency in training.

Edmans J.A., Webster J. and Lincoln N.B., 2000,
A comparison of two approaches in the treatment of perceptual problems after stroke. Clin Rehabil, . **14**(3): p. 230-43.

OBJECTIVE: To compare the effectiveness of the transfer of training and functional approaches in improving perceptual and functional abilities after stroke. DESIGN: Patients identified as having perceptual problems were randomly allocated to either the transfer of training approach or the functional approach for perceptual treatment. On completion of six weeks of treatment, each patient was reassessed for perceptual and functional abilities. SUBJECTS AND SETTING: Eighty inpatients on the Nottingham Stroke Unit. INTERVENTIONS: Perceptual treatment was given for 2.5 hours per week for six weeks. MAIN OUTCOME MEASURES: Rivermead Perceptual Assessment Battery, Barthel ADL Index and Edmans ADL index. RESULTS: There was no significant difference between the treatment groups on patient characteristics or impairments. The results also showed no significant difference between the treatment groups before and after treatment on perceptual ability total scores, individual perceptual subtest scores, or functional ability total scores (Mann- Whitney U 642.5-798.0, $p > 0.05$). Wilcoxon matched pairs signed ranks tests showed a significant improvement in both groups after treatment on perceptual and functional abilities (perceptual $z = 6.02$, p 0.001, functional $z = 6.72$, p 0.001). CONCLUSIONS: These results indicated that the improvement in perceptual abilities was equivalent using either of the two approaches. This could be due to spontaneous recovery or the effects of the Stroke Unit.

Eliassen J.C., Baynes K. and Gazzaniga M.S., 2000,
Anterior and posterior callosal contributions to simultaneous bimanual movements of the hands and fingers. Brain, . **123 Pt 12**: p. 2501-11.

In order to study the role of the corpus callosum in two-handed coordination we tested callosotomy subjects while they attempted to initiate simultaneous discrete movements with both hands. We observed four split-brain patients, including one pre- and post-operatively, as well as normal and epileptic control subjects. Split-brain patients made button presses that were less synchronous than either normal or epileptic controls. Although split-brain patients' average performance did not always differ from control subjects, callosotomy resulted in a 3-fold increase in the variability with which 'simultaneous' movements were initiated. The one subject tested pre- and post-callosotomy showed distinct changes in movement initiation synchrony after both the anterior and the posterior stages of the surgery. These changes suggest that anterior and posterior callosal fibres may make unique contributions to bimanual synchronization, depending on whether responses are self-initiated or in reaction to a visual stimulus. This study demonstrates that neural communication across anterior and posterior fibres of the corpus callosum strongly influences the temporal precision of bimanual coordination. Specifically, callosal transmission affects the degree of bilateral synchrony with which simple simultaneous hand and finger movements are initiated.

Farne A., Pavani F., Meneghello F. and Ladavas E., 2000,
Left tactile extinction following visual stimulation of a rubber hand. Brain, . **123**(Pt 11): p. 2350-60.

In close analogy with neurophysiological findings in monkeys, neuropsychological studies have shown that the human brain constructs visual maps of space surrounding different body parts. In right-brain- damaged patients with tactile extinction, the existence of a visual peripersonal space centred on the hand has been demonstrated by showing that cross-modal visual-tactile extinction is segregated mainly in the space near the hand. That is, tactile stimuli on the contralesional hand are extinguished more consistently by visual stimuli presented near the ipsilesional hand than those presented far from it. Here, we report the first evidence in humans that this hand-centred visual peripersonal space can be coded in relation to a seen rubber replica of the hand, as if it were a real hand. In patients with left tactile extinction, a visual stimulus presented near a seen right rubber hand induced strong cross-modal visual-tactile extinction, similar to that obtained by presenting the same visual stimulus near the patient's right hand. Critically, this specific cross-modal effect was evident when subjects saw the rubber hand as having a plausible posture relative to their own body (i.e. when it was aligned with the subject's right shoulder). In contrast, cross-modal extinction was strongly reduced when the seen rubber hand was arranged in an implausible posture (i. e. misaligned with respect to the subject's right shoulder). We suggest that this phenomenon is due to the dominance of vision over proprioception: the system coding peripersonal space can be 'deceived' by the vision of a fake hand, provided that its appearance looks plausible with respect to the subject's body.

Feys H., Hetebrij J., Wilms G., Dom R. and De Weerdt W., 2000,
Predicting arm recovery following stroke: value of site of lesion. Acta Neurol Scand, . **102**(6): p. 371-7.

OBJECTIVES: The aims of this study were to assess whether the site of lesion is predictive of upper limb recovery after stroke and to determine whether this information adds to the predictive ability of the clinical examination. MATERIAL AND METHODS: Forty-five patients were examined at entry to the study and at 2 and 12 months after stroke. The Brunnstrom-Fugl-Meyer test was used as outcome measurement. Predictor variables included clinical parameters and classifications of lesion site (obtained by CT/MRI). RESULTS: Correlation analysis revealed small to moderate relationships between lesions of subcortical structures and arm outcome at 2 months. In multiple regression analysis, the best model for predicting recovery at 2 months was found to be a combination of the clinical parameters with a purely subcortical lesion. Motor recovery at 12 months was best predicted by the clinical tests alone. The results further indicated that patients with subcortical damage tended to take longer to recover. CONCLUSIONS: Clinical assessment is most useful for determination of the prognosis of upper limb recovery after stroke. Neuroanatomical parameters measured by CT or MRI can only act as an adjunct.

Fox P., Richardson J., McInnes B., Tait D. and Bedard M., 2000,
Effectiveness of a bed positioning program for treating older adults with knee contractures who are institutionalized. Phys Ther, . **80**(4): p. 363-72.

BACKGROUND AND PURPOSE: Although contractures in patients in long-term care institutions are an important issue, there have been only a few studies that have evaluated interventions for contractures. The purpose of this study was to determine the effectiveness of a bed positioning program (BPP) for the treatment of patients with knee flexion contractures. SUBJECTS: Sixteen patients with a high level of cognitive and functional impairment (mean age=82 years, SD=6.48, range=71-93) in a chronic care hospital participated in the study. METHODS: The BPP consisted of stretching a patient's knee into extension and then securing and maintaining the position for a period of 40 minutes, 4 times per week. Participants were randomly assigned to 2 groups (n=8 in each group). One group received a BPP for 8 weeks, followed by 8 weeks of no intervention. The other group received the intervention in the reverse order. Once a week, participants were assessed for range of knee extension, knee pain, and skin integrity. RESULTS: Twelve participants completed the study. There was no improvement in participants' range of knee extension during the intervention period. Overall, there was no difference in mean range of knee extension between the intervention period and the no-intervention period. CONCLUSION AND DISCUSSION: The results of this study do not support the use of a BPP for treating patients with knee flexion contractures.

Frank M., Schlapfer H.U., Otte B., Yasikoff N. and Conzelmann M., 2000,
[Results of neurorehabilitation. An outcome study 20 months after stroke]. Schweiz Rundsch Med Prax, . **89**(44): p. 1799-808.

65 stroke survivors who were discharged home after completing an in- patient rehabilitation program were evaluated at home 20 months post- stroke by physiotherapists. 59 patients (91%) still lived in the community. Functional abilities remained stable with only 11% deteriorating and 25% improving in basal activities of daily living (BADL). 58% of patients needed assistance for at least one BADL and 46% showed signs of impaired cognition. Falls occurred in more than half of patients. Rehospitalisation was common (31%). Aside from living partners, care was provided by relatives in 58% and by home services in 46%. 25% of patients attended day care. Nearly half of patients still received rehabilitative therapy, especially if marked initial deficit was present. In conclusion, 20 months post stroke the majority of survivors who have completed rehabilitation successfully experience persistent limitations but remain in a stable functional status. This seems to be true for more severely disabled patients, too, if rehabilitative therapies, home services and day care are consequently provided.

Frankel M.R., Morgenstern L.B., Kwiatkowski T., Lu M., Tilley B.C., Broderick J.P., Libman R., Levine S.R. and Brott T., 2000,
Predicting prognosis after stroke: a placebo group analysis from the National Institute of Neurological Disorders and Stroke rt-PA Stroke Trial. Neurology, . **55**(7): p. 952-9.

BACKGROUND: Physicians are often asked to predict outcome after acute stroke. Very little information is available that can reliably predict the likelihood of severe disability or death. OBJECTIVE: To develop a practical method for predicting a poor outcome after acute ischemic stroke. METHODS: Data from the placebo arms of Parts 1 and 2 of the National Institute of Neurological Disorders and Stroke rt-PA [recombinant tissue plasminogen activator] Stroke Trial were used to identify variables that could predict a poor outcome, defined as moderately severe disability, severe disability, or death (Modified Rankin Scale score >3) 3 months after stroke. RESULTS: Baseline variables that predicted poor outcome were the NIH Stroke Scale (NIHSS) >17 plus atrial fibrillation, yielding a positive predictive value (PPV) of 96% (95% CI, 88 to 100%). The best predictor at 24 hours was NIHSS >22, yielding a PPV of 98% (95% CI, 93 to 100%). The best predictor at 7 to 10 days was NIHSS >16, yielding a PPV of 92% (95% CI, 85 to 99%). CONCLUSIONS: Patients with a severe neurologic deficit after acute ischemic stroke, as measured by the NIHSS, have a poor prognosis. During the first week after acute ischemic stroke, it is possible to identify a subset of patients who are highly likely to have a poor outcome. These findings require confirmation in a separate study.

Gamble G.E., Barberan E., Bowsher D., Tyrrell P.J. and Jones A.K., 2000,
Post stroke shoulder pain: more common than previously realized. Eur J Pain, . **4**(3): p. 313-5.

Stroke is a common disease often requiring rehabilitation, which may be prolonged by shoulder pain. The true incidence of post stroke shoulder pain has not been fully evaluated. In order to establish this, we undertook a prospective study

of 123 consecutive patients with a diagnosis of acute stroke during a 6-month period. Patients were assessed by interview, full rheumatological and neurological examination, 14 days post stroke, for a history of shoulder pain according to predetermined criteria. In addition, Barthel Index, HAD score and pain scores were also recorded. Twenty-five percent of patients developed shoulder pain within 2 weeks of their stroke. There was a statistically significant association with ipsilateral sensory impairment (p 0.005), abnormal rheumatological examination (p 0.001) and depression score (p 0.005).We conclude that post stroke shoulder pain is more common than previously realized and in addition to abnormal shoulder joint examination may also be associated with upper limb sensory impairment. Thorough neurological examination is required to detect sensory loss and hence establish patients at risk. This is probably best done by a structured proforma.

Gentilucci M., Bertolani L., Benuzzi F., Negrotti A., Pavesi G. and Gangitano M., 2000,
Impaired control of an action after supplementary motor area lesion: a case study. Neuropsychologia, . **38**(10): p. 1398-404.

The kinematics of the action formed by reaching-grasping an object and placing it on a second target was studied in a patient who suffered from an acute vascular left brain lesion, which affected the Supplementary Motor Area proper (SMA-proper) (Matelli M, Luppino G. Thalamic input to mesial and superior area 6 in the macaque monkey. Journal of Comparative Neurology 1996;372:59-87, Matelli M, Luppino G, Fogassi L, Rizzolatti G. Thalamic input to inferior area 6 and area 4 in the macaque monkey. Journal of Comparative Neurology 1989;280:468- 488), and in five healthy control subjects. The reach kinematics of the controls was affected by the positions of both the reaching-grasping and the placing targets (Gentilucci M, Negrotti A, Gangitano M. Planning an action. Experimental Brain Research 1997;115:116-28). In contrast, the reach kinematics of the patient was affected only by the position of the reaching-grasping target. By comparing these results with those previously found in Parkinson's disease patients executing the same action (Gentilucci M, Negrotti A. Planning and executing an action in Parkinson's disease patients. Movement Disorders 1999;1:69- 79, Gentilucci M, Negrotti A. The control of an action in Parkinson's disease. Experimental Brain Research 1999;129:269-277), we suggest that the anatomical "motor" circuit formed by SMA-proper (see above), Basal Ganglia (BG) and Thalamus (Alexander GE, Crutcher MD. Functional architecture of basal ganglia circuits: neural substrates of parallel processing. Trends in the Neurosciences 1990;13:266-271, Hoover JE, Strick PL. Multiple output channels in the basal ganglia. Nature 1993;259:819-821) may be involved in the control of actions: SMA-proper assembles the sequence of the action, whereas BG updates its parameters and stores them.

Greener J., Enderby P. and Whurr R., 2000,
Speech and language therapy for aphasia following stroke. Cochrane Database Syst Rev, . **2**.

BACKGROUND: Aphasia describes language impairment associated with a brain lesion. OBJECTIVES: The objective of this review was to assess the effects of formal speech and language therapy and non-professional types of support from untrained providers for people with aphasia after stroke. SEARCH STRATEGY: We searched the Cochrane Stroke Group Trials Register (last searched: March 1999), and reference lists of relevant articles to December 1998. We also contacted academic institutions and other researchers to identify further published and unpublished trials. We searched The International Journal of Disorders of Communication by hand (known by other names in the past), from 1969 to 1998. Date of most recent searches: January 1999. SELECTION CRITERIA: Randomised controlled trials comparing: 1. Any type of formal speech and language therapy in any setting administered by trained speech and language therapists versus no treatment. 2. Any type of formal speech and language therapy in any setting administered by trained speech and language therapists versus any type of informal support for aphasia, given by speech and language therapists or volunteers, whether these were trained or untrained. 3. One type of speech and language therapy versus another type. Outcome measures included measures of any type of communication, other measures of functioning, numbers of drop-outs, and other non-clinical outcomes. DATA COLLECTION AND ANALYSIS: The principal reviewer collected the data, and assessed the quality of the trials with independent data checking and methodological advice. If we could not perform a statistical combination of different studies, we sought missing data. Failing that we provided a description. MAIN RESULTS: We considered sixty studies in detail, from which we identified twelve trials suitable for the review. Most of these trials were relatively old with poor or unassessable methodological quality. None of the trials was detailed enough for us to complete description and analysis. We could not determine whether formal speech and language therapy is more effective than informal support. REVIEWER'S CONCLUSIONS: The main conclusion of this review is that speech and language therapy treatment for people with aphasia after a stroke has not been shown either to be clearly effective

or clearly ineffective within a RCT. Decisions about the management of patients must therefore be based on other forms of evidence. Further research is required to find out if effectiveness of speech and language therapy for aphasic patients is effective. If researchers choose to do a trial, this must be large enough to have adequate statistical power, and be clearly reported.

Haggard P., Cockburn J., Cock J., Fordham C. and Wade D., 2000,
Interference between gait and cognitive tasks in a rehabilitating neurological population. J Neurol Neurosurg Psychiatry, . **69**(4): p. 479-86.

OBJECTIVES: To quantify the extent of interference between gait and cognitive tasks after brain injury; to investigate whether such interference is common to various cognitive tasks, or confined to specific cognitive modules; to investigate whether such interference declines during recovery from brain injury. METHOD: Fifty participants were recruited from a neurological rehabilitation unit (33 people, 75% of sample); the stroke rehabilitation ward of an acute hospital (11 people, 20%); and a young disabled unit (six people, 5%). Measures of stride duration were taken in single task conditions, and in conjunction with each of four cognitive tasks. Outcome measures were dual task decrements in gait and in cognitive task performance. RESULTS: Overall, a 7% decrement in stride duration was recorded under dual task conditions compared with single task, with stride duration being significantly longer during simultaneous performance of each cognitive task. There was a 4% decrement on average in cognitive task performance under dual task conditions, with significant decrements being recorded for word generation while walking and paired associate monitoring while walking. A significant correlation (r=0.45) was found between dual task decrements and scores on a standard measure of disability-the Barthel activities of daily living scale-but the correlation with 10 m walking time was not significant (r=0.18). CONCLUSION: Interference between cognitive tasks and motor control activities such as gait is a problem in neurological rehabilitation settings. Interference between cognition and locomotor tasks may be important in assessing neurological patients' ability to function independently, and in designing therapies for both cognitive and motor rehabilitation.

Heldmann B., Kerkhoff G., Struppler A., Havel P. and Jahn T., 2000,
Repetitive peripheral magnetic stimulation alleviates tactile extinction. Neuroreport, . **11**(14): p. 3193-8.

Despite its frequency in right brain damaged patients crucial mechanisms of tactile extinction are still obscure and treatments are unavailable. Recent PET observations suggest a hypometabolism in the primary and secondary somatosensory cortex of the lesioned hemisphere in patients with tactile extinction. Functional and morphological investigations have shown that the sensorimotor cortex has a remarkable capability of reorganization when the sensory inflow is changed. Repetitive peripheral magnetic stimulation (RPMS) applied in patients suffering from central paresis alleviates sensorimotor as well as cognitive deficits by the induction of proprioceptive inflow, thereby activating plasticity in the CNS. Based on the observation of reduced metabolic activity in patients suffering from tactile extinction we applied RPMS to explore the effects of peripheral sensory stimulation on tactile extinction. Fourteen right-hemisphere lesioned patients with tactile extinction were randomly allocated to an experimental and a control group. The experimental group received one single RPMS treatment of the left forearm as well as a condition of attentional cueing known to improve visual extinction. The control group, with comparable tactile extinction scores, neither received RPMS nor verbal cueing, but was tested twice to evaluate possible learning or test repetition effects. In the experimental group RPMS led to a significant reduction of left-sided extinctions in the recognition of different tactual surfaces, but had no effect on ipsilesional errors. In contrast, attentional cueing had no significant effect on left-sided extinction errors but unexpectedly increased right-hand extinction errors slightly but significantly. The control group showed stable extinction scores of the left- and right-hand stimulus across two measurements, thus ruling out learning or test repetition effects. These results show that sensory inflow is an important modulatory factor in tactile extinction. Furthermore, multiple RPMS may prove a promising way for the rehabilitation of patients with this disorder.

Ivanenko YP., Viaud-Delmon I., Mayer E., Valenza N., Annoni J.M., Rohr A., Guyot J.P., Berthoz A. and Landis T., 2000,
Lack of anticipatory gaze-orienting responses in patients with right brain damage. Neurology, . **54**(8): p. 1656-61.

OBJECTIVE: To study eye movements during cervical proprioceptive stimulation by passive body rotation in darkness, with the head held stationary, in patients with right brain damage and hemineglect. BACKGROUND: At very low

frequency, this stimulation is reported to produce an illusion of head turning in space and eye deviations directed opposite to trunk rotation (in the direction of the illusory head rotation). METHODS: Ten normal subjects and seven patients with unilateral cerebral lesions (five right brain-damaged patients with mild to moderate visuospatial neglect, two left brain-damaged patients without neglect) were included in the study. Subjects were seated on a rotating chair. Stimuli consisted of slow sinusoidal passive trunk rotations (+/-30 degrees, 0.01 Hz) while the head was fixed in space. RESULTS: Eye movements directed opposite to trunk rotation were typical for normal subjects and for left brain-damaged patients. In contrast, all right brain-damaged patients showed either eye movements in the direction of trunk rotation or no eye deviations at all. CONCLUSION: This result could characterize a lack of anticipatory coordinating gaze behavior in patients with right brain damage.

Jewell G. and McCourt M.E., 2000,
Pseudoneglect: a review and meta-analysis of performance factors in line bisection tasks. Neuropsychologia, . **38**(1): p. 93-110.

An exhaustive qualitative (vote-counting) review is conducted of the literature concerning visual and non-visual line bisection in neurologically normal subject populations. Although most of these studies report a leftward bisection error (i.e., pseudoneglect), considerable between-study variability and inconsistency characterize this literature. A meta-analysis of this same literature is performed in which the total quantitative data set, comprising 73 studies (or sub- studies) and 2191 subjects, is analyzed with respect to 26 performance factors. The meta-analytic results indicate a significant leftward bisection error in neurologically normal subjects, with an overall effect size of between -0.37 and -0.44 (depending on integration method), which is significantly modulated to varying degrees by a number of additional task or subject variables. For example, visual bisection tasks, midsagittal-pointing tasks and tactile bisection tasks all lead to leftward errors, while kinesthetic tasks result in rightward errors. Tachistoscopic forced-choice testing methods reveal much greater estimates of bisection error (effect size = -1.32) than do manual method-of-adjustment procedures (effect size= -0.40). Subject age significantly modulates line bisection performance such that older subjects err significantly rightward compared to younger subjects, and to veridical line midpoint. Male subjects make slightly larger leftward errors than do female subjects. Handedness has a small effect on bisection errors, with dextrals erring slightly further to the left than sinistral subjects. The hand used to perform manual bisection tasks modulated performance, where use of the left hand lead to greater leftward errors than those obtained using the right hand. One of the most significant factors modulating bisection error is the direction in which subjects initiate motor scanning (with either eye or hand), where a left-to-right scan pattern leads to large leftward errors while a right-to-left scan pattern leads to rightward errors.

Karnath H.O., Ferber S. and Dichgans J., 2000,
The origin of contraversive pushing: evidence for a second graviceptive system in humans. Neurology, . **55**(9): p. 1298-304.

BACKGROUND: Stroke patients may exhibit the peculiar behavior of actively pushing away from the nonhemiparetic side, leading to lateral postural imbalance and a tendency to fall toward the paralyzed side. This phenomenon has been called the "pusher syndrome." OBJECTIVE: The current study analyzes the mechanism leading to contraversive pushing. METHODS: The subjective postural vertical (SPV) and subjective visual vertical (SVV) were determined in five consecutively admitted patients with severe contraversive pushing and in controls. Whereas adjustment of the SPV reflects the perceived upright orientation of the body, the SVV provides a sensitive and direction-specific measurement of peripheral and central vestibular dysfunction. RESULTS: The deficit leading to contraversive pushing is an altered perception of the body's orientation in relation to gravity. Pusher patients experience their body as oriented "upright" when it is tilted 18 degrees to the nonhemiparetic, ipsilesional side. In contrast, perception of the SVV was undisturbed. CONCLUSIONS: A separate pathway seems to be present in humans for sensing the orientation of gravity apart from the one for orientation perception of the visual world. This second graviceptive system decisively contributes to humans' control of upright body posture. Contraversive pushing occurring after stroke lesions may represent the behavioral correlate of a disturbed neural representation of this system.

Karussis D., Leker R.R. and Abramsky O., 2000,
Cognitive dysfunction following thalamic stroke: a study of 16 cases and review of the literature. J Neurol Sci, . **172**(1): p. 25-9.

The thalamus is a relay center for afferent sensory pathways that regulates and transmits peripheral stimulation to various representative areas of the cortex. Aphasia, neglect and anosognosia were also reported to occur after thalamic lesions, in the absence of cortical pathology. However, considerable controversy exists as to the pathogenetic mechanisms, and incidence of cognitive abnormalities following thalamic lesions. We present a series of sixteen consecutive stroke patients with thalamic stroke (n=12) or hemorrhage (n=4), admitted to a university based neurology department. Dysphasia was observed in seven of eight patients with left thalamic strokes (five in the territory of the tuberothalamic artery, two inferior-lateral thalamic lesions and one in the area supplied by the anterior choroidal artery). Neglect and anosognosia appeared in five of eight patients with right side thalamic insults (two each in the territories of the tuberothalamic and thalamogeniculate arteries and one in the area supplied by the posterior choroidal artery). These findings reconfirm those found in previous studies and suggest that the thalamus is part of an integral neuronal network concerned with cognitive functions.

Kimura M., Robinson R.G. and Kosier J.T., 2000,
Treatment of cognitive impairment after poststroke depression : a double-blind treatment trial. Stroke, . **31**(7): p. 1482-6.

BACKGROUND AND PURPOSE: Patients with poststroke major depression have a greater severity of cognitive impairment than nondepressed patients even when matched for size and location of stroke lesion. Prior treatment studies have consistently failed to show an improvement in cognitive function even when poststroke mood disorders responded to antidepressant therapy. We examined the response of cognitive function to treatment with nortriptyline or placebo in a double-blind trial. METHODS: Patients with major (n=33) or minor (n=14) depression participated in a double-blind treatment study with nortriptyline or placebo. They were examined for change in depressive mood, measured by the Hamilton Rating Scale for Depression (HAM-D), and change in cognitive impairment, assessed by the Mini-Mental State Examination (MMSE), after treatment with nortriptyline or placebo. Cognitive treatment response, as measured by the MMSE, was compared between patients whose depression did and did not respond to treatment. RESULTS: Patients whose poststroke depression remitted (predominantly associated with nortriptyline treatment) had significantly greater recovery in cognitive function over the course of the treatment study than patients whose mood disorder did not remit (predominantly associated with placebo treatment). CONCLUSIONS: Our findings support the contention that poststroke major depression leads to a "dementia of depression." Prior studies failed to show an effect of treatment because the effect size was too small. Successful treatment of depression may constitute one of the major methods of promoting cognitive recovery in victims of stroke.

Kompoliti K., Goetz C.G., Leurgans S., Morrissey M. and Siegel I.M., 2000,
"On" freezing in Parkinson's disease: resistance to visual cue walking devices. Mov Disord, . **15**(2): p. 309-12.

OBJECTIVE: To measure "on" freezing during unassisted walking (UW) and test if two devices, a modified inverted stick (MIS) and a visual laser beam stick (LBS) improved walking speed and number of "on" freezing episodes in patients with Parkinson's disease (PD). BACKGROUND: Multiple visual cues can overcome "off' freezing episodes and can be useful in improving gait function in parkinsonian patients. These devices have not been specifically tested in "on" freezing, which is unresponsive to pharmacologic manipulations. METHODS: Patients with PD, motor fluctuations and freezing while "on," attempted walking on a 60- ft track with each of three walking conditions in a randomized order: UW, MIS, and LBS. Total time to complete a trial, number of freezes, and the ratio of walking time to the number of freezes were compared using Friedman's test. RESULTS: Twenty-eight patients with PD, mean age 67.81 years (standard deviation [SD] 7.54), mean disease duration 13.04 years (SD 7.49), and mean motor Unified Parkinson's Disease Rating Scale score "on" 32.59 (SD 10.93), participated in the study. There was a statistically significant correlation of time needed to complete a trial and number of freezes for all three conditions (Spearman correlations: UW 0.973, LBS 0.0.930, and MIS 0.842). The median number of freezes, median time to walk in each condition, and median walking time per freeze were not significantly different in pairwise comparisons of the three conditions (Friedman's test). Of the 28 subjects, six showed improvement with the MIS and six with the LBS in at least one outcome measure. CONCLUSION: Assisting devices, specifically based on visual cues, are not consistently beneficial in overcoming "on" freezing in most patients

with PD. Because this is an otherwise untreatable clinical problem and because occasional subjects do respond, cautious trials of such devices under the supervision of a health professional should be conducted to identify those patients who might benefit from their long-term use.

Kroenke K., Hoffman R.M. and Einstadter D., 2000,
How common are various causes of dizziness? A critical review. South Med J, . **93**(2): p. 160-7; quiz 168.

BACKGROUND: Although dizziness is a common symptom in both primary care and referral practices, the relative frequency of various causes has not been well delineated. METHODS: A MEDLINE search identified 12 articles containing original data on the etiology of dizziness in consecutive patients. Study sites included primary care offices (n = 2), emergency room (n = 4), and referral clinics (n = 6). Each study's strength of design was graded using nine quality criteria. RESULTS: Dizziness was attributed to a peripheral vestibulopathy in 44% of patients, a central vestibulopathy in 11%, psychiatric causes in 16%, other conditions in 26%, and an unknown cause in 13%. Certain serious causes were relatively uncommon, including cerebrovascular disease (6%), cardiac arrhythmia (1.5%), and brain tumor (1%). CONCLUSIONS: Dizziness is due to vestibular or psychiatric causes in more than 70% of cases. Since serious treatable causes appear uncommon, diagnostic testing can probably be reserved for a small subset of patients.

Lange G., Waked W., Kirshblum S. and DeLuca J., 2000,
Organizational strategy influence on visual memory performance after stroke: cortical/subcortical and left/right hemisphere contrasts. Arch Phys Med Rehabil, . **81**(1): p. 89-94.

OBJECTIVE: To examine how organizational strategy at encoding influences visual memory performance in stroke patients. DESIGN: Case control study. SETTING: Postacute rehabilitation hospital. PARTICIPANTS: Stroke patients with right hemisphere damage (n = 20) versus left hemisphere damage (n = 15), and stroke patients with cortical damage (n = 11) versus subcortical damage (n = 19). MAIN OUTCOME MEASURES: Organizational strategy scores, recall performance on the Rey-Osterrieth Complex Figure (ROCF). RESULTS: Results demonstrated significantly greater organizational impairment and less accurate copy performance (i.e., encoding of visuospatial information on the ROCF) in the right compared to the left hemisphere group, and in the cortical relative to the subcortical group. Organizational strategy and copy accuracy scores were significantly related to each other. The absolute amount of immediate and delayed recall was significantly associated with poor organizational strategy scores. However, relative to the amount of visual information originally encoded, memory performances did not differ between groups. CONCLUSIONS: These findings suggest that visual memory impairments after stroke may be caused by a lack of organizational strategy affecting information encoding, rather than an impairment in memory storage or retrieval.

Langhammer B. and Stanghelle J., 2000,
Bobath or motor relearning programme? A comparison of two different approaches of physiotherapy in stroke rehabilitation: a randomized controlled study. Clin Reh, . **14**(4): p. 361-9.

OBJECTIVE: To examine whether two different physiotherapy regimes caused any differences in outcome in rehabilitation after acute stroke. DESIGN: A double-blind study of patients with acute first-ever stroke. Sixty-one patients were consecutively included, block randomized into two groups, and stratified according to gender and hemiplegic site. Group 1 (33 patients) and group 2 (28 patients) had physiotherapy according to Motor Relearning Programme (MRP) and Bobath, respectively. The supplemental treatment did not differ in the two groups. MAIN OUTCOME MEASURES: The Motor Assessment Scale (MAS), the Sodring Motor Evaluation Scale (SMES), the Barthel ADL Index and the Nottingham Health Profile (NHP) were used. The following parameters were also registered: length of stay in the hospital, use of assistive devices for mobility, and the patient's accommodation after discharge from the hospital. RESULTS: Patients treated according to MRP stayed fewer days in hospital than those treated according to Bobath (mean 21 days versus 34 days, p = 0.008). Both groups improved in MAS and SMES, but the improvement in motor function was significantly better in the MRP group. The two groups improved in Barthel ADL Index without significant differences between the groups. However, women treated by MRP improved more in ADL than women treated by Bobath. There were no differences between the groups in the life quality test (NHP), use of assistive devices or accommodation after discharge from the hospital. CONCLUSION: The present study indicates that physiotherapy treatment using the MRP is preferable to that using the Bobath programme in the acute rehabilitation of stroke patients.

Lennon S. and Ashburn A., 2000,
The Bobath concept in stroke rehabilitation: a focus group study of the experienced physiotherapists' perspective. Disabil Rehabil, . **22**(15): p. 665-74.

PURPOSE: The Bobath concept, usually known as neuro-developmental treatment (NDT) in America, is one of the major approaches used to rehabilitate patients following stroke; however since the last publication of Bobath (1990), the concept has been taught via an oral tradition on postgraduate courses. This study therefore aimed to explore with experienced therapists firstly how the Bobath concept had changed since 1990, and secondly what they considered its main theoretical assumptions to be using a focus group research design. METHOD: Eight peer-nominated expert physiotherapists agreed to participate in two focus groups organized according to specialist interest in either neurology (group A) or elderly care (group B). Therapists were asked to discuss six topics based on a review of published literature. Data analysis involved several readings of verbatim transcriptions, from which key themes and concepts were developed. RESULTS: All therapists agreed on the following core themes defining Bobath: analysis of normal movement, control of tone and facilitation of movement. Neuroplasticity was described as the primary rationale for treatment with therapists using afferent information to target the damaged central nervous system. In addition group A discussed motor learning, whereas group B discussed patient focused goals and relating treatment to function. CONCLUSIONS: This study highlighted changes in theory, terminology, and techniques. Tone remained a major problem in the rehabilitation management of the hemiplegic patient; however much attention was also directed towards the musculoskeletal system. Both facilitation of normal movement components and task specific practice using specific manual guidance were considered critical elements of the Bobath concept. For Bobath therapists, physiotherapy has an important impact on both the performance components of movement and functional outcomes. In view of the small numbers involved in this preliminary study, further studies are now needed to determine if these themes and concepts are congruent with the majority of physiotherapists' interpretation of the Bobath concept in stroke rehabilitation.

Levin M.F., Selles R.W., Verheul M.H. and Meijer O.G., 2000,
Deficits in the coordination of agonist and antagonist muscles in stroke patients: implications for normal motor control. Brain Res, . **853**(2): p. 352-69.

Movement impairments about a single joint in stroke patients may be related to deficits in the central regulation of stretch reflex (SR) thresholds of agonist and antagonist muscles. One boundary of the SR threshold range for elbow flexor and extensor muscles was measured in hemiparetic subjects by analysing electromyographic activity during stretching of relaxed muscles at seven different velocities. For each velocity, dynamic SR thresholds were measured as angles at which electromyographic activity appeared. These data were used to determine the sensitivity of the threshold to velocity and the static SR thresholds for flexors and extensors. In contrast to relaxed muscles in healthy subjects, static flexor and extensor thresholds lay within the physiological range in 11/12 and 4/12 subjects, respectively. This implies that, in the range between the static SR threshold and one of the physiological joint limits, relaxation of the muscle was impossible. Subjects then made slow movements against different loads to determine their ranges of active movement. Maximal flexor and extensor torques were lower in hemiparetic subjects throughout the angular range. In some subjects, ranges were found in which no active torque could be produced in either extensor or both muscle groups. These ranges were related to the boundary values of SR thresholds found during passive muscle stretch. The range in which reciprocally organized agonist and antagonist muscle activity could be generated was limited in all but one subject. When attempting to produce torque from positions outside their measured range of movement, excessive muscle coactivation occurred, typically producing no or paradoxical motion in the opposite direction. Results suggest a relationship between spasticity measured at rest and the movement deficit in stroke by demonstrating a link between motor deficits and control deficits in the central regulation of individual SR thresholds.

Liston R., Mickelborough J., Harris B., Hann A.W. and Tallis R.C., 2000,
Conventional physiotherapy and treadmill re-training for higher-level gait disorders in cerebrovascular disease. Age Ageing, . **29**(4): p. 311-8.

OBJECTIVES: to compare the therapeutic effects of two approaches to gait re-training--a schedule of conventional physiotherapy and treadmill re-training--in patients with higher-level gait disorders associated with cerebral multiinfarct states. DESIGN: single-blind crossover study involving a 4-week baseline period, 4 weeks of treadmill re-training and

4 weeks of conventional physiotherapy. SETTING: a large teaching hospital. SUBJECTS: patients with cerebral multi-infarct states who met the criteria for higher-level gait disorders. Computed tomographic brain scans showed at least one large vessel infarct, basal ganglia and white matter lacunes or extensive leukoaraiosis. INTERVENTIONS: a schedule of treadmill re-training and a specific schedule of physiotherapy containing 31 interventions in three treatment modules: (i) for gait ignition failure and turning; (ii) to improve postural alignment and enhance balance reactions; and (iii) for other components of cerebral multi-infarct state disordered gait. MAIN OUTCOME MEASURES: spatial and temporal gait measures and activity of daily living assessments. RESULTS: we recruited 18 patients, mean (SD) age 79.1 (6.8) years. Patients walked an average of 7.9 (5.5) km on the treadmill and had an average of 6.7 (3.2) h of physiotherapy. There were clinically moderate but highly statistically significant (P 0.001) improvements in the following indices: time taken to complete the sit-to-stand test; time taken to walk 10 m; number of steps over 10 m; walking velocity; right and left step lengths; and time taken to complete the 'S' test. There were no differences in the results obtained in each limb of the study. CONCLUSION: there is no difference between the effects of conventional physiotherapy and treadmill re- training on the gait of patients with higher-level gait disorders associated with cerebral multi-infarct states. However, the improvements seen during the treatment period suggest that there is scope to improve the gait of this group of frail, elderly patients.

Lonn J., Crenshaw A.G., Djupsjobacka M. and Johansson H., 2000,
Reliability of position sense testing assessed with a fully automated system. Clin Physiol, . **20**(1): p. 30-7.

Position sense testing has increased as a tool for augmenting evaluation of joint injury. In the present study, we investigated the inter-day reliability for four different types of position sense tests using a fully automated system. The tests included (1) passive presentation/active replication, (2) passive presentation/passive replication, (3) semi-passive presentation/semi-passive replication (where semi-passive denotes passive movement during antagonist muscle contraction), and (4) active presentation/active replication. The absolute difference between presented target and replicated position was used as a measure of position sense accuracy. Ten healthy subjects who were blindfolded and seated with the arm in a moveable rig performed the tests on two occasions, separated by 3-4 days. For each type of position sense test, horizontal abduction from a starting position of 0 degrees (relative to the sagittal plane) to target positions of 32 degrees and 64 degrees, and horizontal adduction from a starting position of 80 degrees to 48 degrees and 16 degrees were conducted. A two-way ANOVA revealed no differences in absolute error between days or between testing procedures. However, intra-class correlations (ICC), which are most often used to express test-retest reliability, were moderate at best, ranging from 0.40 to 0.61 for the four types of position sense tests. Hence, the present study indicates that the ability of repositioning tests to detect alterations in proprioceptive function is limited, suggesting that their use in clinical evaluation be approached with prudence.

Lundin-Olsson L., Nyberg L. and Gustafson Y., 2000,
The Mobility Interaction Fall chart. Physiother Res Int, . **5**(3): p. 190-201.

BACKGROUND AND PURPOSE: The aim of this study was to develop and evaluate a screening tool for the identification of older people living in residential care facilities who are prone to falling. METHOD: Two tests focusing on attentional demands while walking were performed: 'Stops walking when talking' and the 'diffTUG'. Medical assessment, rating for cognition, depression and activities of daily living were also carried out. Falls indoors were followed up prospectively over a period of six months. A flowchart, the Mobility Interaction Fall (MIF) chart, for the identification of older people who are prone to falling was developed. The MIF chart includes an observation of mobility level and 'Stops walking when talking', the diffTUG, a test of vision and a rating of concentration. Study subjects were 78 residents, aged over 65 years, in one residential care facility (22 M; 56 F; median age 82 years, range 66-99 years) in Umea, Sweden. RESULTS: Thirty-three (42%) subjects suffered at least one fall indoors during the follow-up period. The rate of falls differed significantly between those subjects classified as being at risk of falls and those not so classified (log rank test 39.1; p 0.001; hazard ratio 12.1; 95% CI 4.6-31.8). The positive predictive value for the classification was 78% (95% CI 67-87%) and the negative predictive value was 88% (95% CI 79-95%). CONCLUSION: The initial findings for the MIF chart indicate a promising way of classifying older people at residential care facilities as being at high or low risk of falling. The classification is quick and easy and requires no expensive equipment.

Mahoney J.E., Eisner J., Havighurst T., Gray S. and Palta M., 2000,

Problems of older adults living alone after hospitalization. J Gen Intern Med, . **15**(9): p. 611-9.

OBJECTIVE: To describe functional deficits among older adults living alone and receiving home nursing following medical hospitalization, and the association of living alone with lack of functional improvement and nursing home utilization 1 month after hospitalization. DESIGN: Secondary analysis of a prospective cohort study. PARTICIPANTS: Consecutive sample of patients age 65 and over receiving home nursing following medical hospitalization. Patients were excluded for new diagnosis of myocardial infarction or stroke in the previous 2 months, diagnosis of dementia if living alone, or nonambulatory status. Of 613 patients invited to participate, 312 agreed. MEASUREMENTS: One week after hospitalization, patients were assessed in the home for demographic information, medications, cognition, and self-report of prehospital and current mobility and function in activities of daily living (ADLs) and independent activities of daily living (IADLs). One month later, patients were asked about current function and nursing home utilization. The outcomes were lack of improvement in ADL function and nursing home utilization 1 month after hospitalization. RESULTS: One hundred forty-one (45%) patients lived alone. After hospital discharge, 40% of those living alone and 62% of those living with others had at least 1 ADL dependency (P =.0001). Patients who were ADL- dependent and lived alone were 3.3 (95% confidence interval [95% CI], 1.4 to 7. 6) times less likely to improve in ADLs and 3.5 (95% CI, 1.0 to 11. 9) times more likely to be admitted to a nursing home in the month after hospitalization. CONCLUSION: Patients who live alone and receive home nursing after hospitalization are less likely to improve in function and more likely to be admitted to a nursing home, compared with those who live with others. More intensive resources may be required to continue community living and maximize independence.

Marchese R., Diverio M., Zucchi F., Lentino C. and Abbruzzese G., 2000,
The role of sensory cues in the rehabilitation of parkinsonian patients: a comparison of two physical therapy protocols. Mov Disord, . **15**(5): p. 879-83.

We devised a single-blind study to assess the role of providing external sensory cues in the rehabilitation of patients with idiopathic Parkinson's disease (PD). Twenty stable, nondemented patients with PD entered a 6-week rehabilitation program and were randomly assigned to two balanced protocols which were differentiated by the use of external sensory cues ("non-cued" vs "cued"). Patients were evaluated by a neurologist, who was blind to group membership, with the Unified Parkinson's Disease Rating Scale (UPDRS) at baseline, end of treatment, and after 6 weeks. Patient groups were comparable for age, disease duration, and severity. A significant reduction of UPDRS scores (activities of daily living and motor sections) was present after the rehabilitation phase in both groups. However, at follow up, while this clinical improvement had largely faded in the "non-cued" group, mean UPDRS scores of the "cued" group were still significantly lower than baseline values. The incorporation of external sensory cues in the rehabilitation protocol can extend the short-term benefit of physical therapy in moderately disabled patients with PD, possibly as a result of the learning of new motor strategies. "Cued" physical therapy for PD should be targeted to compensate for the defective physiological mechanisms.

Martino R., Pron G. and Diamant N., 2000,
Screening for oropharyngeal dysphagia in stroke: insufficient evidence for guidelines. Dysphagia, . **15**(1): p. 19-30.

There is no evaluation of the evidence for the screening of oropharyngeal dysphagia in stroke. We reviewed the literature on clinical screening for oropharyngeal dysphagia in adults with stroke to determine (a) the accuracy of different screening tests used to detect dysphagia defined by abnormal oropharyngeal physiology on videofluoroscopy and (b) the health outcomes reported and whether screening alters those outcomes. Peer-reviewed English-language and human studies were sought through Medline (from 1966 to July 1997) by using the key words cerebrovascular disorders and deglutition disorders, relevant Internet addresses, and extensive hand searching of bibliographies of identified articles. Of the 154 sources identified, 89 articles were original, peer-reviewed, and focused on oropharyngeal dysphagia in stroke patients. To evaluate the evidence, the next selection identified 10 articles on the comparison of screening and videofluoroscopic findings and three articles on screening and health outcomes. Evidence was rated according to the level of study design by using the values of the Canadian Task Force on Periodic Health Examination. From the identified screening tests, most of the screenings were related to laryngeal signs (63%) and most of the outcomes were related to physiology (74%). Evidence for screening accuracy was limited because of poor study design and the predominant use of aspiration as the diagnostic reference. Only two screening tests were identified as accurate: failure on the 50-ml water test (likelihood

ratio = 5.7, 95% confidence interval = 2.5-12.9) and impaired pharyngeal sensation (likelihood ratio = 2.5, 95% confidence interval = 1.7-3.7). Limited evidence for screening benefit suggested a reduction in pneumonia, length of hospital stay, personnel costs, and patient charges. In conclusion, screening accuracy needs to be assessed by using both abnormal physiology and aspiration as diagnostic markers for dysphagia. Large well-designed trials are needed for more conclusive evidence of screening benefit.

McNevin N.H., Wulf G. and Carlson C., 2000,
Effects of attentional focus, self-control, and dyad training on motor learning: implications for physical rehabilitation. Phys Ther, . **80**(4): p. 373-85.

In this article, the authors review recent studies on 3 factors that have been shown to affect the learning of motor skills-the performer's attentional focus, self-control, and practice in dyads-and discuss their implications for rehabilitation. Research has shown that directing learners' attention to the effects of their movements can be more beneficial for learning than directing their attention to the details of their own actions. Furthermore, giving learners some control over the training regimen has been found to enhance learning, unlike prescriptive training protocols that dictate when feedback will be delivered, how often, and the order that tasks will be practiced. Finally, not only can practice in dyads (or larger groups) reduce the costs of training, but it can also result in more effective learning than individual practice sessions. The incorporation of these factors into rehabilitation practice can potentially enhance the effectiveness and efficiency of rehabilitation.

Meegan D.V., Aslin R.N. and Jacobs R.A., 2000,
Motor timing learned without motor training. Nat Neurosci, . **3**(9): p. 860-2.

Improvements due to perceptual training are often specific to the trained task and do not generalize to similar perceptual tasks. Surprisingly, given this history of highly constrained, context- specific perceptual learning, we found that training on a perceptual task showed significant transfer to a motor task. This result provides evidence for a common neural architecture underlying analysis of sensory input and control of motor output, and suggests a potential role for perception in motor development and rehabilitation.

Mitoma H., Hayashi R., Yanagisawa N. and Tsukagoshi H., 2000,
Gait disturbances in patients with pontine medial tegmental lesions: clinical characteristics and gait analysis. Arch Neurol, . **57**(7): p. 1048-57.

OBJECTIVE: To determine the clinical characteristics of gait disorders in patients with pontine medial tegmental lesions. DESIGN: We compared features of gait disorders between patients with infarcts in the medial tegmentum and those with stroke in other areas of the pons (pathological control subjects) by measuring electromyographic results of lower limb muscles and several biomechanical parameters. PATIENTS: Two patients with infarcts in the rostral medial tegmentum and 4 control subjects. Two of the control patients had lesions in the pontine base, while the lesions in the other 2 were in the pontine tegmentum and base (combined lesions). RESULTS: Patients with rostral medial tegmental lesions and controls with pontine base lesions showed unstable walking characterized by irregular angular displacements and foot pressures. However, they differed by the following 3 features. (1) Rostral medial tegmental lesions elicited truncal ataxia without limb ataxia. In comparison, pontine base lesions elicited limb ataxia without truncal ataxia and caused hemiparesis. (2) Instability was more severe and persistent in patients with the former lesions than in those with the latter lesions. Slowness of walking speed and prolongation of the double-support period were clearly observed in the former group. (3) Electromyographic changes characteristic of cerebellar ataxia were clearly evident in patients with rostral medial tegmental lesions. The electromyographic amplitudes of the gastrocnemius and tibialis anterior muscles were almost constant throughout the gait cycle, resulting in the disappearance of the inherent periodic pattern of each muscle. CONCLUSION: Medial tegmental lesions in the rostral pons cause prolonged and severe unstable walking that resembles spinocerebellar ataxic pattern, and impairment of the spinocerebellar loop might be the pathomechanism underlying such a gait disturbance.

Muller C., Atria M., Voller B. and Auff E., 2000,
[The Neuro-Mental Index. An addition to the Barthel Index for detection of impairments in basic psychological-mental diemsnions in neurorehabilitation]. Nervenarzt, . **71**(12): p. 963-9.

The Barthel Index (BI) is the most commonly used scale for assessing impairment of activities of daily living (ADL). For a global view of patients' abilities and the care needed in everyday neurorehabilitation practice, additional information about basic psychological and cognitive functions is essential. We therefore designed a new disability scale comprised of assessments of consciousness, approachability, orientation, memory, behaviour, emotions, communication, problem solving, perception, and behaviour at night. The scale shows exactly the same inner structure as the BI, with ten items and a score of up to 20 in steps from 0-100% (or 0-20 points). By a careful weighing of the items, the final score of the neuromental index (NMI) should create a clearer picture of both the disabilities and the needed resources. A second aim was to cover a broad range of patients including those in coma and coma remission states and those with only slight neuropsychological or behavioural symptoms. The NMI was examined with a group of 179 neurorehabilitation inpatients and proved to be highly valid, reliable, and practicable. It was designed to enable a global assessment of disability as well as the care resources needed, even in patients with different disability levels in ADL and psychological and cognitive functions.

Nudo R.J., Friel K.M. and Delia S.W., 2000,
Role of sensory deficits in motor impairments after injury to primary motor cortex. Neuropharmacology, . **39**(5): p. 733-42.

After a focal ischemic lesion in the hand representation of the primary motor cortex in squirrel monkeys, manual skill was mildly and transiently impaired on a reach-and-retrieval task. Performance was significantly poorer during weeks 1 and 3 post-lesion, but was normal by week 4. An unusual behavioral event was also observed after the lesion. Monkeys reached for pellets, but visually inspected the hand for the presence of the pellets, even when none were actually retrieved. This behavior, possibly indicative of a sensory deficit, was rarely observed prior to the lesion, but was observed at significantly higher levels during week one post-lesion. These results suggest that the primary motor cortex plays a significant role in somatosensory processing during the execution of motor tasks. Motor deficits heretofore identified as purely motor, may be at least partially due to a sensory deficit, or sensory-motor disconnection.

Pomeroy V.M., Frames C., Faragher E.B., Hesketh A., Hill E., Watson P. and Main C.J., 2000,
Reliability of a measure of post-stroke shoulder pain in patients with and without aphasia and/or unilateral spatial neglect. Clin Rehabil, . **14**(6): p. 584-91.

OBJECTIVE: To determine the inter/intra-rater reliability of expert physiotherapists (PTs) measuring post-stroke shoulder pain with 100 mm vertical visual analogue scales (VAS; intensity, frequency and affective response) and a categorical site-of-pain scale. DESIGN: Three PTs independently rated subjects (normal clinical procedure but with a standardized starting position) on three days, at the same time of day, during one week in a randomized order determined by a nested latin square. Reliability for VAS scores was determined with the intraclass correlation coefficient (ICC) and for site-of-pain with the kappa statistic (kappa). Acceptable reliability was set at 0.75. The limits of agreement were also calculated. SETTING: Community. SUBJECTS: Thirty- three patients, mean time post stroke 42 months (range 7-360). RESULTS: Mean inter-rater reliability was 0.79 for intensity, 0.75 for frequency and 0.62 for affective response (ICC). The limits of agreement were wide and rater bias was significant for 6/27 ratings. Mean intra-rater reliability was 0.70 for intensity, 0.77 for frequency and 0.69 for affective response (ICC). For site-of-pain inter-rater reliability ranged from 0.156 (kappa) to 0.385 (kappa) and intrarater reliability ranged from 0.300 (kappa) to 0.559 (kappa). CONCLUSIONS: Although inter-rater reliability was acceptable for intensity and frequency there was a consistently large systematic bias between pairs of raters. Agreement might be improved if a standardized assessment procedure was used and/or if training in pain behaviour interpretation was provided.

Randall K.E. and McEwen I.R., 2000,
Writing patient-centered functional goals. Phys Ther, . **80**(12): p. 1197-203.

Motor learning research, health care policies, reimbursement practices, and the standards of accrediting bodies all support

writing patient- centered functional goals of physical therapy. This article defines patient-centered functional goals within the context of the Guide to Physical Therapist Practice and provides a rationale for incorporating functional goals into physical therapy for patients in all areas of practice. The article also describes how physical therapists can collaborate with patients to identify functional goals that are meaningful to them and describes a 5-step process for writing functional goals that are measurable.

Richardson J., Law M., Wishart L. and Guyatt G., 2000,
The use of a simulated environment (easy street) to retrain independent living skills in elderly persons: a randomized controlled trial. J Gerontol A Biol Sci Med Sci, . **55**(10): p. M578-84.

BACKGROUND: Older adults who receive training for functional skills in contextually appropriate environments may show greater functional improvement than persons trained in a traditional environment. Functionally limited older adults receiving training in contextually appropriate environments (simulated home and community settings) may show greater improvement in activities of daily living (ADL) than persons trained in a traditional manner. METHODS: Eighty-eight patients from a day hospital, aged 65 years or older, were randomized to either receive rehabilitation in a simulated environment (Easy Street) or in a gymnasium setting. Rehabilitation focused on retraining functional skills in a contextually appropriate environment (Easy Street) or in a traditional setting (gymnasium) using motor learning principles for a period of 16 weeks. Outcome measures included the Structured Assessment of Instrumental Living Skills (SAILS), a performance measure with criterion and timed components; a self-report health status questionnaire, the Short Form-36 (SF-36); and the patient-orientated goal-directed Canadian Occupational Performance Measure (COPM). RESULTS: There were no group differences on any of the outcome measures: SAILS ($p = .3$); the SF-36 physical ($p = .83$) and mental ($p = .51$); and the COPM performance scale ($p = .94$) and satisfaction scale ($p = .40$). CONCLUSIONS: Although we have not excluded benefits of contextually appropriate rehabilitation environments with different intervention approaches, at different stages of rehabilitation or with patients at higher functional levels, our results suggest the appropriateness of a moratorium on these expensive interventions pending demonstration of clear positive effects determined from further study.

Sanger T.D. and Merzenich M.M., 2000,
Computational model of the role of sensory disorganization in focal task-specific dystonia. J Neurophysiol, . **84**(5): p. 2458-64.

We present a new computational model for the development of task- specific focal dystonia. The purpose of the model is to explain how altered sensory representations can lead to abnormal motor behavior. Dystonia is described as the result of excessive gain through a sensorimotor loop. The gain is determined in part by the sensory cortical area devoted to each motor function, and behaviors that lead to abnormal increases in sensory cortical area are predicted to lead to dystonia. Properties of dystonia including muscular co-contraction, overflow movements, and task specificity are predicted by properties of a linear approximation to the loop transformation. We provide simulations of several different mechanisms that can cause the gain to exceed 1 and the motor activity to become sustained and uncontrolled. The model predicts that normal plasticity mechanisms may contribute to worsening of symptoms over time.

Sinden J.D., Stroemer P., Grigoryan G., Patel S., French S.J. and Hodges H., 2000,
Functional repair with neural stem cells. Novartis Found Symp, . **231**: p. 270-83.

Approval to commence phase I/II clinical trials with neural stem cells requires proof of concept in well-accepted animal models of human neurological disease or injury. We initially showed that the conditionally immortal MHP36 line of hippocampal origin (derived from the H-2Kb-tsA58 transgenic mouse) was effective in repopulating CA1 neurons in models of global ischaemia and repairing cognitive function, and have now shown that this line is multifunctional. MHP36 cells are effective in restoring spatial memory deficits in rats after excitotoxic lesions of the cholinergic projections to cortex and hippocampus and in rats showing cognitive impairments due to normal ageing. Moreover, grafts of MHP36 cells are effective in reversing sensory and motor deficits and reducing lesion volume as a consequence of occlusion of the middle cerebral artery, the major cause of stroke. In contrast, MHP36 cell grafts were unable to repair motor asymmetries in rats with unilateral 6-hydroxydopamine lesions of the nigrostriatal dopamine system, the prototype rodent model of Parkinson's disease. These data show that conditionally immortal neuroepithelial stem cells are multifunctional,

being able to repair diverse types of brain damage. However, there are limitations to this multifunctionality, suggesting that lines from different regions of the developing brain will be required to treat different brain diseases. ReNeuron is currently developing human neuroepithelial stem cell lines from different brain regions and with similar reparative properties to our murine lines.

Su C.Y., Chang J.J., Chen H.M., Su C.J., Chien T.H. and Huang M.H., 2000,
Perceptual differences between stroke patients with cerebral infarction and intracerebral hemorrhage. Arch Phys Med Rehabil, . **81**(6): p. 706-14.

OBJECTIVE: To assess perceptual performances of patients with intracerebral hemorrhage (ICH) compared with those of ischemic patients early after stroke and to analyze the psychometric properties of three perceptual tests used in the study. DESIGN: Cross-sectional study. SETTING: A rehabilitation unit at a teaching hospital. PATIENTS: Twenty-two stroke patients with ICH and 22 demographically matched stroke patients with infarction. MAIN OUTCOME MEASURES: Loewenstein Occupational Therapy Cognitive Assessment (LOTCA), Rivermead Perceptual Assessment Battery (RPAB), and Motor-Free Visual Perception Test (MVPT). RESULTS: Stroke patients with ICH had significantly more severe deficits on a task of thinking operations than did patients with infarction. A significant lateralized effect of stroke existed in the ICH group, with patients with right-hemisphere strokes scoring lower than patients with left-hemisphere strokes on the figure-ground discrimination subtest of the RPAB. A considerable overlap among the three instruments was found. Yet, the observed correlations between supposedly similar subtests from the tests proved to be moderate, indicating that to a certain extent these test measures tap different perceptual processes. Four factors were generated from a joint LOTCA- RPAB-MVPT factor analysis. They assessed different facets of perceptual functioning, including higher-level and lower-level perceptual skills, part/whole conceptual integration, and color perception. This factor pattern accounted for 75.5% of the variance. CONCLUSIONS: Higher-level perceptual functions tend to be relatively susceptible to ICH stroke pathology early in the course of the disease. This information has important clinical implications in the early treatment planning for the stroke patients with ICH, such that specific compensatory strategies for these deficiencies should be devised to facilitate a successful rehabilitation. Knowledge regarding the influences of specific deficits on the performance of daily activities may also be useful to the patients' family.

Sullivan E.V., Rosenbloom M.J., Lim K.O. and Pfefferbaum A., 2000,
Longitudinal changes in cognition, gait, and balance in abstinent and relapsed alcoholic men: relationships to changes in brain structure. Neuropsychology, . **14**(2): p. 178-88.

Chronic alcoholism is associated with cognitive and motor deficits, and there is evidence for reversibility with sobriety. Alcoholic men were examined after 1 month of sobriety and 2 to 12 months later with cognitive and motor tests and magnetic resonance imaging. In this naturalistic study, 20 alcoholic participants had abstained and 22 had resumed drinking at retesting. Abstainers sustained greater improvement than relapsers on tests of delayed recall of drawings, visuospatial function, attention, gait, and balance. Shrinkage in 3rd ventricle volume across all participants significantly correlated with improvement in nonverbal short-term memory. Additional brain structure- function relationships, most involving short-term memory, were observed when analyses were restricted to alcoholic men who had maintained complete abstinence, were light relapsers for at least 3 months, or had consumed no more than 10 drinks prior to follow-up testing. Thus, alcoholic men who maintain abstinence can show substantial functional improvement that is related to improvement in brain structure condition.

Tham K., Borell L. and Gustavsson A., 2000,
The discovery of disability: a phenomenological study of unilateral neglect. Am J Occup Ther, . **54**(4): p. 398-406.

OBJECTIVE: Clients with right brain damage and unilateral neglect often lack awareness of their disabilities. This study examined how 4 participants with neglect experienced, discovered, and handled their disabilities in the context of their everyday life. METHOD: The 4 participants were interviewed five to seven times during their rehabilitation process. The data were collected and analyzed using the EPP (empirical, phenomenological, psychological) method. FINDINGS: Findings revealed seven features that described a discovery process for the 4 participants. During this process, each participant began to discover and understand the consequences of her unilateral neglect in the performance of everyday tasks. This increased understanding was a prerequisite to being able to use compensatory strategies. CONCLUSION:

By experiencing meaningful occupational situations, the participants gradually discovered and began to compensate for their disabilities in everyday life.

Ustinova K.I., Chernikova L.A., Ioffe M.E. and Sliva S.S., 2000,
[Deficit of learning of posture voluntary control in patients with cortical lesions of various locations: cortical mechanisms of posture regulation]. Zh Vyssh Nerv Deiat Im I P Pavlova, . **50**(3): p. 421-33.

Forty two hemiparetic patients after cerebrovascular accidents were trained to change the position of the center of pressure according to a target on the screen with the visual feedback control. The learning was substantially impaired in comparison with the group of healthy subjects. Patients with the right-hemispheric lesions showed somewhat greater learning deficit than patients with lesions in the left hemisphere. Lesion localization also affected the process of learning. The learning was disturbed to a greater extent in patients with lesions involving not only motor but also premotor and parietal cortical areas. In patients with parieto-temporal lesions the learning reached a very low level after three initial days of training, possibly, because of the deficit of sensory integration and of body scheme in the extra- personal space. Patients with combined lesions of the motor, premotor, and parietal areas showed the lowest results. The learning was shown to depend on the deficit of proprioception and extent of postural disturbances (asymmetry of body weight distribution and amplitude of the center of pressure oscillations) rather than on the extent of motor deficit (paresis and spasticity). However, the learning itself improved some motor disturbances.

van den Berg C., Beek P.J., Wagenaar R.C. and van Wieringen P.C., 2000,
Coordination disorders in patients with Parkinson's disease: a study of paced rhythmic forearm movements. Exp Brain Res, . **134**(2): p. 174-86.

Whereas the consequences of Parkinson's disease (PD) for the performance of single-limb movements are well documented (i.e., bradykinesia, akinesia, rigidity, and tremor), fairly little is known about its implications for the coordination between limb movements. To help resolve this situation an experiment was conducted in which 11 PD patients and 11 control subjects performed rhythmic forearm movements at a comfortable amplitude in the in-phase, antiphase, and single-arm mode at pacing frequencies ranging from 0.5 to 3 Hz. The PD group displayed marked coordination problems over and above the known clinical motor symptoms of PD. The performance of both the in-phase and antiphase modes was significantly affected in the PD group compared to the control group; furthermore, the variability of relative phase was significantly increased in this group. These observations were not caused by problems to synchronize the movements with the external pacing signal. In addition to the bimanual coordination problems, involuntary mirror movements (MM) were observed in the single-arm control trials that were significantly larger in the PD group (4.4% of the amplitude of the moving arm) than in the control group (2.3%), suggesting a reduced ability to suppress a basic in-phase coupling of the arms. In the PD group, MM were largest during movements of the least-affected arm. These parkinsonian coordination problems are interpreted in terms of recent evidence on the neural organization of bimanual coordination, suggesting that they are due to cortical rather than callosal dysfunction.

Weindling A.M., 2000,
Intervention after brain injury to reduce disability. Semin Neonatol, . **5**(1): p. 53-60.

After perinatal brain injury, motor function is generally more severely affected than cognition. This article reviews the evidence that intervention after brain injury can reduce disability. There have been few good quality randomized controlled trials. The reasons for this and the difficulties of doing such trials are discussed. The main reasons are: (i) cerebral palsy (CP) is a relatively rare condition; (ii) the patient population is heterogeneous; (iii) different patterns of CP have different prognoses; (iv) a variety of interventions have been used; and (v) outcome measures are relatively poor. Intervention for children considered at risk of developing CP have generally shown no benefit. After children have developed spastic CP, there is a suggestion of some effect due to increasing the frequency of intervention. The precise role of the therapist remains unclear: support of the family may be as important as physical therapy.

Whitall J., McCombe Waller S., Silver K.H. and Macko R.F., 2000,
Repetitive bilateral arm training with rhythmic auditory cueing improves motor function in chronic hemiparetic stroke. Stroke, . **31**(10): p. 2390-5.

BACKGROUND AND PURPOSE: Chronic upper extremity hemiparesis is a leading cause of functional disability after stroke. We investigated the hypothesis that bilateral arm training with rhythmic auditory cueing (BATRAC) will improve motor function in the hemiparetic arm of stroke patients. METHODS: In this single group pilot study we determined the effects of 6 weeks of BATRAC on 14 patients with chronic hemiparetic stroke (median time after stroke, 30 months) immediately after training and at 2 months after training. Four 5-minute periods per session (3 times per week) of BATRAC were performed with the use of a custom-designed arm training machine. RESULTS: The patients showed significant and potentially durable increases in the following: Fugl- Meyer Upper Extremity Motor Performance Test of impairment (P0.0004), Wolf Motor Function Test (performance time measure, P0.02), and University of Maryland Arm Questionnaire for Stroke measuring daily use of the hemiparetic arm (P0.002). Isometric strength improved in elbow flexion (P0.05) and wrist flexion (P0.02) for the paretic arm and in elbow flexion (P0.02) and wrist extension (P0.02) for the nonparetic arm. Active range of motion improved for paretic-side shoulder extension (P0.01), wrist flexion (P0.004), and thumb opposition (P0.002), and passive range of motion improved for paretic wrist flexion (P0.03). CONCLUSIONS:-Six weeks of BATRAC improves functional motor performance of the paretic upper extremity as well as a few changes in isometric strength and range of motion. These benefits are largely sustained at 8 weeks after training cessation.

Wu C., Trombly C.A., Lin K. and Tickle-Degnen L., 2000,
A kinematic study of contextual effects on reaching performance in persons with and without stroke: influences of object availability. Arch Phys Med Rehabil, . **81**(1): p. 95-101.

OBJECTIVE: To examine the effects of context on reaching performance in neurologically impaired and intact populations. Context was varied by the presence or absence of objects used to complete a task. DESIGN: A counterbalanced repeated-measures design. SETTING: A motor control laboratory in a university setting. PARTICIPANTS: Fourteen persons with stroke and 25 neurologically intact adults. INTERVENTIONS: Each participant was tested under two conditions: the presence of the object, in which the participant reached forward with the impaired arm (or corresponding arm) to scoop coins off the table into the other hand; and the absence of the object, in which the participant reached forward to the place where the coins would be placed in the condition of object present. MAIN OUTCOME MEASURES: Kinematic Variables of movement time, total displacement, peak velocity, percentage of reach where peak velocity occurs, and movement units (derived from acceleration data) for reaching tasks. RESULTS: The condition of using real objects elicited kinematically better performance of reaching movements than the condition of performing movements without relevant objects present. Better performance was reflected by shorter movement time, less total displacement, higher peak velocity, greater percentage of reach where peak velocity occurs, and fewer movement units. CONCLUSION: The results of this study showed that the condition of object present elicited better performance of movements represented by kinematic variables than the condition of object absent. The clinical implication is that the use of real and functional objects might be an effective way of facilitating efficient, smooth, and coordinated movement with the impaired arm in persons with stroke. This study, however, should be replicated and extended to confirm the validity of its findings and to allow for generalization in various functional activities.