ABSTRACTS OF RECENT LITERATURE ON TREATMENT OUTCOMES IN STROKE

Although very many research studies on stroke were published in the last two years, very few of them were concerned with treatment outcome. Those which were tended to be limited to investigating single treatment techniques or adjuncts to physiotherapy treatment. Not one study investigated the effects of neurodevelopmental therapy in hemiplegia, highlighting the urgent need for clinical research in this field.

The following abstracts were compiled by the Education Committee of IBITAH, the International Bobath Instructors Association for Adult Hemiplegia. They are reproduced with IBITAH's permission and with appreciation for what that organisation is doing to improve our skills in the management of hemiplegia and related conditions.

CAN SENSORY STIMULATION IMPROVE THE FUNCTIONAL OUTCOME IN STROKE PATIENTS?

Johanson K, Lindgren I, Widner H *et al. Neurology* Nov 1993:**43**(11);2189-92

After obtaining informed consent, we randomised 78 patients with severe hemiparesis of the left or right side within 10 days of stroke onset: 40 to a control group receiving daily physiotherapy and occupational therapy, and 38 to a group that, in addition, we treated with sensory stimulation (acupuncture) twice a week for 10 weeks. The median age was 76 years for both groups. Motor function, balance, and ADL (Barthel's Index) were assessed before the start of treatment and at 1 and 3 months after stroke onset; ADL was also assessed after 12 months. We assessed the quality of life (QL) using the Nottingham Health Profile 3, 6 and 12 months after stroke onset. Patients given sensory stimulation recovered faster and to a larger extent than the controls, with a significant difference for balance, mobility, ADL, QL, and days spent at hospital/nursing homes. Whether acupuncture per se is responsible for the differences requires further study.

RESTORATION OF GAIT IN NONAMBULATORY HEMIPARETIC PATIENTS BY TREADMILL TRAINING WITH PARTIAL BODY-WEIGHT SUPPORT

Hesse S, Bertelt C, Schaffrin A *et al. Arch Phys Med Rehabil* Oct 1994:**75**(10);1087-93

The effect of a treadmill training with partial body-weight support was investigated in nine nonambulatory hemiparetic patients with a mean poststroke interval of 129 days. They had received regular physiotherapy within a comprehensive stroke rehabilitation program at least 3 weeks before the treadmill training without marked improvement of their gait ability. After 25 additional treadmill training sessions scoring of functional performance and conventional gait analysis showed a definite improvement: gait ability, assessed by the Functional Ambulation Category (0 to 5) improved with a mean of 2.2 points, other motor functions, assessed by the Rivermead Motor Assessment Score with a mean of +3.9 points for gross function (range 0 to 13) and of +3.2 points for leg and trunk section (range 0 to 10) and gait cycle parameters (p .01). Muscle tone and strength of the paretic lower limb remained stable. We suggest that treadmill training with partial body-weight support could augment restoration of ambulation and other motor functions in hemiparetic patients by active and repetitive training.

THE EFFECTS OF CASTING ON UPPER EXTREMITY MOTOR DISORDERS AFTER BRAIN INJURY

Hill J. *Am J Occup Ther.* March 1994:**48**(3);219-24

OBJECTIVES. This study compares casting to traditional techniques, such as passive range of motion, static stretch, and splinting, in the treatment of the hypertonic upper extremity in individuals with severe brain injury. METHOD. Fifteen subjects with brain injury were randomly assigned to one of two groups. One group received a month of casting followed by a month of traditional therapy; the second group received 1 month of traditional therapy followed by casting. The subjects' limbs were evaluated for range of motion, clinical indications of spasticity, and functional use of the extremity at three intervals — before intervention, after the first month of intervention, and after the second month of intervention. Two sample t-tests and paired t-tests were used in data analysis. RESULTS. All but one subject showed a greater improvement in range of motion with casting than with traditional treatment; 11 subjects showed a greater improvement in clinical measures of spasticity with casting. There was no apparent correlation between these measures and functional use of the extremity. CONCLUSION. These findings suggest that casting is more effective than traditional techniques in reducing contracture and in decreasing hypertonicity in some cases. The greater improvements in these motor indicators with casting did not translate into greater gains in functional use of the upper extremities.

REHABILITATION OF WALKING WITH ELECTROMYOGRAPHIC BIOFEEDBACK IN FOOT-DROP AFTER STROKE

Intiso D, Snatilli V, Grasso M G *et al. Stroke* June 1994:**25**(6);1189-92

BACKGROUND AND PURPOSE: Alterations of gait cycle and foot-drop on the paretic limb are characteristic of stroke patients. Electromyographic biofeedback treatment has been used in rehabilitation of walking, but results are controversial. We performed gait analysis to evaluate the efficacy of electromyographic biofeedback compared with physical therapy. METHODS. Sixteen patients with ischemic stroke were enrolled in the study. The experimental group (4 men, 4 women) received electromyographic biofeedback treatment together with physical therapy. The control group (5 men, 3 women) was treated with physical therapy only. Clinical and functional evaluations before and after treatment were performed using Canadian Neurological, Adams, Ashworth, Basmajian, and Barthel Index scales. Computerised gait analysis was performed in all patients. RESULTS. Electromyographic biofeedback patients showed significantly increased scores on the Adams scale (P .05) and Basmajian scale (P .01). Gait analysis in this group showed a recovery of foot-drop in the swing phase (P .02) after training. CONCLUSIONS. Our data confirm that the electromyographic biofeedback technique increases muscle strength and improves recovery of functional locomotion in patients with hemiparesis and foot-drop after cerebral ischemia.

UPPER EXTREMITY WEIGHT-BEARING EFFECT ON CORTICOSPINAL EXCITABILITY FOLLOWING STROKE

Brouwer B J, Ambury P. *Arch Phys Med Rehabil* August 1994:**75**(8);861-6

The effects of upper extremity weight-bearing on the excitability of corticospinal neurons projecting to the flexor carpi ulnaris (FCU) muscle of patients having had cerebrovascular accidents (strokes) were examined. Alternate transcranial magnetic and ulnar nerve stimulation were

applied and peristimulus time histograms of single FCU motor unit discharge times were generated to provide information about the cortical and segmental postsynaptic potentials (PSPs), respectively. Recordings from 10 patients and 5 control subjects indicated the cortically evoked PSPs were initially abnormally small in the stroke group (p .01). Following weight-bearing the cortical projection strength to FCU motoneurons increased in stroke patients (p .05) only. The composite group Ia PSP was reduced in 2 patients, but data could not be obtained from the remaining subjects. It is concluded that upper extremity weight-bearing normalises corticospinal facilitation of FCU motor units in stroke patients. A sustained increase in motor cortical excitability through augmented afferent input may be responsible.

THE EFFECTS OF FUNCTIONAL ELECTRICAL STIMULATION ON SHOULDER SUBLUXATION, ARM FUNCTION RECOVERY, AND SHOULDER PAIN IN HEMIPLEGIC STROKE PATIENTS.

Faghri P D, Rodgers M M, Glaser R M *et al. Arch Phys Med Rehabil* January 1994:**75**(1);73-9

The purpose of this study was to evaluate the effectiveness of a functional electrical stimulation (FES) treatment program designed to prevent glenohumeral joint stretching and subsequent subluxation and shoulder pain in stroke patients.

Twenty-six recent hemiplegic stroke patients with shoulder muscle flaccidity were randomly assigned to either a control group (n = 13; 5 female, and 8 male) or experimental group (n = 13; 6 female, and 7 male). Both groups received conventional physical therapy. The experimental group received additional FES therapy where two flaccid/paralysed shoulder muscles (supraspinatus and posterior deltoid) were induced to contract repetitively up to 6 hours a day for 6 weeks. Duration of both the FES session and muscle contraction/relaxation ratio were progressively increased as performance improved. The experimental group showed significant improvements in arm function, electromyographic activity of the posterior deltoid, range of motion, and reduction in subluxation (as indicated by x-ray) compared with the control group. We concluded that the FES program was effective in reducing the severity of shoulder subluxation and pain, and possibly facilitating recovery of arm function.

IMMEDIATE EFFECTS OF THE TOE SPREADER ON THE TONIC TOE FLEXION REFLEX

de Saca LR, Catlin PA, Segal R L. *Phys Ther.* June 1994:**74**(6);561-70

BACKGROUND AND PURPOSE. The purpose of the study was to determine whether the use of a toe spreader to inhibit the tonic toe flexion reflex (TTFR) immediately alters temporal-distance gait characteristics, plantar surface contact, or muscle activity in the limb exhibiting the TTFR of subjects with hemiparesis secondary to supraspinal lesion. SUBJECTS. Eighteen adults with hemiparesis secondary to supraspinal lesions served as subjects for the standing portion of the study. Sixteen of the subjects participated in the gait portion of the study. METHODS. The study was a randomised, within-subject, between-conditions comparison consisting of standing and gait phases, with four conditions for each phase (shoe off, toe spreader off/on, shoe on, toe spreader off/on). Measures performed were ink footprint gait analysis and integrated electromyography from the limb exhibiting the TTFR. RESULTS. Presence of the TTFR was reduced significantly with the use of the toe spreader. Velocity and cadence were increased significantly by use of the toe spreader. CONCLUSION AND DISCUSSION. The toe spreader may be a useful treatment option for improving gait. The clinical significance of these findings, however, will depend on the functional context of toe-spreader use.

REFLEX SYMPATHETIC DYSTROPHY IN HEMIPLEGIA - TWO CASE REPORTS AND REVIEW OF THE LITERATURE

Yen H L, Kong K H, Tan E S. *Ann Acad Med Singapore* May 1994:**23**(3);391-5

Reflex sympathetic dystrophy (RSD) can be precipitated by a variety of events. We report two cases of RSD in hemiplegic patients detected within three months of the cerebrovascular accidents. Diagnosis of RSD was based upon clinical and scintigraphic findings. Management included elevation, range of movement of the affected joints and analgesics. With treatment, the pain and swelling subsided, range of motion of joints improved and the patients were able to participate in the rehabilitation programme. A high index of suspicion, early diagnosis and aggressive treatment were found to be essential for the successful treatment of RSD.

SENSORY STIMULATION PROMOTES NORMALISATION OF POSTURAL CONTROL AFTER STROKE

Magnusson M, Johansson K, Johansson B B. *Stroke* June 1994:**25**(6);1176-80

BACKGROUND AND PURPOSE. In a randomised study of hemiparetic stroke patients with a median age of 75 years, functional recovery was significantly better in those who received additional sensory stimulation (n = 38), including electrostimulation, than in control patients (n = 40) given the same physiotherapy and occupational therapy; group differences for balance, mobility, and activities of daily living were significant. The present study was designed to investigate postural control in patients who survived more than 2 years after stroke onset. METHODS. The 48 survivors (mean, 2.7 years; range, 2.0 to 3.8 years), 22 from the treatment group and 26 from the control group, were compared with 23 age-matched healthy subjects. Subjects were perturbed by vibrators applied to calf muscles or with galvanic vestibular stimulation. We evaluated postural control in terms of sway variances or sway velocities and the dynamics of postural control as a feedback system using system identification with a model previously validated for human postural control. RESULTS. Significantly more patients of the treatment group than of the control group maintained stance during perturbations (P .01). Among patients capable of maintaining stance during perturbation, the control patients were characterised by significant divergence from normal values in two of the three characteristic parameters of dynamic postural control (ie. swiftness and stiffness; P .05) compared with the treatment subgroup or age-matched subjects. CONCLUSIONS. The course of sensory stimulation enhanced recovery of postural function, an enhancement still significant 2 years after the lesion and treatment. The differences and near normalisation of characteristic parameters of dynamic postural control among treated patients suggest that improved recovery after sensory stimulation may be achieved by patients regaining normal or near normal dynamics of human postural control.

SIMILAR MOTOR RECOVERY OF UPPER AND LOWER EXTREMITIES AFTER STROKE

Duncan P W, Goldstein L B, Horner R D *et al. Stroke* June 1994:**25**(6);1181-8

BACKGROUND AND PURPOSE. This study examined the validity of the clinical tenet that poststroke recovery of the upper extremity is less rapid and complete than poststroke recovery of the lower extremity. Previous studies comparing upper and lower extremity recovery have evaluated disability rather than motor impairment. Individuals with lower extremity impairments may be more functional and appear less disabled than individuals with upper extremity impairments. Function of the upper extremity requires finer motor control, for which the patient can less readily compensated. Therefore, impairments and disability

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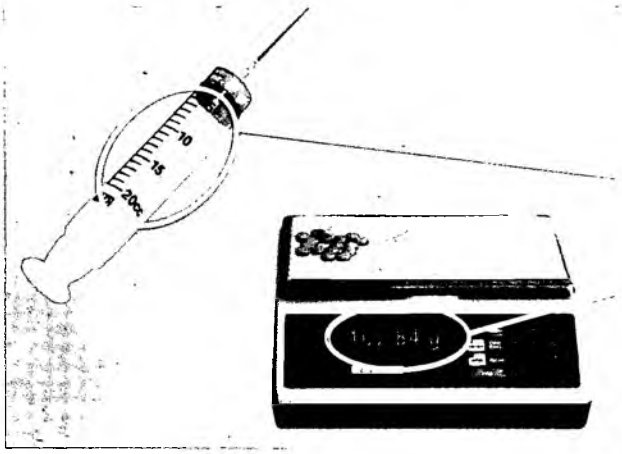

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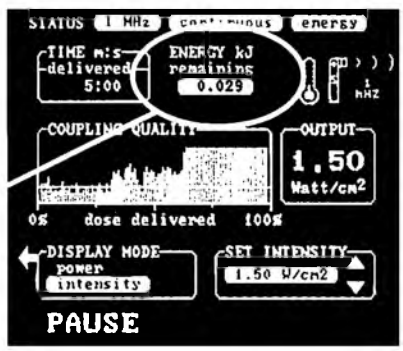

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would predictably be more highly correlated in this area. We tested the hypothesis that upper and lower extremity motor recovery are similar. METHODS. The 95 patients selected for this study were enrolled in the Durham County Stroke Study and had been diagnosed with anterior circulation ischemic stroke. Each subject received Fugl-Meyer assessments within 24 hours of admission and then 5, 30, 90, and 180 days after stroke. We used these assessments to compare the time course and patterns of motor function of the upper and lower extremities. RESULTS. Repeated-measures ANOVA revealed that percent maximal motor recovery was significantly (P .001) affected by time after stroke but not by extremity (upper extremity versus lower extremity) (P = .32). When stroke severity level is controlled, the upper and lower extremities continue to show no difference in percent motor recovery (P = .19). CONCLUSIONS. In patients with anterior circulation ischemic stroke, the severity of motor impairment and the patterns of motor recovery are similar for the upper and lower extremities. The most rapid recovery for both extremities occurs within 30 days.

VOLUNTARY MOVEMENT AT THE ELBOW IN SPASTIC HEMIPARESIS

Fellows SJ, Kaus C, Thilmann AF. *Ann Neurol* Sept 1994:**36**(3);397-407

The relative importance of hyperreflexia and paresis in disturbances of voluntary arm movement was studied in a group of patients (n = 25) with spasticity arising from a unilateral ischemic cerebral lesion. Patient performance was evaluated against data obtained from normal subjects (n = 15). Spastic patients achieved lower maximum movement velocities during flexion or extension than did normal subjects. The more marked the paresis of the elbow flexor and extensor muscles of the patients, relative to the strength of the normal subjects, the greater was this reduction in maximum velocity. For a given velocity, however, the time taken to complete a movement and the time to reach the peak velocity were normal. No relationship was found between the degree of impairment of voluntary movement and the level of passive muscle hypertonia in the antagonist. Although overactivity of the antagonist muscle may play some role in disturbance of movements made at low velocities without an opposing load, antagonist activity during movements made against a load (ie. under more natural conditions) was at or below normal levels, even in those patients with the most marked passive muscle hypertonia. It is concluded that agonist muscle paresis, rather than antagonist muscle hypertonia, plays the dominant role in the disturbance of voluntary elbow movement following stroke.

PUBLIC LIABILITY INSURANCE

Incorrect information was inadvertently given by GlenRand about Public Liability Insurance. Please will PPA members correct their last PPA Newsletter to this effect:

"**SASP membership does not provide public liability cover**. To have public liability included together with professional liability would push the premiums up too high. If you have your own practice you should have an Office Comprehensive Policy, which should be extended to cover you for public liability risks. Check that your insurance does give you this cover."

CPA NATIONAL CONGRESS 1996

■ *Canadian Physiotherapy Association: National Congress, Victoria, British Columbia. May 31 – June 3.*

The theme for this year's Congress – Turn and Face the Change – reflects the complex and changing health care environment in which physiotherapists are currently working. The daily themes of "Changing Models of Health Care Delivery", "Evidence-Based Practice" and "Marketing/Education" emphasise the positive and pro-active role physiotherapists can play in developing and influencing health care delivery and policy.

On Thursday May 30 the Keynote speaker (opening ceremony) is Gwynne Dyer, PhD: "Been There, Done That: The Politics of Change".

Plenary speakers are:

31 May: Marilyn J Bruner: "Flinging Yourself Forward".

1 June: Neil Oldridge, PhD: "Health-Related Quality of Life: Experience with Patients in Cardiac Rehabilitation and with Patients undergoing Lumbar Spinal Surgery">

2 June: James Vargo, PhD: "Comfortable Change – an Oxymoron".

3 June: Shirley Sahrmann, PhD, PT: "Diagnosis-Based Practice: A Requirement for Changing Health Care Delivery and Evidence-Based Practice".

The Plenary Wrap-up speaker on Monday 3 June is Nancy McKay, PT: "Shaping our Futures: Changes, Choices and Commitment".