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2:30 pm – 2:50 pm

S6-R-TOWARDS A CLINICAL TEST OF SPATIAL NAVIGATION.

Paquet N, Kulkarni K, Kaldas J, Fung J; School of Physical and Occupational Therapy, McGill University; Jewish Rehab. Hospital Research Center, Montreal, P.Q. H7V 1R2, Canada

PURPOSE: The ultimate goal is to develop a clinical test of spatial navigation. Our aims are: (1) to measure distance and directional errors of navigation in young and elderly healthy subjects; (2) to compare the norms with patients suffering from unilateral vestibular deficits; (3) to establish whether these measures could be easily obtained and equally valid with clinical measurement tools. **RELEVANCE:** Patients with a variety of neurological disorders have difficulty moving safely in the surrounding environment, especially in darkness. To date, clinicians have no means of quantifying deficits of spatial navigation. **SUBJECTS:** Seventeen young (18-38 y/o) and 9 older healthy subjects (67-83 y/o) participated, as well as 5 patients (45-69 y/o) with absent vestibular function on one side. **METHODS AND MATERIALS:** Subjects side-stepped laterally with their eyes closed from one target to another located 1.25 m to their right and left, and were instructed to stop when they felt that they were in front of the target. The trajectories of body motions were recorded with a 6-camera Vicon512 system (KIN). Distance and deviation errors from final feet position were taken with a ruler and a goniometer (CLIN) in 10 healthy subjects and 1 patient. **ANALYSIS:** The agreement between KIN and CLIN measures was determined by Intraclass Correlation Coefficients (ICC). **RESULTS:** Young and older healthy subjects had mean (\pm SD) displacement error of 30 ± 31 cm and -2 ± 18 cm, respectively, and deviation of $8^\circ \pm 10^\circ$ and $0^\circ \pm 11^\circ$. Four of 5 patients had larger deviation when navigating towards the side of their vestibular lesion, i.e. 15° versus 7° when navigating towards the other side. The agreement between KIN and CLIN was excellent for displacement error (ICC = 0.99) and very good for deviation (ICC = 0.88). **CONCLUSION:** Distance and deviation errors are both good measures of navigational abilities. Our results indicate that these measures can also be done with simple tools such as ruler and goniometer. Among the two measures, deviation error is a more sensitive measure to distinguish patients with unilateral vestibular deficits from healthy subjects. Supported by CIHR, CFI, FRSQ, REPAR and the Jewish Rehabilitation Hospital Foundation.

2:50 pm – 3:10 pm

S34-S-CONSTRAINT-INDUCED MOVEMENT THERAPY AT ST. BONIFACE GENERAL HOSPITAL.

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PURPOSE: To describe the challenges involved with implementing and evaluating a program of constraint-induced movement therapy (CIT) for stroke survivors at SBGH. **RELEVANCE:** The CIT approach has received attention in both scientific and popular press as a promising new approach for treating the functional deficits of the arm in stroke survivors. It is characterized by restraint of the less involved arm in conjunction with supervised practice of arm activities with the more involved limb for several hours per day for 2-3 weeks. Implementing and evaluating such a program poses significant challenges. **DESCRIPTION:** Individuals participating in the SBGH CIT program present with stroke-related deficits in arm function, live in the community and consent to the program. Participants sign a contract agreeing to: 1) wear a restraint mitt on the less involved limb for a goal of 90% of their waking hours; 2) attend practice sessions 4 hours in length for 10 days where they perform activities under the supervision of a clinician; and, 3) keep a written log regarding compliance with the restraint and use of their more affected limb. A battery of assessments (Chedoke-McMaster

Impairment Inventory Arm and Hand scores, Chedoke Arm and Hand Activity Inventory, Motor Activity Log, ABILHAND questionnaire and Canadian Occupational Performance Model) is applied prior to the start of the 2 week training period, at the start and conclusion of the training period, and at 1 and 6 months following the conclusion of the training period. The training sessions include activities to maintain compliance with the restraint, promote general arm function and improve performance in participant-identified goal areas. Activities are prescribed and feedback provided in a manner that is consistent with current beliefs about motor learning. **OBSERVATIONS:** Our goal is to offer the CIT program 4 times per year with 2-4 individuals participating per offering. The first participants were enrolled in May 2001; a total of 12 individuals will have completed the program by May 2002; there has been full attendance. The current battery of assessments can be applied in 90 minutes. Participants have reported progress towards and achievement of personal goals. Improved performance on the assessment tools has been found although interpretation of these findings is hampered by the current state of knowledge of the measurement characteristics of the assessment battery. Gains have persisted at follow-up assessments. **CONCLUSIONS:** A major challenge of this program is availability of clinicians to staff the training sessions. Issues that require further attention include suitability of applying the CIT approach at a tertiary care facility, inclusion/exclusion criteria, supervision ratio and the measurement characteristics of the assessment battery.

3:10 pm – 3:30 pm

S14-R-DIFFERENTIAL EFFECT OF TENS AND VIBRATION ON CORTICOSPINAL EXCITABILITY IN LOWER LIMB MUSCLES.

Héroux M, Tremblay LE, Tremblay F; School of Rehabilitation Sciences, University of Ottawa, Ottawa, Ontario K1H 8M5, Canada.

PURPOSE: To investigate the effect of TENS and vibratory stimulation (VIBS) on motor evoked potentials (MEPs) in lower limb muscles. **RELEVANCE.** Physiotherapists commonly use VIB and TENS in the treatment of musculoskeletal or neurological conditions. While these modalities are often used to modulate sensory perception, they also produce motor effects at the spinal and cortical level. **SUBJECTS.** TENS and VIBS were tested separately in two testing sessions in young healthy adults (n=9, age: 19-27 yrs). **METHOD AND MATERIALS.** MEPs were recorded in the Quadriceps (Quad), Biceps femoris (BF) and Soleus (SOL) in response to Transcranial Magnetic Stimulation of the contralateral motor cortex. MEPs were measured before (control resting values) and at specific time intervals during and after each application. The TENS application consisted of a 20 minutes stimulation (120 Hz) in the L3-L4 dermatomes at intensity just below the motor threshold. For VIBS, the vibrator head (60 Hz) was applied on the patellar tendon for five min. For TENS, MEPs were recorded at the 10th and 20th min of application and at one-minute intervals for 10 min after application. For VIBS, MEPs were recorded at one-minute intervals both during (5 min duration) and after the application (10 min duration). **DATA ANALYSIS.** A repeated measures ANOVA was used to compare changes in mean MEPs amplitude across conditions. **RESULTS:** TENS induced a small and gradual increase in MEPs amplitude in Quad that reached significance ($p < .05$) at the 20th minute of stimulation. This facilitation persisted up to 5 minutes after removal of the stimulation. During VIBS, a large facilitation was seen in the Quad's (400-700% increase in MEPs, $p < .01$). MEPs in the BF and SOL ($p < .01$) were also facilitated, though to a lesser degree than the Quad. On removal of stimulation, MEPs in the Quad returned to their resting values, but their amplitude was depressed (50%, $p < .01$) one and two minutes post-vibration. No such depression was seen in BF and SOL. **CONCLUSION.** These results suggest that TENS and VIBS can modulate corticospinal excitability in lower limb muscles. VIBS produced consistently larger and more extensive effects, whereas TENS produced more local and subtle

were compared with Student's t-tests. **RESULTS:** Mean ($\pm 1SD$) displacement errors indicate that elderly subjects slightly undershot targets (-1.7 ± 18.4 cm), whereas young subjects overshot targets (29.9 ± 30.6 cm, $p < 0.01$). Mean angular deviations were small, i.e. within 10° in both groups: $0^\circ \pm 11^\circ$ in old subjects and $8^\circ \pm 10^\circ$ in younger subjects. **CONCLUSION:** Our pilot results indicate that a small group of elderly subjects was more accurate in reaching previously seen targets than younger subjects. It suggests that contrary to popular belief, spatial orientation and navigation abilities may not deteriorate with aging. We will study larger groups subjects to further test this hypothesis. Supported by CIHR, CFI, FRSQ and Jewish Rehabilitation Hospital Foundation. K.Kulkarni was recipient of a 2001 REPAR Summer Bursary.

P5-R-RELIABILITY OF SPATIAL NAVIGATION ABILITIES.

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PURPOSE: To investigate whether the ability to navigate with eyes closed towards previously seen targets is reproducible in healthy subjects. Our objective was to demonstrate reliability of distance and direction errors within a 7-day period. **RELEVANCE:** We have previously reported that healthy subjects make distance and direction errors when navigating without vision (Paquet and Fung, Control of Posture and Gait, 2001, p.481-4). However, the within-subject reliability of our measures remains to be shown. **SUBJECTS:** Five healthy subjects (22-36 years old) participated in 2 testing sessions (test and retest) separated by 7 days. **METHODS AND MATERIALS:** Subjects walked sideways (side stepping) with eyes closed towards targets located 1.25 meter to their right and left, and stopped when they estimated that they were standing in front of the target. Head and body position data in 3-D were recorded with a 6-camera Vicon512 system at 120 Hz. Twenty alternate right-left trials were performed (total=40 trials). **ANALYSIS:** Dependent variables were: (1) total distance travelled; (2) displacement error, which is the distance between the end-target and sternum; (3) deviation, which is the angle formed between the line joining the initial and end targets and the line joining the acromions. Intraclass correlation coefficients (ICC) were been calculated for the 3 variables. **RESULTS:** The mean ($\pm 1S.D$) total distance traveled was 1.70 ± 0.25 meter in the test and 1.83 ± 0.43 meter in the retest (ICC = 0.70). On average, the displacement error was 24 ± 26 cm at test and 32 ± 39 cm at retest (ICC = 0.78). Deviation error was $9^\circ \pm 10^\circ$ at test and $9^\circ \pm 8^\circ$ at retest (ICC = 0.60). **CONCLUSION:** The reliability of a displacement measure of spatial navigation is very good, as the same errors are reproducible within the same subject over a 7-day period. Deviation (direction error) has lower, but good test-retest reliability. This suggests that healthy subjects' performance is reasonably consistent even if lateral navigation without vision involves complex sensorimotor and cognitive functions. Supported by CIHR, CFI, FRSQ and Jewish Rehabilitation Hospital Foundation. J. Kaldas was recipient of a 2001 CIHR/Burroughs Wellcome Fund Student Research Award.

P7-R-WALK TESTS FOR ELDERLY POPULATIONS WITH MUSCULOSKELETAL IMPAIRMENT.

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PURPOSE: 1. To identify walk tests that are currently employed to

assess function in the elderly (> 65 years) population with musculoskeletal (MSK) impairment. 2. To compare outcomes between the Timed Up and Go test (TUG), the 13m walk test (13mWT) and the 6 minute walk test (6MWT) measured pre-operatively in individuals undergoing elective primary total hip replacement (THR). **RELEVANCE:** In the literature, there exists a vast array of tests that have been utilized for evaluating walking ability in the elderly population with MSK impairment. Reliability and validity is not always known for these tests. It is difficult for practising clinicians to choose the optimal walk test for their clients when this information is not available. **SUBJECTS:** 34 elderly individuals undergoing elective THR were assessed (mean age=72.6 years ± 5.6). **METHODS AND MATERIALS:** A literature search using keywords such as walk test, elderly, MSK and orthopedics was executed in MEDLINE and CINAHL. Data was collected using results of the TUG, 13mWT, and the 6MWT at pre-operative THR assessment. **ANALYSIS:** Correlation statistics were used to analyse the relationship between results of walking tests. Independent t-tests were used to determine statistical significance between those subjects that required (n=21) or did not require (n=13) the use of aids to perform the tests. **RESULTS:** In the literature, the 6MWT has demonstrated test-retest reliability, concurrent and construct validity, and responsiveness for the elderly population with MSK impairment. The 13mWT (based on the 50 foot walk test) has demonstrated test-retest reliability. The TUG has demonstrated intra- and inter-rater reliability, and construct validity in the literature. TUG results correlated highly with the 13mWT results ($r = 0.90$). The 13mWT velocity (0.86m/s) was significantly ($p < 0.01$) faster than the average 6MWT velocity (0.70m/s). TUG scores negatively correlated with the 6MWT scores ($r = -0.79$). Individuals using gait aids required a significantly longer time to complete the TUG, 13mWT and 6MWT, each test achieving a significance level of $p < 0.001$. **CONCLUSIONS:** Careful selection of appropriate walk tests is important to measure functional outcome in the elderly with MSK impairment. The 6MWT test appears to be the most reliable and valid walking test for the elderly with MSK impairment when assessing endurance, and the 13mWT when assessing velocity. Though the 13mWT and TUG are highly correlated and yield similar values, different but equally clinically important information, being velocity and basic mobility respectively, are obtained from each test.

P9-S-STROKE CARE COORDINATOR: A UNIQUE OPPORTUNITY FOR PHYSIOTHERAPISTS.

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PURPOSE: This poster will describe a unique role for a physiotherapist in hospital based stroke care. In recent years, there has been increased emphasis on the need for organized care and skilled providers in the care of patients with stroke. The position of Stroke Care Coordinator at our facility developed over time from a primarily clinical position of Stroke Physiotherapist. This poster will describe the role in detail, present the evolution, observed benefits, supporting evidence from the literature, and discuss why such a position is a natural fit for physiotherapists. **RELEVANCE:** The role of Stroke Care Coordinator provides an additional avenue within health care to apply the unique skills that physiotherapists possess. As Stroke Care Coordinator, a physiotherapist can apply their keen awareness of patient needs and their understanding of the system as a whole. Strengths in the areas of communication, teaching, and a professional emphasis on evidence based practice make physiotherapists natural candidates for the role of Stroke Care Coordinator. **DESCRIPTION:** In an effort to provide enhanced physiotherapy care and champion the implementation of a new stroke care path, our facility created a new position of Stroke Physiotherapist in 1998. Overtime, the scope of this position has expanded significantly to include facilitation of coordinated stroke care, evaluation of patient and program outcomes, liaison between acute and rehabilitation teams, and promotion of research and