

POSTER PRESENTATIONS

The poster session will be held Saturday, June 10th, from 0915-1130 (during the Scientific Programme), with the authors in attendance.

Your poster should measure 4'(H) x 8'(W) and should be mounted with velcro. Please mount your poster any time after 1200 hours on Thursday, June 8th. Posters must be removed by 1200 hours on Sunday, June 11th.

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A Cross-Sectional Study of Marijuana and Other Complimentary Therapies Use of MS Patients in Saskatchewan

Objective: To study the epidemiology of marijuana and other alternative therapies in multiple sclerosis (MS) patients. **Background:** The interest in complimentary therapies to treat chronic disorders has increased in recent years as patients become increasingly dissatisfied with conventional treatments. **Methods:** A cross-sectional study of 250 randomly selected MS patients from Saskatchewan. An anonymous questionnaire was sent asking about: 1.) course of the disease 2.) symptoms 3.) complimentary therapy use and 4.) details of past or present marijuana usage. **Results:** 168/250 (67%) of patients responded within two months, 111 females (mean age 47.7±10.5years) and 57 males (50 ±11.3years). There were 60/168 (36%) who had smoked marijuana, 40 females and 20 males. A total of 25(15%), 14 females and 11 males, were current users as treatment for symptoms of MS. Benefits included improvement in depression (85%), improved spasms when falling asleep (84%), muscle pain relief (82%), and decreased spasticity with walking (82%), reduced spasms at night (75%). The numerous other alternative therapies used had variable limited responses. **Conclusion:** Prevalence of marijuana use in MS patients is significant. This small number of cannabis users provides some indication of potential symptomatic relief in MS. The medical effects of marijuana appear to benefit symptoms of spasticity and pain. The data supports the proposal for a properly controlled randomised trial to test the claims of the beneficial effects of marijuana in multiple sclerosis.

Observation of Acupuncture Pain Control Effect Before and After Lumbar Disc Protrusion Surgery

Management of acute and chronic low back and leg pain often includes the use of acupuncture. The effectiveness of this form of therapy is dependent upon compliance, which in turn is dependent on availability, response, treatment of proper acupoints and the placebo effect. We hypothesized that classical acupuncture would be more effective than placebo acupuncture. One hundred and thirty-two patients with acute and chronic low back and leg pain were examined before and after surgery for lumbar disc protrusion. Diagnosis was based on CT and MRT findings. Patients received acupuncture drug-free throughout the study period. The visual analogue scale (VAS) was used to assess pain intensity before and after (i.e., 30min, 60min, 2h and 6h) acupuncture. Classical acupuncture resulted in a significant reduction in pain that become increasingly stronger during the 6h-study period. Placebo acupuncture lead to same early pain relief that did not reach statistic significant and then declined thereafter.

The effective Acupuncture Points for this study were chosen from some low back and leg pain effective classical points that depending on the indication, that 9 points [Da-Chang-Shu (BL-25), Feng-Shi (BL-31), Guan-Yuan-Shu (BL-26), Huan-Tiao (GB-30), Shen-Mai (BL-62), Shen-Shu (BL-23), Wai-Qiu (BL-36), Wei-Zhong (BL-40) and Yang-Ling-Quan (GB-34)] were needed. In conclusion, the use of acupuncture for lumbar disc protrusion pain provided convenient and effective pain relief without side effects. Although the limitations (patients willing and randomized planing e.g.) of our study must be considered, classical acupuncture appears to be superior to placebo acupuncture in limiting the overall disabilities caused by the pain of lumbar disc protrusion pain.

Lalith Satkunam, Shelley Wyldman, Gerard L.W. Lobay,
K. Ming Chan

The objective of this study is to examine the influence of the ulnar nerve on hand function. Two young laborers, each with an almost complete conduction block of the ulnar nerve at the elbow were studied. An initial assessment of their hand function at the time of diagnosis was done by using a battery of tests: 1) monofilament test to quantify pressure sensations, 2) Jebsen-Taylor Hand Function Tests for fine dexterity, 3) Moberg Pickup Test for object recognition without sight and 4) Baltimore Tool Evaluation and dynamometer for strength and endurance using simulated job tasks. In both patients, marked sensory deficit was present in the ulnar nerve territory. While neither patient had any significant problem with fine manipulation and object recognition, their grip and pinch strength were markedly reduced. This posed major problems in their jobs that required heavy repetitive hand use. One subject subsequently underwent surgical decompression of the ulnar nerve and an intraneural ganglion was removed. The conduction block completely resolved following surgery accompanied by a full functional recovery. The conduction block in the other patient resolved spontaneously which was also accompanied by a marked functional improvement. A third patient with a similar problem declined surgery as it did not cause any major difficulty in her work as an administrator. These three cases illustrate the importance of the ulnar nerve in determining the grip strength that is particularly relevant to those engaged in heavy physical labor.

Yoichiro Aoyagi, Fay Strohschein, K. Ming Chan

The objective of this project is to evaluate the risk of stimulating the same motor axon at different points along the median nerve when using the multiple point stimulation technique and how this affects the accuracy of the motor unit number estimate. Using the multiple point stimulation technique, motor unit number estimation in the median innervated intrinsic hand muscles was done on two normal subjects, a patient with carpal tunnel syndrome and one with prior poliomyelitis. The collision technique was then used to confirm whether two motor unit action potentials with similar configurations and sizes were generated by the same motor unit. A new motor unit number estimate was re-calculated after the repeated inclusion of the same motor unit had been eliminated. While the risk of stimulating the same motor axon at widely separate locations of the median nerve was negligible in normal subjects, this risk was much higher in patients with a depleted motor neuron pool. This resulted in marked distortion of the calculated size of the average single motor unit action potential and, consequently, inaccuracy of the motor unit number estimate. The inadvertent inclusion of the same motor units, if not recognized, can markedly affect the accuracy of the motor unit number estimate. The collision technique can be useful in minimizing this risk.

Preliminary Findings of a Feasibility Study of the Model Systems Database for TBI in Ontario

Nora Cullen, MD, MSc, FRCPC

Objective: To determine the feasibility of utilizing the Model Systems Database at an Ontario centre. The Model Systems Database is a valid and reliable data set established in 1989 and is currently being used in 17 centres across the United States to assess the progress of TBI patients over 10 years of follow up.

Methods Used: Data collection begins at the time of rehab admission on moderately to severely traumatically brain injury patients. There are 400 data points per patient collected during their rehabilitation stay. The data collection is distributed amongst nurses, physiotherapists, occupational therapists, physicians, social workers, neuropsychologists and the database coordinator. The data includes demographics, premorbid status, causes of injury, measures of impairment, disability, function and cognitive status. Data that was routinely collected by staff was identified and is now entered into the data base. The remaining data was outlined and volunteers were sought to collect it. The additional amount of time it takes to collect this information is noted. Data that are not already being collected by staff are collected by the database coordinator. This time is also recorded.

Results Obtained: We currently have 22 patients entered into the database. It takes an average of 4.75 hours of extra staff time to collect the data on each patient during their entire inpatient stay. This is broken down to about 1.25 hours of time per patient from the regular staff and another 3.5 hours by the database coordinator in addition to managing the database. The direct and indirect costs of using this data collection system will be discussed as well as its uses and limitations.

Conclusions: The Model Systems Database appears to be a cost effective tool in an Ontario inpatient rehabilitation setting.

The Impact of Plasma Exchange on Indices of Primary Demyelination in CIDP

Nigel L Ashworth, MD, Douglas W Zochodne, MD, Angelika F Hahn, MD, Charles F Bolton, MD, Neelan Pillay, MD, Colin H Chalk, MD, Timothy J Benstead, MD, Vera Brill, MD, Thomas E Feasby, MD.

Introduction: Chronic Inflammatory Demyelinating Polyneuropathy (CIDP) has been shown to respond clinically to plasma exchange (PE), immunoglobulin and various immunosuppressants. Little is known however of the changes in nerve conduction parameters that occur in association with these changes in the clinical state.

Objectives: To evaluate the impact of PE on electrophysiological indices of primary demyelination in CIDP.

Methods: Hahn¹ recently completed a multicenter double-blinded crossover trial of PE compared to sham exchange for CIDP. PE improved clinical outcome measures in 12 of 15 patients. We studied changes in electrophysiological indices of primary demyelination for median, ulnar, peroneal and tibial motor nerves in these 12 responders.

Results: Proximal motor amplitudes and areas in individual motor territories demonstrated improvement with plasma exchange for responders (but not non-responders). While there were trends toward improvement in other parameters, these did not achieve statistical significance.

Conclusions: Electrophysiological studies are an important way of following the clinical course of patients with CIDP. Improvement in nerve conduction parameters occurs simultaneously with clinical improvement and may provide useful objective evidence for the success of various treatment strategies in CIDP.

1. Hahn AF et al. Plasma-exchange therapy in chronic inflammatory demyelinating polyneuropathy. Brain 1996; 119:1055

^{1,4}Guy Trudel MD, MSc, ^{2,4}Masayuki Seki, MD, PhD ^{3,4}Hans K. Uthoff, MD, FRCS.

From the ¹Division of Physical Medicine and Rehabilitation, Department of Medicine, ²Tohoku University, Sendai, Japan, ³ Division of Orthopaedic Surgery and the ⁴ Bone and Joint Laboratory, University of Ottawa, Ottawa, Ontario, Canada.

Connective tissue proliferating and invading the intra-articular space is considered a feature of joint contractures. Others reported that no pannus proliferated after joint immobility but all reports were qualitative. No precise longitudinal study has ever attempted to quantify pannus formation secondary to joint immobility. **Hypotheses:** Pannus proliferation will increase 1) the intra-articular synovial length and 2) the cross-sectional capsular area. **Objective:** To measure intra-articular pannus proliferation after immobility in the rat knee joint. **Methods:** Forty rats underwent unilateral knee immobilization with plate and screws for 2, 4, 8, 16 and 32 weeks. Twenty controls had a sham surgery. The histomorphometry of knee joints were examined with an image analysis software. The synovial intima length and the subintimal area were measured on sagittal histology slides. Distances and areas were recorded for each site of the knee: anterior, posterior, superior and inferior. **Results:** The synovial intima did not lengthen. To the contrary, it was smaller in immobilized knees compared with controls and this difference was statistically significant 4 and 32 weeks after immobility ($p < 0.05$). Interestingly, the posterior synovium showed a reproducible decrease in synovial length, statistically significant 4, 8, 16 and 32 weeks after immobilization ($p < 0.05$). The cross-sectional capsular area did not increase in immobilized knees compared with controls. **Conclusion:** Both hypotheses testing for histomorphometric changes consequent with pannus proliferation were defeated. This first quantitative study of the intra-articular pannus in joint contractures revealed a significant decrease in synovial length and no change in the capsular area. Posterior changes were prominent with knee flexion contractures. These results suggest that pannus proliferation is not the major pathophysiological change leading to joint contractures.

30 **Medical Marijuana Use in Spinal Cord Injury: The British Columbia Survey**

Jennifer Yao, Andrea F. Townson

Marijuana has been used as an herb for centuries, but its medicinal properties remain relatively unknown. Anecdotal reports of the beneficial effects of marijuana exist for a wide variety of symptoms. Delta-9-tetrahydrocannabinol, the primary active ingredient in marijuana, is currently approved by the FDA for treatment of chemotherapy-induced nausea and vomiting and AIDS related wasting syndrome only. Use of marijuana in multiple sclerosis (MS) patients for pain, spasticity, neurogenic bladder and other MS related symptoms has been documented in the literature. There are also case reports of spinal cord injured (SCI) patients using marijuana to treat pain, spasticity, and neurogenic bladder. However, there are no studies on the usage pattern of medical marijuana in the SCI population.

G.F. Strong Rehab Centre is the provincial tertiary care facility for SCI rehabilitation in British Columbia. In order to document the use of medical marijuana in SCI, a survey of SCI patients at G.F. Strong Rehab Centre is being conducted. Demographics, pre-injury experience with marijuana, post-injury experience with marijuana and perceived beneficial and side effects of medical marijuana are being recorded with a special emphasis on spasticity. As well, given the controversial aspect of marijuana, patient attitudes toward the use of medical marijuana are being explored. The results of this survey will be presented. The data will provide insight into the current patterns of usage and attitudes toward the use of medical marijuana in SCI patients and will help guide further research in this field.

Jennifer Yao

Evaluating Outcomes in an Interdisciplinary Post-acute Acquired Brain Injury Program

Joyce, B., Braha, R., Saunders-Green, L.

Objective: The purpose of this study was to evaluate the effectiveness of our interdisciplinary rehabilitation program for acquired brain injury patients at the Nova Scotia Rehabilitation Centre.

Methods: The project consisted of readiness, process and outcome studies. Six program evaluation indicators and audit tools were developed or revised. We will report on data from selected outcome indicators. Two indicators provided data regarding program outcomes: a customized, 35 item Patient and Family Satisfaction Questionnaire and Goal Attainment Scaling. Data was collected prospectively on all patients admitted during the 18 month study period.

Results: Data is presented from the Patient and Family Satisfaction Questionnaire. An 48 percent response rate (N=64) was achieved through the use of a mail-out questionnaire. Major outcomes included: eighty-two percent of respondents felt admission helped them to better understand their injuries. Seventy-eight percent felt treatment improved their ability to do things for themselves. Sixty-three percent of respondents felt treatment improved their ability to cope with their injuries.

Conclusions: Results provided strategic direction for ongoing program development. Outcome evaluations must be considered an integral part of the practice of rehabilitation medicine.

A Comparison of In- Patient Rehabilitation Outcomes in Older, Hip Fracture Patients from Two Rehabilitation Units

G.R. Jones, T.A. Miller, and R. J. Petrella. The Centre for Activity and Ageing, St. Joseph's Health Centre, Parkwood Hospital and The University of Western Ontario, London, ON. CANADA.

Objective: The objective of this study was to compare outcome measures at admission and discharge in hip fracture patients treated at two separate rehabilitation units.

Methods: Non-parametric tests were used to compare the patient groups treated at each rehabilitation unit. Patients were assessed for age, length of stay (LOS) mini-mental state examination (MMSE) scores and functional independence measures (FIM) completed upon admission and discharge from each unit.

Results: A total of 100 hip fracture patients (83 females) were treated at two rehabilitation units (Unit I n =52; Unit II n =48). Both groups were similar for age (Unit I 82.4 "7.3; Unit II 80.8 " 7.9, range 61-99) and the mean length of stay (Unit I 29.3 ± 18.3; Unit II 30.5 " 12.9, range 2-108). However, patient groups were different upon admission (P £ 0.05) in MMSE score, total FIM score and motor FIM sub-scale score, with significantly higher scores reported by patients admitted to Unit II. Upon discharge both patient groups had improved (Unit I 19.4%; Unit II 16.9%) and there was no significant difference between discharge FIM scores. However, patients from Unit I had a significantly greater percent change (P = .029) over patients from Unit II.

Conclusions: The FIM may be a better tool to capture change in lower functioning patients than in those with higher initial scores. Rehabilitation for hip fracture patients improves their level of independence. The improvements in outcome comparing the two units are primarily related to the change in the domains of mobility and locomotion.

S.C. Marshall, Tardif G, Ashworth N

Background: Carpal tunnel syndrome (CTS) is a clinical syndrome manifested by signs and symptoms of irritation of the median nerve at the level of the carpal tunnel in the wrist. Treatment of CTS can be surgical or non-surgical. Local corticosteroid injection for CTS has been previously studied, however most studies have been either retrospective or uncontrolled in design. The effectiveness and duration of benefit of local corticosteroid injection for CTS remains unknown. **Objectives:** To evaluate the effectiveness of local steroid injection for carpal tunnel syndrome versus placebo injection or other non-surgical interventions in improving clinical outcome and to determine the length of symptom relief post injection. **Search strategy:** We searched the Cochrane Neuromuscular Disease group register, MEDLINE, EMBASE and CINAHL. In addition, the Journal Muscle and Nerve was hand searched. **Selection criteria:** Studies using either a randomized or quasi-randomized methodology were eligible for inclusion. The studies included participants with the diagnosis of carpal tunnel syndrome and the treatment intervention was local corticosteroid injection. The primary outcome measure was clinical improvement post injection. **Data collection & analysis:** Three reviewers independently selected the trials to be included in the study. Studies were rated for their overall quality independently by the reviewers. Studies were compared for heterogeneity using the chi square statistic. Relative risks and 95% confidence intervals were calculated for each trial and summary relative risks and 95% confidence intervals were also calculated. **Main results:** We identified 4 randomized controlled trials studying local corticosteroid injection for the treatment of CTS. Two of the trials were excluded since one did not include clinical assessment as an outcome and the other did not provide patient outcomes, but only statistical values. Each of the remaining 2 trials had demonstrated clinical improvement of CTS at 1 month following local corticosteroid injection compared to placebo injection. The pooled relative risk (RR) for in favour of treatment was 3.62 (95% confidence interval 1.94 to 6.73). **Reviewers' conclusions:** Local corticosteroid injection for CTS provides clinical improvement in symptoms 1 month post injection compared to placebo. The duration of symptom relief beyond 1 month compared to placebo has not been demonstrated. The effectiveness of local corticosteroid injection has not been compared to other non-surgical or surgical interventions for CTS in randomized controlled trials.

Ambulation and Selfcare Abilities Following Dual Disability: Stroke and Lower Extremity Amputation

Edmund R. Harrison, MD FRCPC (Division of PM&R, Dalhousie University, QEII Health Sciences Centre, Halifax)

Objectives: (a) Determine the ambulation and self-care ability outcomes in patients with impairments following stroke and lower extremity amputations in the setting of a tertiary level Canadian health care centre (b) Determine potential predictors of successful outcomes in ambulation and self-care (c) assess the appropriateness of prosthetic prescription in this specific patient population. **Methods:** A 2 year retrospective chart review was performed on patients seen in an ambulatory amputee clinic or admitted to the inpatient amputee rehabilitation service of a tertiary rehabilitation centre. 20 patients (m:f = 6:14), with a mean age 71 yr (50-87 yr), with post-stroke hemiplegia (L:R= 16:4) and lower extremity dysvascular amputations (L:R= 10:10; #BK=8, #AK=9;#bilat=3) were identified. **Results:** For ambulation, 4 achieved independence, 9 more achieved indoor walking and 7 were wheelchair dependent. For self-care, 12 achieved independence, 7 achieved modified independence or assistance and 1 was dependent. Age, level of amputation, side of hemiplegia, and sex had little effect on ambulation ability. Better outcomes were more common with ipsilateral hemiplegia and amputation, better functional ability prior to second disabling event, and in ipsilateral (versus contralateral) amputees. **Conclusions:** Outcomes for the group were better than previously reported series', especially in A/K or bilateral amputees. This study confirms the importance of some previously reported prognostic indicators. Further work, with larger series of patients, using standardized measures for impairment and disability, is warranted to identify important prognostic indicators and outcomes. Clinicians could then better counsel patients and family re: realistic rehabilitation goals and to ensure optimal utilization of increasingly scarce rehabilitation and health care resources.

Exercise Stress Testing People Who Have Had a Stroke With a Combined Upper and Lower Limb Ergometer: A Pilot Study

Denise C. Hill, Karen D. Ethans, Donald A. MacLeod, Edmund R. Harrison, Jane E. Matheson.

Objective: Patients with hemiparesis performed graded exercise stress tests on a new combined arm/leg ergometer called the Power Trainer (PT). Maximal heart rates obtained on the PT were compared with heart rates obtained on the Kinetron, stationary bicycle, arm ergometer, and while ambulating. **Methods:** Eleven patients were stress tested on the PT. Extent of motor recovery was evaluated using the Chedoke McMaster CM) stages of motor recovery, the Berg Balance Scale, and walking velocity. Heart rate (HR), blood pressure (BP), and rate pressure product (RPP) were determined at rest and incremental exercise. Based on stress test performance, heart rate limits were prescribed for testing on the Kinetron, arm ergometer, and stationary bicycle. Subjective experience of fatigue and comfort during exercise was assessed using a questionnaire. **Results:** 11 patients, an average of 6.7 weeks post stroke, were recruited. Mean walking velocity was 1.7 mph, mean Berg Balance Score was 45/56 (SD = 10), and mean CM stage - arm was 3.9/7.0 (SD = 1.7) and leg was 4.2/7.0 (SD = 1.1). During testing, no evidence of myocardial ischemia was demonstrated, but 1 patient was withdrawn due to supraventricular tachycardia. Mean percentage of age-predicted maximal heart rate (APMaxHR) achieved on the Power Trainer was 79% (SD = 12%). 40% achieved \geq 85% of APMaxHR. The mean RPP was 199 (SD = 33). Walking speed correlated strongly with stress test performance ($r = 0.722$, $p = 0.018$). 6/10 patients achieved maximal heart rates on the PT, 3/10 on the Kinetron, and 1/10 walking. Mean overall satisfaction with the PT was high. Patients did not experience less limb fatigue on the PT compared to other modalities. **Conclusion:** This preliminary data suggests that the PT may be used for exercise stress testing patients after stroke regardless of extent of motor recovery. Further study is warranted.

Adults with spasticity due to cerebral palsy frequently have few viable treatment options.

A case series is described in which Botulinum toxin type A was successfully used to treat this patient population.

The method of patient selection, the injection technique, timed follow-up and observed outcomes are documented. Remarkable improvements with decrease in tone, improved brace fitting, decreased skin breakdown, diminished pain, increased speed of ambulation and decreased use of walking aides are highlighted.

To date, many studies have reviewed the use of botulinum toxin in cerebral palsy. ALL of these studies have specifically addressed its use in the pediatric population. As well, there have been many studies analyzing this drugs use in adults with acute onset neurologic deficits such as stroke and traumatic brain injury.

Based on this experience, Botulinum Toxin type A can be quite useful as a treatment option for individuals with longstanding central nervous system abnormalities such as cerebral palsy.

Further study is planned to:

- 1) define client or caregiver knowledge about this treatment option
- 2) prove this drug's usefulness in the treatment of equinovarus and spastic upper extremities in adults with cerebral palsy.

Defining, more precisely which clients in this large population can be assisted through the use of this antispasticity agent is imperative.

Norine Foley, BAsC, Hillel Finestone, MD, FRCPC, M. Gail Woodbury, PhD, Linda S. Greene-Finestone, MSc. Department of Physical Medicine and Rehabilitation, London Health Sciences Centre and Research Department, St. Joseph's Health Care London, University of Western Ontario, London, Ontario.

Objective: To examine the relationship between Beta-adrenergic blocking agents (β -blockers) and resting energy expenditure (REE) and body composition in the stroke patient over a three-month period. Long-term use of β -blockers has been reported to decrease resting energy expenditure, increase body weight and reduce body cell mass (muscle), with long term use. **Methods:** REE of recently diagnosed stroke patients at the London Health Sciences Centre was measured prospectively, using indirect calorimetry, at admission to hospital, days 7, 11, 14, 21 and 90 and expressed as Kcals/24 hrs. Weight and body cell mass were measured at admission and days 21 and 90 post stroke using bioelectrical impedance analysis (BIA). **Results:** Twenty-six of the 91 patients studied (29%) were already taking β -blockers or had it prescribed after admission for the treatment of hypertension. REE was lower in the stroke patients on β -blockers at all times tested. REE at admission, day 7, 11, 14, 21 and 90 was 1512 vs. 1666 (p=NS), 1514 vs. 1658 (p=NS), 1494 vs. 1728 (p=.045), 1436 vs. 1578 (p=NS), 1374 vs. 1596 (p=.005) and 1431 vs. 1740 (p=.001), respectively. There were no differences in either weight or body cell mass (BCM), at admission (weight=74.5 vs. 78.9 kg; p=NS, BCM= 23.0 vs. 25.6 kg; p=NS), day 21 (weight=70.7 vs. 76.3 kg; p=NS, BCM= 22.0 vs. 25.1 kg; p=NS) or day 90 (weight=71.4 vs. 75.2 kg; p=NS, BCM=23.0 vs. 25.1 kg; p=NS) post stroke between patients on β -blockers and those who were not. **Conclusions:** Stroke patients on β -blockers experienced significantly lower REE at days 11, 21 and 90. While both groups lost weight over the study period, there were no differences in weight or body cell mass between the two groups. This finding suggests that stroke patients who are prescribed β -blockers are not at increased risk of weight gain or loss of muscle tissue in the first three months following stroke.

Hillel M. Finestone, MD, FRCPC, Linda Greene-Finestone, MSc, M. Gail Woodbury, PhD. Department of Physical Medicine and Rehabilitation, London Health Sciences Centre and St. Joseph's Health Care London, University of Western Ontario, London, Ontario.

Objectives: To determine a) whether resting energy expenditure (REE) changes and exhibits a hypermetabolic pattern in stroke patients from admission to 90 days and b) to examine the relationship between energy expenditure and stroke size, type and location. Methods: This is a prospective, observational study. Participants were 91 consecutive, newly diagnosed stroke patients who met eligibility criteria. Indirect calorimetry measured REE on admission, and days 7,11,14,21, and 90. REE is expressed as Kcal/kg/24 hours to control for body size. Stroke size, location and type were determined by radiographic imaging. A mixed linear model, to handle repeated measures in unbalanced groups, determined how REE varied over time. ANOVA or t-tests examined differences in stroke location (right and left hemisphere, basal ganglia, cerebellum, brainstem), stroke size (lesion <0.5, 0.5-<1.5, 1.5 cm-<1/3, 1/3-<2/3, >2/3 of vascular territory) and stroke type (infarct versus hemorrhage). Results: REE estimates at evaluation times were 21.9, 20.8, 21.6, 21.1, 20.6 and 21.6 Kcals/kg/24 hours, respectively (p=.029). There was marked individual variation at each evaluation time. There were no differences detected in REE with respect to stroke size, location or type at any of the testing times. Conclusions: While statistically significant changes in REE occurred over time, they do not appear to be of clinical significance. These data suggest that a) unlike the head injured, a hypermetabolic phase does not occur acutely and b) REE is not a contributor to the energy deficits that may lead to undernutrition post stroke.

Vasculitis Related Strokes

M.S. Acharya, M.D., FRCPC

Cerebrovascular vasculitis in isolation is uncommon, although as a part of systemic disease is known to cause cerebrovascular accidents. How common is this cause of strokes in our population?

This poster will describe various causes of CNS vasculitis and through case illustrations raise the insight of viewers regarding this possible cause of strokes, especially in young patients with less known traditional risk factors of having a stroke.

40 The Role of Hyper-Homocysteinemia in the Etiology of Cerebrovascular Accidents

M.S. Acharya, MD., FRCPC; V.R. Chari, MD., FRCPC; F. Kelly, MD, FCCP

Moderate to high levels of homocysteine is prevalent in 5-15% of population. Hyperhomocysteinemia is linked with cardiovascular atherosclerosis. Limited information is available regarding the role of hyperhomocysteinemia in causing cerebrovascular accidents, in North American literature.

This poster will describe the possible role of this easily treatable condition in causing cerebrovascular accident. Through a series of case studies, it will also identify its incidence in the stroke patients admitted for Rehabilitation at Saint-Vincent Hospital, and suggest treatment which will compliment the present methods of stroke prevention in appropriate cases.

Method - 50 patients from Stroke Rehabilitation Program with recent CVA and 25 patients from Neurolocomotor Rehabilitation Program (non CVA) were included from inpatient rehabilitation units of Saint-Vincent Hospital, between January and March 2000.

Initial assessment included detailed history and physical examination as well as the following laboratory assessment: Fasting CBC, SMA₁₈, S. cholesterol, TSH, VitaminB₁₂, Folate, homocysteine. Microalbuminuria. As appropriate, the following values were re-assessed after about 1 month of medical intervention: Fasting homocysteine level, Vitamin B₁₂, Folate.

Results

1. For this study, serum homocysteine level of 13 umol/L and higher was considered as elevated level of homocysteine (Literature review suggests ranges of levels between 11-15 as elevated level. In some studies, treatment was provided even at homocysteine level of 9 umol/L).
2. Baseline values of serum homocysteine, Vitamin B₁₂, Folate are shown in the following table:

Category		# CVA Patients	# Non-CVA Patients
Vitamin B ₁₂	Normal (> 150 mcg)	40	17
	Abnormal (<150 mcg)	10	8
Hcy	Normal (<13 umol/L)	9	13
	Abnormal (>13 umol/L)	41	12
Folate	Normal	49	24
	Abnormal	1	1

3. After intervention in appropriate cases, a repeat value of Hcy was available in 15 patients in CVA group. Further information will be available in the near future on more patients.

The range of homocysteine level reduction was 1 - 11 umol/L, except in one patient with recurrent renal failures, in whom homocysteine level increased by 11 umol/L despite the vitamin supplementation.

Conclusion

1. This study indicates the presence of hyperhomocysteinemia is significantly higher in stroke group in comparison with the control non-stroke group.
2. This does not have a proof of causality but long term follow-up will indicate if recurrence of CVA is reduced when additional risk factor management is provided, i.e. treatment of hyperhomocysteinemia.
3. Treatment with Vitamin B₁₂, B₆ and Folic acid is inexpensive, effective and free from side effects and would be an important addition to stroke management options should normalization of homocysteine level prove to control new and recurrent vascular accidents.
4. A subgroup of patients with baseline low Vitamin B₁₂ level responded well to oral supplements avoiding the need for injectable supplements.

Dr. V.R. Chari; MD., FRCPC; F. Kelly, MD., FCCP

a) Objective - To determine whether or not Vitamin B₁₂ deficiency - \bar{I} is prevalent in patients with MS, \bar{I} is a factor with respect to fatigue/well being, and \bar{D} can be treated orally than parenterally.

b) Methods - Prospective Case Control Study of 25 patients, admitted from January 2000 onwards to the Neurolocomotor Rehabilitation Unit of Saint-Vincent Hospital, with MS and other diagnostic categories - serving as Control group.

c) Results - Vitamin B₁₂ deficiency was considered to be present if the serum level was less than 150. Preliminary data at this time revealed that 5 out of 8 patients with MS (62%) had the vitamin deficiency compared to 3 out of 17 control patients (18%) - with good response to daily oral supplementation.

d) Conclusion - Vitamin B₁₂ deficiency appears to occur more frequently in MS patients and can be treated with oral supplementation.

Dr. V.R. Chari; MD., FRCPC; M.S. Acharya, MD., FRCPC; F. Kelly, MD., FCCP
Stroke Rehabilitation Program - Saint-Vincent Hospital

a) Objective - To determine whether or not microalbuminuria is an independent stroke risk factor through an evaluation of its incidence/prevalence in patients with recent stroke(s) and its relationship with other well-known risk factors associated with microalbuminuria.

b) Methods - Prospective Case Control Study of patients with recent stroke(s) admitted, to Stroke Rehabilitation Unit at Saint-Vincent Hospital, from January 2000 onwards. Non-stroke patients admitted at the same time period, to the Neurolocomotor Rehabilitation Unit, considered as Controls.

c) Results - Preliminary data at this time revealed the presence of microalbuminuria in 14 stroke patients out of 29 tested (48%) compared to 7 non-stroke patients out of 18 tested (39%).

d) Conclusion - The increased presence of microalbuminuria in stroke patients compared to non-stroke patients, merits further evaluation of this factor which is rather inexpensive and easily measured.

Intracranial Dural Fistula as a Cause of Cervical Myelopathy: Neurological and Functional Outcome after Surgical Repair

Chris Boulias PhD, MD and Alborz Oshidari MD, FRCPC
University of Toronto, Department of Medicine, Division of Physiatry and The Toronto Rehabilitation Institute, Lyndhurst Spinal Cord Centre

A 62-year-old male developed a slowly progressive cervical myelopathy as a result of arteriovenous dural fistula draining from the distal right internal carotid artery into the spinal cord. This is a rare cause of cervical myelopathy. The fistula was closed microsurgically. Prior to the surgery the patient had developed incomplete quadriplegia and bladder and bowel dysfunction. During a six month inpatient comprehensive rehabilitation he showed mild neurological and functional recovery. Motor recovery in the upper extremities was complete. The power in the right lower extremity improved by 2 MRC levels in most muscle groups. There was no change with respect to sensation below the level of the lesion. At seven months post surgery he was still wheelchair-dependant. There was no improvement in bladder and bowel function. Fifteen reported cases of intracranial and spinal arteriovenous fistulas are reviewed. Pathophysiologically, venous hypertension, edema or hypoxia from a reduced arteriovenous pressure gradient seems to play a role in the development of the myelopathy. Long term neurological and functional outcome following rehabilitation depends on the duration and poor functional status prior to surgical intervention. In the long term most patients with intracranial arteriovenous fistulas show a mild neurological and functional improvement. The diagnostic difficulties, surgical and/or vascular therapeutic methods and functional outcome of myelopathy as a result of arteriovenous dural fistulas are discussed.

The Effect of Ankle Foot Orthoses on Standing Balance in Individuals with Hemiplegia

Christine Short MD, Edmund Harrison MD, Donald MacLeod MSc, Alison McDonald BSc PT, Division of Physical Medicine and Rehabilitation, Dept. of Medicine, Dalhousie University, Halifax, N. S.

Objective: The objective of our study was to assess the effect of ankle foot orthoses (AFO) on static balance and standing-balance-related activities in individuals with hemiplegia, as we could find no literature (medline^R 1967-present) assessing this specifically.

Methods: Using a Kistler Instruments force platform (Model CH8408), we measured static balance (through postural sway) in hemiplegic individuals with and without their AFOs. As a measure of standing-balance-related activities, we recorded Berg balance scores in the same individuals with and without their AFOs.

Results: In our preliminary data (eleven of twenty subjects' data collected), no significant changes in postural sway have been identified as yet. However, we have observed a trend toward an increase in the Berg balance scores when testing individuals with their AFOs on. Seven of eleven have had increases in their Berg balance scores when wearing their AFOs and no subjects showed a decrease in their Berg scores.

Conclusion: Preliminary data shows that use of an AFO in hemiplegic individuals may improve balance for standing activities.

Robert Teasell MD, Norine Foley BSc, Hillel Finestone MD. Department of Physical Medicine and Rehabilitation, University of Western Ontario and London Health Sciences Centre, London, Ontario.

Objective. To examine the clinical characteristics of brainstem stroke patients admitted to a rehabilitation unit.

Methods. A retrospective chart review was conducted of 563 stroke patients consecutively admitted to the rehabilitation unit at the University Campus of London Health Sciences Centre over a ten year period of time. Radiographic imaging reports were reviewed to identify those patients with focal brainstem findings, including specific lesions within the pons, cerebellum, medulla, and midbrain. A variety of clinical characteristics and complications were recorded for each of these patients.

Results. Eighty-five patients (15% of the total stroke rehab population) were identified with focal brainstem strokes. Four patients with clinical features of brainstem lesions were excluded from the analysis because of a lack of radiological correlation. Mean age was 62 (SD±16; range 18-85) years. Fifty-six (66%) of the patients were male and 29 (34%) were female. In terms of stroke types, 70 (82%) were infarctions while 15 (18%) were hemorrhages. Hemiparesis, ataxia and diplopia were present in 41 (48%), 73 (86%) and 32 (38%) patients, respectively. Dysarthria was reported in 42 (49%) and dysphagia in 40 (47%). Pneumonia during hospitalization was a complication in 12 (14%) of brainstem strokes. Seizures and deep venous thrombosis were rare, occurring in only 3 (4%) and 1 (1%) of patients. The risk factors of diabetes in and hypertension were present in 22 (26%) and 47 (55%) of patients, respectively. Fourteen (17%) patients had suffered a previous stroke.

Conclusions. Brainstem stroke rehabilitation patients tended to be younger, male and having suffered an infarct. About half of the patients experienced hemiparesis, dysarthria and dysphagia while the vast majority were ataxic. A significant number had pneumonia as a complication.

Robert Teasell MD, Norine Foley BSc, Hillel Finestone MD. Department of Physical Medicine and Rehabilitation, University of Western Ontario and London Health Sciences Centre, London, Ontario.

Objective. To examine the clinical characteristics of medullary stroke patients admitted to a rehabilitation unit.

Methods. A retrospective chart review was conducted on 563 stroke patients admitted to the rehabilitation unit at the University Campus of London Health Sciences Centre over a 10 year period of time. Of these 89 strokes were identified as primarily brainstem in origin and 20 of these had radiological evidence of a medullary stroke as the primary lesion. A variety of clinical features for these medullary strokes were identified utilizing a chart review.

Results. Of the 20 medullary stroke rehab patients, mean age was 56 years (21-78) while 15 (75%) were male and 5 (25%) were female. Seventeen (85%) of the strokes were infarctions while 3 (15%) were hemorrhages. Hemiparesis was present in 6 (30%) while ataxia was reported in 19 (95%). Diplopia was present in 10 (50%). Dysarthria was reported in 9 (45%) and dysphagia in 11 (55%). Pneumonia during hospitalization was a complication in 5 (25%) of the medullary stroke patients. The risk factors of diabetes and hypertension were present in 3 (15%) and 10 (50%) of patients respectively. Three patients (15%) had suffered a previous stroke.

Conclusions. Medullary stroke patients tend to be younger (mean of 56 years). The vast majority were infarctions. Hemiparesis was present in about one third while all but one of the patients suffered from ataxia. Dysphagia was recorded in over half of the medullary stroke patients and one quarter developed pneumonia during their hospitalization.

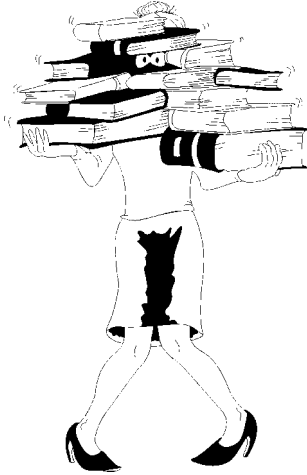
Robert Teasell MD, Allan Shapiro PhD. Department of Physical Medicine and Rehabilitation, University of Western Ontario and London Health Sciences Centre, London, Ontario.

Objective. To study patients admitted to a rehabilitation unit with a misdiagnosis of conversion disorder.

Methods. Over 150 individuals with suspected conversion disorders were assessed for admission to a rehabilitation program for conversion disorders and of these approximately 100 were diagnosed with conversion disorders. Forty-five patients with a diagnosis of conversion disorder agreed to be admitted to the rehabilitation program. These patients were then reviewed to see if any had been misdiagnosed as conversion disorders.

Results. After assessment by a multidisciplinary rehabilitation team in an inpatient setting five of the cases of initially diagnosed conversion disorders turned out to have a medical or organic reason for their clinical presentation. Four of the cases were female while only one was male which matches the ratio of females to males in the other 40 patients with proven conversion disorders who underwent in-patient rehabilitation. The actual diagnoses varied from a sarcoma-induced osteomalacia, a cerebellar tumor, Huntington's chorea, transverse myelitis and a lower extremity dystonia. In each of the cases diagnostic testing was not definitive and the condition relatively rare. In four of the cases there were identified psychological disorders which were not felt to be appropriate and the fifth case was a registered nursing assistant on a neurological unit with close experience with the clinical presentation of the paralysis that she presented with.

Conclusions. A history of psychological difficulties, unusual neurological presentation, and normal diagnostic testing in a female patient is associated with the misdiagnosis of conversion disorders.



ABSTRACTS

FOR THE

RESIDENT ESSAY CONTEST

IN PHYSICAL MEDICINE AND

REHABILITATION

WINNER OF THE 2000 RESIDENT ESSAY CONTEST IN PHYSICAL MEDICINE AND REHABILITATION

Perspectives on Medical Marijuana in Rehabilitation

Jennifer Yao, MD, University of British Columbia, Vancouver, British Columbia.

Marijuana has been used as an herb for centuries, but its medicinal properties remain relatively unknown. Anecdotal reports of the beneficial effects of marijuana exist for a wide variety of symptoms including pain, nausea and vomiting, weight loss, and spasticity. Although much has been learned in the past few decades about marijuana pharmacology, there is still a significant void in the understanding of its clinical applications. Delta-9-tetrahydrocannabinol (THC) is currently available in Canada for treatment of chemotherapy-related nausea and vomiting only. Evidence of marijuana's therapeutic effects on pain and spasticity is accumulating in the literature. It is likely that some rehabilitation patients who suffer from these symptoms are self-medicating with marijuana. Consequently, a current understanding of evidence-based medical marijuana use is becoming increasingly relevant to the physiatrist not only from a patient-care perspective, but also in directing future research into the potential medicinal effects of marijuana.

ADDITIONAL RESIDENT ESSAY CONTEST ABSTRACTS

03 **On Feeling Sick and Becoming Disabled**

Jaime Guzman

The prism model of disablement and its implications for disability research. Jaime Guzman, MD MSc. Section of Physical Medicine and Rehabilitation, Department of Medicine, University of Manitoba Faculty of Medicine.

Many health care providers, researchers and policy makers seem to adhere to a narrow interpretation of the disablement process. For them, disability (defined as inability or limitation in performing the socially defined activities and roles expected of individuals within a social and physical environment) is the end result of a process that starts with a disease or pathology, followed by impairment and measurable shortfalls in function. This paper argues that a better way of approaching disability is to see it as the result of a dynamic interaction between sickness signs and behaviours and the corresponding societal responses, within the frame of social-cultural expectations. Depending on its nature, behaviours and societal responses can have positive or negative effects on each other, working to decrease or increase the degree of disability generated. Like a prism, you have a single input and then depending on the interaction within, you may have a wide range of outputs. Adopting such a model would require changing the traditional biomedical approach often used to research disablement. The traditional approach requires isolation of the phenomenon of interest from its context and relying only on objective data. Disability always happens in a social context and humans often act on their perceptions of their circumstances rather than on objective data. If we are to take full advantage of the prism model of disablement we would need to modify our research approach along the lines of qualitative research, as used in sociology and anthropology. At the end of the day we don't have to drop our quantitative research tools, what we do have to do is to expand our repertoire of research tools and use the ones best suited to the problem at hand.

06 **Should Physiatrists Treat Osteoporosis?**

Patricia Forgeron

Osteoporosis is characterized by low bone mass, has many etiologies and different patterns of bone loss. The resultant increase in bone fragility and susceptibility to fracture has functional implications in the rehabilitation setting. Dual-energy x-ray absorptiometry is a safe, accurate, low cost diagnostic tool that measures bone mineral density and is useful for predicting fractures, as well as monitoring therapy. The management of osteoporosis includes primary and secondary prevention strategies.

Osteoporosis is common in various patient populations cared for by the discipline of Physical Medicine and Rehabilitation. However, there is very little literature available in the management of osteoporosis in patients with multiple sclerosis (MS), spinal cord injury (SCI) or stroke.

This paper reviews the definition, pathophysiology and diagnosis of osteoporosis. Primary and secondary prevention guidelines are outlined. The evidence regarding osteoporosis in MS, SCI and stroke is reviewed and specific recommendations for assessment and management is provided.

ADDITIONAL RESIDENT ESSAY CONTEST ABSTRACTS

- 10 **Current Concepts in Reflex Sympathetic Dystrophy** R Li Pi Shan
- Reflex sympathetic dystrophy is a complex syndrome that provides a considerable challenge to many clinicians. It is at times difficult to diagnose, and in most cases, it is extremely difficult to treat. Prognosis for full recovery is very poor. In this review, signs and symptoms of RSD will be discussed. Criteria used in the diagnosis of this condition will also be outlined. The debate regarding the pathophysiology of this syndrome will be presented. Finally, a description and evaluation of the various treatment modalities including non-pharmacologic, pharmacologic, and surgical management of RSD will be included.
- 16 **The Effects of Elastic Abdominal Binding in the Spinal Cord Injured Population** H Underwood
- Objectives: To review the pathophysiology of respiratory function and orthostatic hypotension (OH) in the spinal cord injured (SCI) population. To review and critically analyze the evidence supporting the use of elastic abdominal binders (EAB) for respiratory dysfunction and OH in the SCI population.
- Study Selections: A comprehensive Medline search of the effects of abdominal binding/anti-G suits/strapping on respiratory function and OH in the SCI population excluding case reports.
- Conclusions: There is minimal evidence to support the use of EAB for clinical improvement of vital capacity and total lung capacity in the SCI population. Evidence supporting a clinically significant improvement in cough with abdominal binding is inconsistent. Although there is evidence to support the use of anti-G suits in the prevention of OH, no such evidence exists to support the use of EAB in the prevention of OH. Overall, evidence supporting the use of EAB in the SCI population is poor.

ADDITIONAL RESIDENT ESSAY CONTEST ABSTRACTS

17 **The Long and Short of It: Controversies in Leg-length Discrepancy**

Ed Hanada

Ed Hanada, Dalhousie University, Halifax, Nova Scotia.

Leg-length discrepancy (LLD) is a common disorder, with important clinical implications. There are many controversial clinical issues involving LLD that can make it challenging for the clinician. The extent of LLD that is clinically significant is up for debate, although this is now more commonly expressed as a percentage of the longer limb leading to, for example, compensatory strategies in gait. There is some evidence to suggest that LLD has an association with low back pain, and is linked with degenerative arthritis of the longer-leg hip and knee, although the strength of these associations are a contentious issue. Evaluation of LLD should involve a thorough history and physical examination, including clinical measurement through the "iliac crest palpation book correction" technique, and gait analysis. Finally, treatment should involve stretching, and strengthening exercises for the hip abductors/adductors, and extensors, as well as for the back. For LLD between 20-50mm, conservative management should involve a trial of a heel with or without a shoe lift. Larger LLD should be managed by prostheses if surgical management is not being considered. Leg-length discrepancy remains a fascinating clinical entity and an important one, with which clinicians should be familiar, and be able to manage effectively.

18 **Perspectives on Medical Marijuana in Rehabilitation**

Jennifer KJ Yao

Jennifer Yao, MD, University of British Columbia, Vancouver, British Columbia.

Marijuana has been used as an herb for centuries, but its medicinal properties remain relatively unknown. Anecdotal reports of the beneficial effects of marijuana exist for a wide variety of symptoms including pain, nausea and vomiting, weight loss, and spasticity. Although much has been learned in the past few decades about marijuana pharmacology, there is still a significant void in the understanding of its clinical applications. Delta-9-tetrahydrocannabinol (THC) is currently available in Canada for treatment of chemotherapy-related nausea and vomiting only. Evidence of marijuana's therapeutic effects on pain and spasticity is accumulating in the literature. It is likely that some rehabilitation patients who suffer from these symptoms are self-medicating with marijuana. Consequently, a current understanding of evidence-based medical marijuana use is becoming increasingly relevant to the physiatrist not only from a patient-care perspective, but also in directing future research into the potential medicinal effects of marijuana.

ADDITIONAL RESIDENT ESSAY CONTEST ABSTRACTS

- 19 **Management of Neurogenic Bladder in Women with Spinal Cord Lesions: Overview and New Advances** Denise C Hill

Denise C. Hill MD

Spinal cord lesions cause neurogenic bladder dysfunction which can be the source of significant physical and psychological morbidity. Physiatrists should be aware of the unique goals and management options that exist for women with spinal cord lesions. Management regimes should result in urinary continence in the presence of low pressure urine storage and voiding, ideally in the absence of indwelling catheters. This is frequently a challenge for physiatrists, urologists, and the patient herself. Due to complications associated with indwelling catheters, most women try combination pharmacologic therapy/clean intermittent catheterization regimes first, before resorting to other methods. Surgical interventions often become necessary due to upper tract deterioration, urethral erosion, or persistent incontinence. A management plan leading to a lifestyle that is not restricted by neurogenic bladder and potential complications is an achievable and worthwhile goal that may be reached by collaboration between physicians and patients themselves.

- 21 **Vision Rehabilitation: Looking Into the Challenge of the 21st Century** Noorshina Virani

Physiatrists manage patients with numerous disabilities including stroke, brain and spinal cord injury, and amputations. As our North American society ages, the population of visually disabled individuals will unequivocally rise⁶⁷. Are we prepared with the knowledge and resources to meet this challenge? With advances in acute management and rehabilitation practices we have seen a longer life expectancy for the patients that we treat. As our patient population continues to age, their risk for visual impairment to add to their disability accumulates. In order to meet this challenge, physiatrists need to be familiar with common ophthalmological diseases including age-related macular degeneration, diabetic retinopathy, cataracts and glaucoma,^{42,59} along with central causes of visual impairment due to stroke and traumatic brain injury including visual neglect and homonymous hemianopia¹⁸. The ability to address these concerns, with strategies targeted towards improving quality of life, may ultimately make the difference between independent living and total care.



**ABSTRACTS
FOR THE
RESIDENT RESEARCH CONTEST
IN PHYSICAL MEDICINE AND
REHABILITATION**

WINNER OF THE 2000 RESIDENT RESEARCH CONTEST IN PHYSICAL MEDICINE AND REHABILITATION

Évaluation du comportement des disques intervertébraux lombaires en position assise à la résonance magnétique à champs ouvert (IRMCO) chez les patients avec lombalgie chronique

M.Lamontagne*, MD, J.F. Roy*, MD, P. Grondin* , MD, C. Lindsay* , MSA, C. Moisan*, PhD M.C. Guertin, PhD
**

*Unité de IRMT , Centre Hospitalier Universitaire de Québec, Québec , Canada

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RÉSUMÉ: M.Lamontagne, J.F. Roy P. Grondin , C. Lindsay , C. Moisan, M.C. Guertin

Evaluation du comportement des disques intervertébraux lombaires en position assise à la résonance magnétique à champs ouvert chez les patients avec lombalgie chronique.

Objectifs: L'objectif principal de l'étude est de déterminer si l'évaluation des patients lombalgiques, en position assise, avec et sans charge, à l'IRMCO, permet de visualiser de nouvelles hernies discales ou de modifier la morphologie de ces dernières, lorsque comparée à la position de décubitus dorsal. Les objectifs secondaires sont de vérifier si la sensibilité de l'IRMCO est comparable à l'IRM pour la détection des hernies discales en position couchée et de mesurer les changements de diamètre du canal spinal pour les différentes positions étudiées.

Méthodologie : Étude pilote descriptive. 26 patients avec lombalgie ou lombo-sciatalgie chronique (plus de trois mois) ont été recrutés. Quatre séries d'images étaient pratiquées, soit une sur IRM en décubitus dorsal et trois sur IRMCO , en décubitus dorsal , en position assise sans charge et en position assise avec charge . Deux caractéristiques des disques L4-L5 et L5-S1 furent étudiés: la prévalence des différents types de hernies discales et la modification de leur volume en fonction de la position du patient et de l'ajout d'une charge. Le diamètre du canal spinal a été mesuré aux mêmes niveaux.

Résultats : On a obtenu une excellente concordance ($\kappa = 0.920$) entre les deux appareils pour la détection des hernies discales. Aucune nouvelle hernie discale ou compression radiculaire n'ont été mises en évidence à l'IRMCO en position assise tant avec que sans charge . Aussi, on a noté des modifications du calibre de la hernie lors de prise de la position assise dans 35.7% des cas (10 sur 28) et ce de façon statistiquement significative ($p=0.004$). La variation était de 62,5% (10 sur 16) lorsque les bombements, qui sont demeurés stables, étaient exclus. L'ajout d'un poids en position assise a peu modifié l'imagerie. Aussi, on a observé une majoration statistiquement significative du diamètre du canal spinal en passant de la position de décubitus dorsal à la position assise.

Conclusion : La présente étude n'a pas démontrée d'avantages à l'utilisation de l'IRMCO pour la détection de nouvelles hernies discales chez les patients lombalgiques chroniques. Toutefois, elle a mis en évidence une composante dynamique pour certains types de hernies selon la position . Une étude avec groupe contrôle asymptomatique pourrait permettre d'établir le degré de corrélation clinique avec cet élément de mobilité.

**WINNER OF THE 2000 RESIDENT RESEARCH CONTEST IN
PHYSICAL MEDICINE AND REHABILITATION**

Decomposition-based Quantitative Electromyography (DQEMG): Methods and Preliminary Normative Data

Timothy J. Doherty, McMaster University, Hamilton ON; Daniel W. Stashuk, University of Waterloo, Waterloo, Ontario.

Quantitative needle electromyographic (EMG) techniques provide clinically useful information to aid in the diagnosis and follow the course or responsiveness to treatment of diseases affecting the motor system. The purpose of this study was to describe a new decomposition-based quantitative electromyography method (DQEMG) designed to obtain clinically applicable information relating to motor unit action potential (MUAP) size, configuration and firing characteristics. Additionally, preliminary normative data were obtained from the deltoid, biceps brachii, first dorsal interosseous, vastus medialis and tibialis anterior muscles of 13 control subjects. DQEMG was capable of efficiently and accurately extracting MUAP data from complex interference patterns during mild to moderate contractions. Mean MUAP amplitude, macro-MUAP amplitude, MUAP duration, number of phases, and MU firing frequencies varied significantly across muscles. The mean values for individual muscles, however, were similar to previous reports based on other quantitative methods. The main advantages of this method are 1) the speed of data acquisition and processing, 2) the ability to obtain MUAPs from low and higher threshold contractions, 3) the ability to obtain both macro-MUAP data as well as firing rate information.

ADDITIONAL RESIDENT RESEARCH CONTEST ABSTRACTS

- 01 **A Cost Analysis of Low Molecular Weight Heparin Vs. Warfarin for Prophylaxis of Deep Vein Thrombosis During Rehabilitation of Spinal Cord Injury** Benjamin Meikle

BENJAMIN G. MEIKLE, MD, PGY-3, DEPARTMENT OF PHYSICAL MEDICINE AND REHABILITATION, UNIVERSITY OF TORONTO

- Objective:** To determine the difference in cost of using warfarin compared to low molecular weight heparin (LMWH) for deep venous thrombosis (DVT) prophylaxis during rehabilitation of spinal cord injury (SCI).
- Setting:** Tertiary hospital specializing in SCI rehabilitation.
- Design:** Cost-analysis.
- Cost Data:** The total cost of warfarin for DVT prophylaxis was calculated from retrospective warfarin prophylaxis utilization data for twenty consecutive patients admitted to our centre with acute SCI. These costs were compared to a theoretical LMWH group with similar impairment and the same duration of prophylaxis.
- Results:** Total cost (labour + medication + supplies + laboratory costs) for providing a mean 48.7 days of prophylaxis was \$396.32 for warfarin and \$411.22 for LMWH. Warfarin was associated with a \$322.25 (83.8%) reduction in medication cost vs. LMWH. However, there was a \$170.71 increase in laboratory cost (laboratory cost \$0 for LMWH) and a \$136.55 (84.3%) increase in labour cost associated with warfarin use. The cost of supplies was negligible for both groups.
- Conclusion:** This study suggests the medication cost savings of warfarin compared to LMWH for DVT prophylaxis during in-patient SCI rehabilitation are offset by increased laboratory and labour costs.

ADDITIONAL RESIDENT RESEARCH CONTEST ABSTRACTS

02 **The Contribution Of Vision To Wheelie Balance**

Matt McInnes

Matt DF McInnes, R. Lee Kirby and Donald A. MacLeod
Dalhousie University and Queen Elizabeth II Health Sciences Centre, Halifax, NS

Objective: To test the hypothesis that vision plays an important role in the maintenance of balance during a stationary wheelchair wheelie.

Design: Within-subject comparisons of the ability of subjects to perform wheelies with their eyes open (EO) and their eyes closed (EC).

Setting: Kinesiologic laboratory.

Participants: Ten able-bodied adults, a sample of convenience.

Main Outcome Measures: Postural sway, as reflected by the standard deviation of sagittal-plane movements of the center of pressure of the right rear wheel on a force platform during a 10s stationary wheelie balance, and the number of mistrials.

Results: The postural sway for all trials (3 EO and EC data collections at the end of each of 3 one-hour training sessions) was 88% greater with the EC than with the EO ($p < 0.001$) and the number of mistrials was 324% greater ($p = 0.001$). By the end of the final training session, the postural sway with the EC (4.0 cm) was still 100% greater than with the EO (2.0 cm) ($p < 0.001$) although there was no longer a difference in the number of mistrials.

Conclusion: Vision plays an important role in the maintenance of a stationary wheelie, but wheelies can be maintained with the eyes closed. These findings are relevant to the training of wheelchair users and also provide broader insights to the nature of wheelchair function and dynamic balance.

ADDITIONAL RESIDENT RESEARCH CONTEST ABSTRACTS

- 04 **Multidisciplinary Treatments for Chronic Low Back Pain. A Systematic Review of Ten Randomized Controlled Trials** Jaime Guzmán

Jaime Guzmán, MD, MSc ^{a,b} Rosmin Esmail, MSc ^a Antti Malmivaara, MD ^c Kaija Karjalainen, MD ^c Emma Irvin, BA ^a Claire Bombardier, MD, MSc ^{a,d}. ^a Institute for Work & Health, Toronto, Canada, ^b University of Manitoba Faculty of Medicine, Winnipeg, Canada, ^c Finnish Institute of Occupational Health, Helsinki, Finland, ^d Clinical Epidemiology and Health Care Research Program, University of Toronto, Toronto, Canada.

Objective: To assess the effect of multidisciplinary treatments for chronic LBP on clinically relevant outcomes.

Design: Systematic review of ten randomized controlled trials.

Subjects: 1964 patients with disabling low back pain of more than three months duration.

Main outcome measures: Pain, function, employment, quality of life and global assessments.

Results: The ten trials reported on a total of 12 randomized comparisons. Three were high quality comparisons (>4 in a 8 point scale) of intensive (>100h) bio-psycho-social programs with functional restoration. Two reported impact on function and one on pain; they demonstrated statistically significant benefits. One reported increase on work-readiness, but none could demonstrate reduction in sickness leaves. Three high quality comparisons of less intensive (<30h) bio-psychological programs could not demonstrate statistically significant effects on pain, function or employment status. One high quality comparison could not document benefit from individualized bio-psycho-social treatment. Quality of life and global assessments were reported by only a few trials. Four of the five lesser quality comparisons reported positive effects of multidisciplinary treatment.

Conclusions: The reviewed trials provide strong evidence that intensive multidisciplinary bio-psycho-social treatments with functional restoration improve pain and function. There was moderate evidence that less intensive interventions do not produce consistent improvements.

ADDITIONAL RESIDENT RESEARCH CONTEST ABSTRACTS

- 09 **Évaluation du comportement des disques intervertébraux lombaires en position assise à la résonance magnétique à champs ouvert (IRMCO) chez les patients avec lombalgie chronique** M Lamontagne

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RÉSUMÉ: M.Lamontagne, J.F. Roy P. Grondin , C. Lindsay , C. Moisan, M.C. Guertin

Evaluation du comportement des disques intervertébraux lombaires en position assise à la résonance magnétique à champs ouvert chez les patients avec lombalgie chronique.

Objectifs: L'objectif principal de l'étude est de déterminer si l'évaluation des patients lombalgiques, en position assise, avec et sans charge, à l'IRMCO, permet de visualiser de nouvelles hernies discales ou de modifier la morphologie de ces dernières, lorsque comparée à la position de décubitus dorsal. Les objectifs secondaires sont de vérifier si la sensibilité de l'IRMCO est comparable à l'IRM pour la détection des hernies discales en position couchée et de mesurer les changements de diamètre du canal spinal pour les différentes positions étudiées.

Méthodologie : Étude pilote descriptive. 26 patients avec lombalgie ou lombo-sciatalgie chronique (plus de trois mois) ont été recrutés. Quatre séries d'images étaient pratiquées, soit une sur IRM en décubitus dorsal et trois sur IRMCO , en décubitus dorsal , en position assise sans charge et en position assise avec charge . Deux caractéristiques des disques L4-L5 et L5-S1 furent étudiés: la prévalence des différents types de hernies discales et la modification de leur volume en fonction de la position du patient et de l'ajout d'une charge. Le diamètre du canal spinal a été mesuré aux mêmes niveaux.

Résultats : On a obtenu une excellente concordance ($\kappa = 0.920$) entre les deux appareils pour la détection des hernies discales. Aucune nouvelle hernie discale ou compression radiculaire n'ont été mises en évidence à l'IRMCO en position assise tant avec que sans charge . Aussi, on a noté des modifications du calibre de la hernie lors de prise de la position assise dans 35.7% des cas (10 sur 28) et ce de façon statistiquement significative ($p=0.004$). La variation était de 62,5% (10 sur 16) lorsque les bombements, qui sont demeurés stables, étaient exclus. L'ajout d'un poids en position assise a peu modifié l'imagerie. Aussi, on a observé une majoration statistiquement significative du diamètre du canal spinal en passant de la position de décubitus dorsal à la position assise.

Conclusion : La présente étude n'a pas démontrée d'avantages à l'utilisation de l'IRMCO pour la détection de nouvelles hernies discales chez les patients lombalgiques chroniques. Toutefois, elle a mis en évidence une composante dynamique pour certains types de hernies selon la position . Une étude avec groupe contrôle asymptomatique pourrait permettre d'établir le degré de corrélation clinique avec cet élément de mobilité

ADDITIONAL RESIDENT RESEARCH CONTEST ABSTRACTS

- 11 **A Cross-Sectional Study of Marijuana and Other Complimentary Therapies Use of MS Patients in Saskatchewan** Gary Linassi

Objective: To study the epidemiology of marijuana and other alternative therapies in multiple sclerosis (MS) patients. **Background:** The interest in complimentary therapies to treat chronic disorders has increased in recent years as patients become increasingly dissatisfied with conventional treatments. **Methods:** A cross-sectional study of 250 randomly selected MS patients from Saskatchewan. An anonymous questionnaire was sent asking about: 1.) course of the disease 2.) symptoms 3.) complimentary therapy use and 4.) details of past or present marijuana usage. **Results:** 168/250 (67%) of patients responded within two months, 111 females (mean age 47.7 ± 10.5 years) and 57 males (50 ± 11.3 years). There were 60/168 (36%) who had smoked marijuana, 40 females and 20 males. A total of 25 (15%), 14 females and 11 males, were current users as treatment for symptoms of MS. Benefits included improvement in depression (85%), improved spasms when falling asleep (84%), muscle pain relief (82%), and decreased spasticity with walking (82%), reduced spasms at night (75%). The numerous other alternative therapies used had variable limited responses. **Conclusion:** Prevalence of marijuana use in MS patients is significant. This small number of cannabis users provides some indication of potential symptomatic relief in MS. The medical effects of marijuana appear to benefit symptoms of spasticity and pain. The data supports the proposal for a properly controlled randomised trial to test the claims of the beneficial effects of marijuana in multiple sclerosis.

ADDITIONAL RESIDENT RESEARCH CONTEST ABSTRACTS

13 **Évaluation de la fiabilité et de la validité d'une échelle de douleur et d'incapacité de l'épaule** Luc Fortin

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Objectif :

Étudier les caractéristiques des items, l'homogénéité, la fiabilité et la validité de la version française de l'échelle de SPADI développée pour mesurer la douleur et l'incapacité reliées aux pathologies de l'épaule.

Méthode :

Trente-trois patients avec un diagnostic de tendinite ou de capsulite de l'épaule ont rempli, lors d'une première visite, trois questionnaires, soit la version française du SPADI, le McGill Pain Questionnaire et le SF-36. Les sujets ont répondu au questionnaire SPADI une semaine après la visite initiale. L'analyse des items a été réalisée en utilisant le coefficient de corrélation de Pearson. L'homogénéité a été évaluée par l'alpha de Cronbach. Le coefficient de corrélation intraclasse (CCI) a été calculé pour déterminer la fiabilité du SPADI. La validité de construit a été déterminée en calculant le coefficient de corrélation de Pearson entre le SPADI et le McGill Pain Questionnaire ainsi qu'entre le SPADI et le SF-36.

Résultats :

Le CCI pour la sous-catégorie douleur est de 0.90, celui pour l'incapacité est de 0.98 et pour le score total il est de 0.97. Le degré d'homogénéité est de 0.98 pour le score total. La corrélation avec le McGill-Melzack varie entre 0.68 et 0.94 tandis qu'avec le SF-36, la corrélation varie entre -0.53 et -0.92.

Conclusion :

La version française de l'échelle de SPADI est fiable et valide pour évaluer la douleur et l'incapacité reliées aux pathologies de l'épaule.

ADDITIONAL RESIDENT RESEARCH CONTEST ABSTRACTS

15 **Measuring Leg-length Discrepancy by the “Iliac Crest Palpation and Book Correction” Method: Reliability and Validity**

Ed Hanada

Dalhousie University

Hanada E, Kirby RL, Mitchell M, Swuste J.

Objective: To determine the reliability and validity of a new clinical measurement of leg-length discrepancy (LLD), the iliac crest palpation and book correction (ICPBC) method.

Design: Intra- and inter-rater reliability and validity determinations.

Setting: Rehabilitation center.

Subjects: 34 healthy subjects, none of whom had LLD.

Method: We induced a simulated LLD (7-53 mm) for each subject. To measure the LLD, the examiner performed the ICPBC method by palpating the iliac crests and correcting identified differences with a book opened to the required number of pages. The thickness of the book correction was measured. For reliability (n=20), two blinded examiners used the ICPBC method to measure the LLD. For construct validity (n=34), the ICPBC measurement was compared to the extent of the induced LLD and, for concurrent validity (n=14), to the difference in heights of the superior aspect of the femoral heads from standing radiographs.

Results: The intra-class correlation coefficient (ICC) for the intra-rater and inter-rater reliabilities were 0.98 and 0.91. The ICCs for the construct and concurrent validities were 0.62 and 0.76. The ICPBC method underestimated the induced LLD by a mean difference (SD) of 3.8 (10.3)mm (p=0.055) and the radiological measure by 5.1 (8.6)mm (p=0.043).

Conclusions: The “iliac crest palpation with book correction” technique for measuring LLD is reliable and valid. We recommend using iliac crest palpation to detect LLD, and the “book correction” to quantify it.

ADDITIONAL RESIDENT RESEARCH CONTEST ABSTRACTS

20 **Decomposition-based Quantitative Electromyography (DQEMG): Methods and Preliminary Normative Data**

Timothy Doherty

Timothy J. Doherty, McMaster University, Hamilton ON; Daniel W. Stashuk, University of Waterloo, Waterloo ON.

Quantitative needle electromyographic (EMG) techniques provide clinically useful information to aid in the diagnosis and follow the course or responsiveness to treatment of diseases affecting the motor system. The purpose of this study was to describe a new decomposition-based quantitative electromyography method (DQEMG) designed to obtain clinically applicable information relating to motor unit action potential (MUAP) size, configuration and firing characteristics. Additionally, preliminary normative data were obtained from the deltoid, biceps brachii, first dorsal interosseous, vastus medialis and tibialis anterior muscles of 13 control subjects. DQEMG was capable of efficiently and accurately extracting MUAP data from complex interference patterns during mild to moderate contractions. Mean MUAP amplitude, macro-MUAP amplitude, MUAP duration, number of phases, and MU firing frequencies varied significantly across muscles. The mean values for individual muscles, however, were similar to previous reports based on other quantitative methods. The main advantages of this method are 1) the speed of data acquisition and processing, 2) the ability to obtain MUAPs from low and higher threshold contractions, 3) the ability to obtain both macro-MUAP data as well as firing rate information.

ADDITIONAL RESIDENT RESEARCH CONTEST ABSTRACTS

22 **Infrared Skin Temperature Measurement Cannot be Used to Detect Myofascial Tender Spots**

M Radhakrishna

Objective: The aim of this study was to determine the relationship between skin temperature and pressure tolerance in patients with myofascial pain. The hypothesis that no difference exists between the skin temperature overlying tender spots and non-tender areas was tested.

Design: Blinded, criterion standard.

Setting: Community physiatry clinic

Patients: Sixteen consecutive female patients with myofascial pain or fibromyalgia with shoulder girdle symptoms above the T4 level for at least 3 months. No patient met the exclusion criteria of recent trauma to the area or therapy within 48 hours.

Interventions: Skin temperature was measured using a handheld infrared thermometer over 36 points arranged in a grid manner on the upper and mid trapezius. Following this, the pressure threshold was assessed at each point using a pressure threshold meter. A second, blinded examiner then examined each patient to find any myofascial tender spots.

Main Outcome Measures: 1) The correlation between temperature and pressure threshold; 2) the difference in temperature between tender and non-tender areas.

Results: A non-significant correlation of 0.023 ($p=0.57$) was found between temperature and pressure threshold. The mean temperature of the tender spots was 32.1 °C. No significant difference was found when comparing tender spot temperature and that of non-tender points (32.1 °C, $p=0.653$) or contralateral points (32.0 °C, $p=0.893$).

Conclusions: Skin temperature measured with a handheld infrared thermometer cannot be used to diagnose and follow treatment progress of myofascial tender spots.