

BOOK OF ABSTRACTS



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BOOK OF ABSTRACTS



01-01

ACCELERATING DECALCIFICATION WHILE PRESERVING ANTIGENICITY IN HARD TISSUES

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Decalcification of osseous tissues by perfusion of decalcifying solution into the vascular system has never been applied to the study of peripheral joints. To optimize perfusion methods, rats were decalcified by direct immersion or by one of two perfusion techniques: i) systemic perfusion circulating the decalcifying solution from the ascending aorta; and ii) regional perfusion circulating the solution to the lower extremities from the abdominal aorta. The process of decalcification was monitored by serial radiographic examinations. After decalcification, bone and joint samples were stained for histochemistry and immunohistochemistry.

With systemic perfusion, the decalcification time, dependent on weight, was markedly reduced compared to immersion. Regional perfusion decalcification was faster than all other methods studied. Microstructural preservation was comparable and immunostaining quality often improved.

Applications of this work will improve the study of basic skeletal and articular problems.

01-02

NEUROMUSCULAR MICROSTIMULATION FOR SHOULDER SUBLUXATION IN PERSONS WITH STROKE

Bagg S, Loeb G, Richmond F, Dupont A and Creasy J.

This is a preliminary report on a prospective, randomized controlled trial study which examines the effectiveness of a new technique utilizing BIONsTM (BIONic Neurons) for therapeutic electrical stimulation (TES) to prevent and reduce glenohumeral subluxation after stroke. BIONsTM are individually addressable, single channel electrical stimulators that can be injected into one or more muscles through a 12 gauge hypodermic needle. They receive power and command signals from an externally worn radio-frequency transmission coil. As of this writing, 6 of the projected 30 patients have been accrued, 4 have received two implants each (middle deltoid and supraspinatus muscles), and 4 have completed the 12 week protocol. The four implanted patients have had stable thresholds at each site (1-10 mA @ 200 μ s pulse width) and no pain or other complications associated with implantation and regular TES, which they self-administer in 15-30 minute sessions 3 times a day. BION treatment in the first patient resulted in substantial reduction of shoulder subluxation and reversal of muscle atrophy.



01-03

VALIDATION OF THE BERG BALANCE SCALE AS A PREDICTOR OF LENGTH OF STAY AND DISCHARGE DESTINATION IN STROKE REHABILITATION

Joy Y.M. Wee, BSc, MD, FRCPC

Objective To validate the utility of the Berg Balance Scale (BBS) in predicting length of stay and discharge destination for patients admitted to a stroke rehabilitation unit.

Methods

Design: Prospective study

Setting: Tertiary inpatient stroke unit for a primarily geriatric population

Patients: Three hundred thirteen of three hundred twenty-five patients admitted consecutively between April 1998 and August 2000.

Main Outcome Measures: Length of Stay and Discharge Destination

Results Admission BBS scores and Functional Independence Measure scores correlated with length of stay ($r = -0.53$ and -0.54 respectively, controlling for age). Logistic regression confirmed that the following were independent predictors of being discharged home rather than to an institution (adjusted odds ratio, 95% confidence interval): Admission BBS (1.09 per point, 1.06-1.12) and supports (15.0, 7.2-31.3). These results generally concur with previously published results, obtained at a different stroke rehabilitation setting.

Conclusions This study validates the use of the BBS scores in assisting to approximate Length of stay and eventual discharge destination. Age was not found to significantly correlate with the outcomes measured in this study, which was conducted on a geriatric population.

01-04

OSTEOPOROTIC HIP FRACTURES IN MEN FOLLOWING STROKE CAUSING HEMIPLEGIA

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Fracture prevention has been the focus of osteoporosis management in post-menopausal women. Regional causes of osteoporosis such as paralysis have not been well characterized. Rehabilitation facilities offer both a rehabilitation program following stroke and following hip fractures. Those patients who have had a stroke and later present with a hip fracture can therefore be identified. The objectives of this study were: 1) to determine the mean time from stroke to hip fracture on the hemiparetic side in men and 2) to determine the impact of fracture on residual disability status. A chart review was conducted on male patients who presented from 1995 to 1998 with a hip fracture and had a history of stroke. A total of 5 male patients were identified. Their mean age at the time of hip fracture was 69.8 years (range 59-87) with a mean age at the time of stroke of 61.8 years (range 48-69). The mean time from the time of stroke to hip fracture was 8 years (range 5-11). In all cases the fracture occurred at the proximal femur on the hemiparetic side. At the time of discharge following stroke, all patients were independent with respect to their ADLs, transfers and mobility. All patients required an assistive device (straight cane, 4; quad cane, 1) for walking and 3 of the patients were prescribed a wheel chair for longer distance community ambulation. Following hip fracture, all patients were noted to have a worsened gait pattern and 3 patients required a wheel chair for the majority of their activities. This case review recognizes that men are affected by a regional type of osteoporosis leading to hip fracture on the hemiparetic side. Hip fractures following stroke resulted in a decline in independent ambulation.



01-05

STRENGTH TRAINING OF THE HEALTHY ELDERLY DOES NOT ADVERSELY AFFECT THEIR MUSCLE FATIGUE RESISTANCE—A PRELIMINARY REPORT

Chan KM, Strohschein FJ, Unwala H, Lechelt K.

We have recently shown that the elderly has diminished muscle strength but greater muscle fatigue resistance compared with younger individuals. Given the well-known relationship between the tension and fatigue properties of muscle fibres, whether strength training would reduce muscle fatigue resistance is unclear. The purpose of this study was to test whether strength training in the elderly could have an adverse effect on their muscle fatigue resistance. Five healthy elderly subjects (3 men and 2 women, aged 62-73 years) were recruited. After the isometric maximum voluntary contraction (MVC) and the fatigability (defined as the decline in MVC following a 90s bout of sustained maximum contraction) of their thumb muscles have been measured, three subjects were randomly assigned to the exercise group and the other two to the control group. Subjects in the exercise group carried out 3 sets of 8 contractions at 80 % MVC three times a week for six weeks. Tests were repeated once every two weeks and the training load was progressively increased based on the new MVC level. Subjects in the control group did not receive any training but were tested in an identical manner. The mean MVC of the three trained subjects improved by 22 ± 18 % (mean \pm S.D.) after six weeks of training while the change in the two control subjects was -3 ± 4 %. The muscle fatigability of the trained subjects remained similar to the pre-training state (33 ± 13 % pre-training vs. 27 ± 10 % post-training) whereas the muscle fatigability of the two subjects in the control group somewhat declined (42 ± 16 % at baseline vs. 56 ± 17 % after six weeks). In conclusion, our preliminary results suggest that strength training of the elderly improved the strength of their thumb muscles and did not have a deleterious effect on their muscle fatigue resistance.

01-06

THE LACK OF EFFECTS OF MUSCLE PAIN ON THE EXCITABILITY OF THE MOTOR CORTEX AND THE STRETCH REFLEX PATHWAYS

Zedka M, Chan KM, Prochazka A.

Muscle pain induced experimentally by hypertonic saline infusion into the back muscles is known to cause a reduced depth of EMG modification of these muscles during voluntary trunk movements. The underlying mechanism of this is not known. We hypothesized that the altered pattern of muscle activation is due to a change in the motor cortical excitability and excitability of the reflex pathways. To test this hypothesis, 5 % hypertonic saline was infused into the lumbar paraspinal muscles of five healthy subjects (3 males and 2 females, 25-55 years of age) to induce a grade 5-7/10 muscle pain on the visual analogue scale. To determine changes in motor cortical excitability, the amplitude of the motor evoked potentials obtained by transcranial magnetic stimulation at baseline and during pain was compared. For changes in the reflex pathways, the amplitude of the stretch reflexes at baseline and during pain was compared. No significant difference in either motor cortical excitability or in reflex response between baseline and painful conditions was observed. Based on these findings, we concluded that the change in voluntary muscle activation during muscle pain was not due to a change in excitability of the motor cortex, the α spinal motoneurons or the transcortical reflex loops. By elimination, these results imply that the change in voluntary muscle activation during pain could well stem from pathways in the CNS 'upstream' from the motor cortex.



01-07

BILATERAL ANTERIOR SUPERIOR ILIAC SPINE PRESSURE SORES

N. Dudek, U. Buenger and G. Trudel

The most frequent sites for pressure sores in a patient in the supine or lateral position are the bony prominences; the occiput, sacrum, ischia, trochanters, lateral malleoli and posterior heels. Here, a case of bilateral grade three anterior superior iliac spine pressure sores is presented. To the best of our knowledge pressure sores in this location have not been reported in the literature. This 27 year old female with vasculitis (Wegener's Granulomatosis) was admitted to our Rehabilitation service following a sixty-five day admission to the ICU. She was intubated and mechanically ventilated because of respiratory failure secondary to hemorrhagic pneumonitis. She required placement in the prone position for extended periods of time in order to achieve adequate oxygenation. The pressure sores over both anterior superior iliac spines were managed with mechanical debridement and appropriate dressings. Complicating factors included variable levels of oxygenation, malnutrition and steroid therapy. Complete healing, documented with serial photographs, took place over nine months. Although prone positioning can improve pulmonary ventilation and therefore oxygenation, it exposes the patient to unique complications. Specific care should be directed to unusual weight bearing bony prominences in critically ill patients requiring prone positioning in order to avoid pressure sores.

01-08

ASPIRATION IN BRAINSTEM STROKE PATIENTS ADMITTED TO A REHABILITATION UNIT

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Objective. An aspiration severity scale was developed and used to compare the results of videofluoroscopic modified barium swallow (VMBS) studies of patients with medullary and pontine/cerebellar strokes.

Methods. A chart review identified 85 patients from a cohort of 563, with radiographic evidence of a brainstem stroke. An ordinal aspiration scale (0-3) was developed based on the results of initial VMBS studies. Patients were potentially scores on five different consistencies. A score of zero indicated no aspiration, a score of three represented gross aspiration and intermediate scores represented mild or moderate aspiration. The results of all tests were then averaged to reach a final score of 0-3 for each patient.

Results. Thirty-one patients had at least one VMBS study associated with the diagnosis and treatment of dysphagia. Patients with medullary strokes (n=10) had significantly higher aspiration scores on their initial VMBS when compared to patients with pontine/cerebellar stroke (n=21), (1.47 " 1.03 vs. 0.65" 0.79, p=0.02).

Conclusions: Dysphagic medullary stroke patients admitted to a rehabilitation unit demonstrated more severe aspiration on initial VMBS study compared to patients with pontine/cerebellar strokes using an ordinal aspiration scale.



01-09

INCIDENCE, MANAGEMENT AND COMPLICATIONS OF DYSPHAGIA IN PATIENTS WITH MEDULLARY STROKES ADMITTED TO A REHABILITATION UNIT

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Objective: To examine the incidence of dysphagia and related consequences in medullary stroke patients admitted to a stroke rehabilitation unit.

Methods: A chart review of a cohort of 563 stroke patients admitted to a rehabilitation unit was used to identify patients with evidence of predominantly medullary lesions. Age, gender, length of hospital stay, dietary interventions, complications and discharge disposition were noted. The results of both initial and follow-up videofluoroscopic modified barium swallow (VMBS) studies were also reviewed for evidence of aspiration or residua in dysphagic patients.

Results: Twenty of the 563 patients (3.6%) were diagnosed with a medullary stroke. Eleven (55%) patients were identified clinically with dysphagia and nine had at least one VMBS study. All nine patients demonstrated some degree of either aspiration or residua on both initial and final swallowing study. All dysphagic patients received some form of dietary modification; eight required nasogastric tubes and eight required gastrojejunostomy tubes for non-oral feeding. Five patients developed pneumonia. Patients with dysphagia had significantly longer hospital stays and were more likely to develop pneumonia when compared to non-dysphagic patients ($p < 0.05$).

Conclusions: A significant number of medullary stroke rehabilitation patients were dysphagic and required non-oral feedings. Medullary stroke rehabilitation patients with dysphagia were more likely to develop aspiration pneumonia and experienced longer hospital stays.

01-10

COMPLICATIONS EXPERIENCED BY A COHORT OF STROKE SURVIVORS DURING INPATIENT TERTIARY STROKE REHABILITATION

Deirdre E. McLean, MD, FRCP

OBJECTIVE: To identify the most common complications experienced by stroke survivors during inpatient, tertiary stroke rehabilitation.

DESIGN: A descriptive analysis of data collected from consecutive admissions to a provincial, tertiary stroke rehabilitation unit.

SETTING: A tertiary level, 23 bed, inpatient stroke rehabilitation unit in a freestanding rehabilitation hospital.

PARTICIPANTS: All stroke survivors (N=133) admitted for tertiary level stroke rehabilitation between October 1st, 1999 and September 30th, 2000 were included.

MEASURES: The presence or absence of specific complications was determined during the interdisciplinary discharge conference held during the week of discharge for each patient.

RESULTS: The 3 most common medical complications experienced by stroke survivors during inpatient rehabilitation were depression (26%), shoulder pain (24%) and urinary tract infection (15%). Other less common complications included congestive heart failure, pneumonia, seizures, pressure sores, fractures and deep venous thromboses.

CONCLUSIONS: Depression, shoulder pain and urinary tract infections are common complications experienced by stroke survivors during their inpatient rehabilitation. Heightened awareness of these potential complications may lead to prevention, earlier recognition or improved management of these conditions.



01-11

A COMPARISON OF DIETARY INTAKES OF HOSPITALIZED STROKE PATIENTS RECEIVING THREE DIFFERENT FEEDING REGIMES

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Objective: The purpose of this study was to determine whether the energy and protein intakes of 91 newly diagnosed, hospitalized stroke patients differed according to diet type. We hypothesized that patients on dysphagia diets would consume less calories and protein compared to patients receiving two other diet types.

Methods: Calorie counts were used to calculate protein and energy intakes for patients on oral diets and fluid balance sheets were used to measure volumes of enteral feeds administered to patients on non-oral diets. Diet classification included regular, enteral feeding and dysphagia (texture-modified solids and thickened fluids). Dietary intake data was collected and averaged over a two-day period at admission, day 7, 14 and 21.

Results: The energy intakes (Kcals/kg/day) for patients receiving regular diets vs. enteral vs dysphagia diets, were respectively: admission; 20.0 vs 16.4 vs. 17.0, ($p=0.056$), day 7; 20.4 vs 21.4 vs. 18.2, ($p=0.092$), day 14; 20.9 vs. 25.0 vs. 19.0, ($p=0.021$) and day 21; 22.4 vs. 22.8 vs. 18.7, ($p=0.032$). The protein intakes (grams/kg/day) of patients on the three different diet types were: admission; 0.84 vs. 0.84 vs. 0.68, ($p=0.57$), day 7; 0.88 vs. 0.90 vs. 0.68, ($p=0.006$), day 14; 0.82 vs. 1.5 vs. 0.84, ($p=0.11$) and day 21; 0.92 vs. 0.89 vs. 0.80, ($p=0.003$).

Conclusions: Dysphagia diets provided less calories and protein to the post-stroke patient compared to enteral feeding or regular diet at three out of the four testing intervals.

01-12

CHANGING DEMOGRAPHICS IN THE SPINAL CORD INJURY POPULATION IN NOVA SCOTIA

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Objective: To determine if spinal cord injury (SCI) population demographics in Nova Scotia are different from those commonly quoted in the United States literature.

Method: We conducted a review of SCI patient demographics in Nova Scotia from 1975 to 1999. Data was obtained from the Canadian Paraplegia Association database. Analysis was restricted to the Nova Scotia population (years 1975- 2000).

Results: During the twenty-five year period assessed the overall incidence of SCI has been relatively stable at 15.7 cases per year which is below the U.S. reported means of 25-35 per million people. Furthermore, compared to U.S. data, our patients were older (71% of patients over age 35) and there was a paucity of violent causes for SCI (2%). The male to female ratio was 4:1. The number of incomplete injuries and paraplegics has risen compared to complete injuries and tetraplegics, respectively. The proportion of injuries related to motor vehicles has decreased since 1990.

Conclusion: Demographics of the SCI population in Nova Scotia are changing and reflect demographics that are different from those quoted in the U.S. literature. This illustrates the need to establish Canadian specific prospective databases for monitoring changes and evaluating the impact of new medical, rehabilitative and surgical therapies for the treatment of SCI; as well as new legislation to prevent SCI.



01-13

THE FUNCTIONAL OUTCOME AND LENGTH OF STAY OF ABORIGINAL PATIENTS IN SASKATCHEWAN INPATIENT REHABILITATION PROGRAMS

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This study investigated the previously unexamined relationship between ethnicity, functional outcome and length of stay in two Saskatchewan inpatient rehabilitation programs. Using the functional Independence Measure (FIM), the study described the differences in the rehabilitation outcomes (Total, Motor, and Cognitive FIM Changes, and length of stay) of Aboriginal and non-Aboriginal patients with disabilities resulting from the following impairment groups: stroke, traumatic brain injury, spinal cord injury, amputation, and 'other' impairments. The settings of the study were two tertiary rehabilitation centres located in Saskatoon and Regina, Saskatchewan. The study population consisted of 1652 individuals admitted to the two rehabilitation programs between 1994 and 1999. Using General Linear Models, the results of the study indicated that significant differences existed between Aboriginal and non-Aboriginal patients in functional outcome and length of stay. Compared to non-Aboriginal patients, Aboriginal patients had significantly lower Total FIM Change ($\beta=-2.603$, 95% confidence Intervals, CI=-5.069 and -0.137), Cognitive FIM Change ($\beta=-4.558$, 95%CI=-5.984 and -2.252), and shorter lengths of stay ($\beta=-0.273$ --values based on log transformed length of stay, 95% CI= -0.422 and -0.123), net of covariables: gender, age, marital status, vocational category and effort, impairment group, comorbidities, pre-admission and post-discharge living status. This study recommends that rehabilitation service providers begin to increase their cultural competence to ensure that appropriate and effective rehabilitation programs are offered to Aboriginal patients.



01-14

IDENTIFYING FACTORS THAT INFLUENCE THE REINTEGRATION TO WORK IN TRAUMATIC BRAIN INJURY (TBI) SUBJECTS: A DESCRIPTIVE STUDY

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The goal of this study is to identify the factors that influence reintegration to work in a population of traumatic brain injury subjects. Retrospective data from 1997 to 1998 of 42 traumatic brain injury subjects admitted to a vocational program at a Québec rehabilitation hospital were reviewed. A team of TBI clinicians developed a questionnaire, which was used for collection by an Occupational Therapist. Information was collected on premorbid status (age, gender, education, work history), clinical status (severity of TBI, type of trauma, presence of polytrauma, education of rehabilitation, post trauma disabilities (as defined by the International Classification of Impairments, Disabilities and Handicaps), and reintegration to work (return to work, type (light to heavy), status (full or part time), presence of restrictions, work modifications, training by stage, environmental factors). Descriptive and Chi-square statistical analyses were used to examine the relationship between the study factors and the probability of going back to work. As the literature has shown, the severity of the traumatic brain injury is related with the success of going back to work. The proportion returning to remunerated work in the moderate to severe TBI subjects was 30.0% compared to 71.4% in the mild TBI subjects. The most frequently observed disabilities were alertness/attention, tolerance, thinking process, interoceptive functions (pain). The results of this descriptive study may facilitate clinicians in orienting treatment plans by identifying important factors that affect the reintegration of TBI subjects in the workplace.

If this topic has been presented elsewhere, please provide date, place and title:

Third World Congress on Brain Injury*, June 13-16, 1999, Québec City, Québec

01-15

BIZARRE GAIT ASSOCIATED WITH RETROPATELLAR HEMATOMA

Timothy J. Doherty, Robert W. Teasell, Department of Physical Medicine & Rehabilitation, The University of Western Ontario, London ON, Canada.

A 34-year-old woman presented with a two-year history of left knee pain and a bizarre gait disturbance characterized by markedly excessive knee flexion during the stance phase bilaterally. She had been involved in a motor vehicle accident and experienced trauma with associated soft tissue injury over the lateral aspect of the left leg. She initially underwent physiotherapy for the left leg pain and dysfunction, as well as chiropractic treatment for associated back pain, both with no benefit. Following a number of medical consultations the possibility of a "somatoform gait disturbance" was raised. At the time of our initial assessment, reflexes and sensation were intact in the lower extremities. There was no evidence of ligamentous injury. The left quadriceps strength was full on routine MRC testing, however, the left knee buckled with any weight bearing either in stance or during attempted gait. An MRI of the left knee revealed a heterogeneous mass in the medial recess of the left suprapatellar pouch. Surgical consultation was arranged and a medial arthrotomy of the knee resulted in the removal of a plum-sized mass. The pathology was consistent with an organized chronic hematoma. In a careful review of the literature no similar reports have been published. The potential contribution of quadriceps inhibition in this setting is discussed.



01-16

CONSUMERS AND CLINICIANS TOGETHER..... CREATING COLLABORATIVE PRACTICE

Ansley, B., Clark, L. , Debruin, H.

Objective: To design and validate an interactive patient satisfaction survey for rehabilitation populations, and to implement it's use as an element of continuous program evaluation.

Methods : The patient satisfaction survey is composed of four stand alone sections, administered at different times as determined by clinical teams, throughout the patient's stay.

The tool has been piloted three times. The data analysis resulting from the first and second pilot allowed the authors to reduce the number of items in the survey.

The third and final pilot of this tool was conducted across all inpatient units of the rehabilitation program on a sample of convenience of 70.

Results : The final data analysis has allowed the authors to complete item reduction and prepare to incorporate the use of this tool in everyday clinical practice.

Conclusions : The validation of this patient satisfaction survey will bring new challenges to teams. These challenges include: distributing and collecting the survey sections in a timely fashion, ensuring that clinical practice adjusts in response to the feedback and evaluating each practice change based on ongoing feedback generated through the continuing use of the survey.

This patient satisfaction survey, designed collaboratively and used interactively by patients and health care workers, is the first of it's kind for use within rehabilitation populations.

01-17

THE USE OF OASIS™ SKIN GRAFTING FOR PRESSURE ULCERS IN PEOPLE WITH SPINAL CORD INJURY - TWO CASE REPORTS

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Introduction: Pressure ulcers in people with spinal cord injury are extremely common, and despite treatment with standard best practice techniques, can often become chronic, lasting months or years. We report the use of Oasis™, a new collagen matrix dressing made from the submucosa of porcine intestine, in two people with paraplegia who had chronic, non-healing pressure ulcers.

Methods: These people each had one or more pressure sore of the lower limb which lasted more than 1 year despite conventional best known practice therapy. Subject A is a 50 year old man with thoracic level 8 paraplegia who had a right lateral malleolus pressure sore, deep grade 2, 3 cm diameter, with a central open area 1.75 diameter, for over 1 year. Subject B is a 40 year old man with thoracic level 3 paraplegia who had deep grade 2 pressure ulcers, 2-3 cm in diameter, on the lateral malleoli bilaterally for 1 ½ years. Previous autologous skin grafting failed. Each was treated with Oasis™ dressing to the affected area and the dressings were changed every 5-7 days.

Results: Subject A had complete closing of the open area within 3 weeks, and no recurrence has occurred over 7 months. Subject B had complete closing of the open area within 10 weeks, with no recurrence on last follow up (2 months). Progress was documented with photography and tracings.

Discussion: Although only a report of 2 cases, this small study illustrates that Oasis™, a new biologic product, can be very effective in healing chronic pressure sores that are refractory to other treatments. It is acellular thus is non-antigenic and will not be rejected by the human body. It is relatively cost effective, given the short time span of healing and the infrequent dressing changes needed.



01-19

ARTICULAR GANGLIA AND INTRANEURAL MUCOID CYSTS AS A CAUSE OF FOCAL NEUROPATHY

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Articular ganglions can result in focal compression neuropathy at a number of common locations, including the wrist and knee. In contrast, intraneural mucoïd cysts, variably referred to, as intraneural or peripheral nerve ganglia, cystic nerve tumors, or neural mucoïd pseudocysts, display no obvious connection with adjacent articulations, tendons or synovium. Pathologically they are similar to articular ganglia and are mucoïd-containing nonepithelialized cysts. Intraneural cysts are thought to arise from within the peripheral nerve presumably of epineural origin.

The clinical and electrophysiological findings in two cases of ulnar neuropathy, one of posterior interosseous nerve palsy at the elbow and another of peroneal nerve palsy at the knee, all of which related to either articular ganglions or intraneural cysts are presented. The above are compared with the presentation of another cystic mass affecting the suprascapular nerve as a result of a glenoid labral cyst and spinoglenoid ganglion.

A favourable prognosis was demonstrated and stresses the need for early diagnosis and treatment with surgical excision. Magnetic resonance imaging is the tool of choice and the localizing ability of electrodiagnosis compliments imaging in planning surgical intervention and maximizing outcome. The success of treatment depends in large part on the severity and duration of axonal loss. Given their compressive and not invasive nature, the utility of inching techniques in localizing focal conduction block and slowing within the nerve is demonstrated.

01-20

EVALUATION OF RESTRICTED DRIVER LICENSING FOR MEDICAL IMPAIRMENTS IN SASKATCHEWAN

Shawn Marshall MD MSc FRCPC, Robert Spasoff, Rama Nair, Carl van Walraven

Driving ability may be adversely affected by many medical conditions and many jurisdictions therefore allow for a restricted license that permits driving under specified conditions. The objective of this retrospective cohort study was to evaluate restricted licensing by comparing "at-fault" crash and traffic violation rates for drivers with a restricted license to the general driving population and also to compare driving pre and post restriction. Following multivariate Poisson regression, the adjusted IRR for "at-fault" crashes and traffic violations for restricted versus non-restricted drivers were 0.92 (95% CI, 0.89 to 0.95) and 0.87 (95% CI, 0.85 to 0.90) respectively. Interventional time series analysis demonstrated a significant decrease in "at-fault" crash and traffic violation rates post imposition of restrictions. Restricted licensing programs are effective and allow persons with decreased driving ability due to medical conditions to continue driving under specific conditions.



01-21

COGS: (COMPREHENSIVE OBSERVATIONAL GAIT SCALE)

Farooq Ismail MD, Mark Bayley, MD

Objective: To develop a scale that allows clinicians to efficiently and reliably diagnose gait abnormalities in the clinical setting, while providing an anatomical focus for planning gait improvement and tracking patient progress over time.

Methods: The COGS was developed with the assistance of Physiatrists specializing in the qualitative assessment of gait patterns and deviations. Furthermore, it was derived from a variety of gait scales that have been produced and have proven to be of moderate statistical reliability. In our pilot study, we randomly selected 15 patients with Musculoskeletal and Neurological difficulties, to walk for a predetermined period of time, while being videotaped from a variety of camera angles. Study participants, consisting of Physiatrists and Medical Residents, were provided with an orientation and then asked to evaluate the videotaped gaits with the COGS. Patients were presented in a random order on videotape and videotaped analysis was conducted in real time, without any use of stop or slow action video techniques.

Results: Inter-rater reliability was calculated using Kappa. Between-rater reliability was statistically significant for the temporospatial variables of cadence, step length, stride length and for correctly identifying the affected side in each patient. Statistical significance was not achieved for the kinematic variables analyzed in swing and stance phases on the affected side.

Conclusions: The results of the COGS pilot study indicate that it is of moderate reliability. Improvements to the scale, along with a larger study are required to improve upon its inter-rater reproducibility.



01-22

THE WHEELCHAIR SKILLS TEST: A PROGRESS REPORT

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Objective: To review the development of a new rehabilitation outcome measure, the Wheelchair Skills Test (*WST*).

Method: Descriptive.

Results: In 2000, after 5 years of development, we reported the *WST*. The *WST* is an objective measure intended to document the initial status and subsequent improvements of individual wheelchair users, to serve as an outcome measure for rehabilitation programs, to assist in testing research hypotheses and to assist engineers in the development of new technologies. In the reported pilot study (assessing 33 skills on 24 wheelchair users), we found the *WST* to be practical, safe, well tolerated, to exhibit good to excellent reliability, excellent content validity, fair construct and concurrent validity and moderate usefulness. However, limitations were identified. Since then, we have refined the *WST*, particularly the skill set (now 50), evaluation criteria, scoring and report form. We have completed a study comparing subjective and objective evaluations of wheelchair skills, identifying the limitations of the former. Three studies are underway, using the revised *WST* (version 2.4): i) to re-evaluate the revised test's measurement properties (n=65 to date); ii) to compare the *WST* abilities of people who have hemiplegia with able-bodied control subjects simulating hemiplegia; and iii) to quantify the wheelchair skills of patients involved in a wheelie training study. We are about to begin two other studies: i) looking at the wheelchair skills of occupational therapists themselves, and ii) looking at the effect on the *WST* abilities of wheelchair users due to brief periods of additional skills training. Two other Canadian centres are considering introduction of the *WST* in their settings. We are exploring mechanisms by which the *WST* might be integrated with multi-centre outcome measures (e.g., the UDS/FIM or Lifeware/FIM).

Conclusion: We believe that we are making excellent progress toward meeting the need for a well-validated clinical and research outcome measure. The process has also provided some interesting insights about wheelchair function.

01-23

CONCURRENT USE OF ALTERNATIVE MEDICINES AND CONVENTIONAL ANTIDEPRESSANTS AGGRAVATE SPASTICITY

Potter PJ, Sequeira KS, Robinson J, Hsieh JTC, Warren D

There is an increasing trend of patients taking a more active role in treatment, especially as the selection of alternative therapies continues to expand. The potential for adverse effects of conventional pharmaceutical treatments rises when combined with independent, patient self-treatment using alternative therapies. The case under current study involves a young, male patient with myelopathy (C6, Asia D) secondary to C4-5 disk herniation. Spasticity, secondary to the myelopathy, was treated by increasing tizanidine from 6 to 12 mg per day. The result of tizanidine treatment appeared as a paradoxical effect that presented as severe spasticity and episodes of falling. A subsequent patient interview revealed that the increase in spasticity coincided with concurrent 1) ingestion of ginkgo biloba (inhibits CYP 1A2, 2D6), 2) an increase in citalopram (inhibits CYP 2D6, 1A2, 2C19) and 3) an increase in clomipramine (substrate of CYP 1A2, 2C19, 2D6). Weaning from ginkgo and clomipramine resulted in alleviation of the increased spasticity. The patient was not aware of the importance of revealing each change in treatment to all practitioners involved in his care. Each treatment had been considered in isolation without regard for possible interactions.



01-24

FOCAL NEUROPATHIES OF THE MUSCULOCUTANEOUS NERVE: CLINICAL AND ELECTROPHYSIOLOGIC FEATURES

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Focal neuropathies of the musculocutaneous nerve (MCN) and its terminal sensory branch the lateral antebrachial cutaneous nerve (LACN) are rarely reported in the literature. In this series, three cases of isolated involvement of the MCN and LACN are described in terms of their clinical and electrophysiologic features. Case 1 involved a 33-year-old woman who underwent venipuncture of the left brachial vein during a diagnostic test. Following the test she noted numbness and paresthesiae in the distribution of the left LACN. In Case 2, a 27-year-old male experienced pain and altered sensation in the lateral aspect of the right forearm following heavy lifting. In both cases the physical exam was consistent with isolated loss of sensation in the distribution of the LACN and electrophysiologic testing revealed absence of the sensory response for the LACN. In Case 3, a 19-year-old male underwent a 4.5 hr surgical procedure to the left wrist during which a blood pressure cuff was in position around the right upper arm for periodic monitoring. When he awoke, he experienced numbness in the LACN distribution and severe weakness in elbow flexion and supination. Electrodiagnostic testing revealed marked denervation in the biceps and brachialis. These cases describe three different mechanisms of focal injury to the MCN/LACN and their clinical features. The usefulness of electrodiagnostic testing in diagnosis and prognosis is discussed.

01-26

USING THE PRINCIPLES OF CONTINUOUS QUALITY IMPROVEMENT TO DEVELOP A QUALITY ASSURANCE CURRICULUM FOR RESIDENTS

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Objective

All residency programs accredited by the Royal College of Physicians and Surgeons of Canada are required to include a Quality Assurance curriculum within their training program. The objective of this presentation is to describe a post-graduate Quality Assurance curriculum which can be completed over a limited period of time and with limited resources.

Methods

This Quality Assurance curriculum was developed using the principles of Continuous Quality Improvement, allowing the curriculum to be repeatedly revised to meet the needs of the residents. The resulting curriculum can be completed over three 2-hour sessions. A 20 minute didactic lecture introduces the basic concepts of Quality Assurance but the focus of the program is on completing a small Quality Assurance project in a timely manner.

Results

This Quality Assurance curriculum has been used in its current format for two years. The content and teaching methods used in the curriculum have been evaluated favourably by residents. Active involvement of the residents in completing a small Quality Assurance project was critical to the success of this program.

Conclusion

The Quality Assurance curriculum presented can be completed over a limited period of time and with minimal resources. The curriculum is a feasible method of incorporating Quality Assurance into the core curriculum of post-graduate residency training programs.



01-27

CASE REPORT: FIBROMYALGIA PATIENT WITH LOW BACK PAIN EFFECTIVELY TREATED WITH BOTOX

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Objective: To report the clinical effectiveness of Botulinum toxin A therapy in fibromyalgia patients.

Methods used: Recalcitrant fibromyalgia (FMS) patients meeting the ACR criteria were given an initial trial of trigger point injections (most painful muscular sites) with 1% procaine. They were then instructed to keep a one week pain diary. Of those who reported a significant reduction in pain with the procaine, further injections in the same sites were administered with botulinum toxin A (under EMG guidance). Pre and post-injection outcome measures were recorded.

Results obtained:

Patient profile: A.S. 33 yr old married mother of one, disabled customer service worker with wide-spread pain and R. sciatica x 5 years. Chronic pain risk factors include: childhood sexual abuse; major depressive disorder, panic disorder, agoraphobia; abnormal sleep EEG (restless legs, alpha-delta intrusion), slip and fall trauma 10/98 and MVA 01/99 with 2 week hospitalization, subsequent home care and wheelchair use. Previous treatments: Traditional physiotherapy, chiropractic, massage, laser and Chan-Gunn acupuncture, hydrotherapy, podiatry orthotics, psychotherapy. Medications: oxycocet, flexeril, relafen, neurontin, rivotril, stadol, imovane. No response to epidural corticosteroids (CT scan: L5S1 bulging disc but EMG study was normal) and facet joint injections/ nerve blocks.

Pre-injection findings: (15-03/00) 5'10" 320 lbs. obese.

18/18 tender points (TPs) (3+): Fischer algometry < 2 kg. Control points: R deltoid 9 kg. R tibia 4.8 kg.

VAS pain 10/10 Fibromyalgia impact questionnaire (FIQ): 69.4/ 90 Revised Oswestry (OSW): 23/ 50.

Short-form McGill pain questionnaire (SFMcGill): 37 /45.

Initial procaine injections:

Trigger point injections: trapezii, scalene anticus, rt. erector spinae, right piriformis. Post-injection pain diary recorded short-term improvement with these injections.

BOTOX injections: (03-04/00) 200 units: R piriformis (with 3/2" 22 gauge needle), R erector spinae (T11), both upper trapezii. All injections done with EMG guidance.

Post-injection findings: (30-05/00). 5/18 tender points (1+ < 4kg.) VAS 4/10, FIQ: 11.3/90, OSW: 1/ 50, SFMcGill 2 /45. She reported for the first time in years that she was able to walk several blocks, make beds without help, do laundry, dishes, most yard work. Joined weight-watchers.

(08/00): After 2nd series BOTOX (400 units): she weaned off oxycontin and NSAIDs completely.

(11/00): After 3rd series BOTOX (400 units): she had lost 34 lbs. and began vocational retraining for registered practical nurse.

Conclusion: These and other case reports (to be discussed) suggest that Botox may be effective in FMS patients who respond favourably to initial procaine injections into muscle trigger points. Several randomized trials support the use of Botox for myofascial pain (Porta M, Pain 2000; Lang AM, Am J Pain Manage 2000; Cheshire WP, Pain 1994) and for headache (Silberstein S, Headache 2000; Freund BJ, Headache 2000). The one published negative report on Botox in fibromyalgia (Paulson GW, Movement Disorders 1996) did not pre-screen patients for injection. A randomized controlled trial is needed to corroborate the findings in these case reports.



01-29

DO YOU UNDERSTAND MY ROLE IN THE TEAM? (A SUPERIOR TEAM DEVELOPMENT ACTIVITY)

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Stroke Rehabilitation is ideally provided by a team of various professionals. They bring a variety of expertise in different clinical areas due to their professional background. While working as a team, it is important for each team member to clearly understand the role of other members to optimize the synergy of their functions.

The Stroke Rehabilitation team of SCOHS - Saint-Vincent Hospital undertook an activity of superior team development to address this issue. Weekly half an hour long information sessions were provided by representatives of various professionals, in which their role, goals and objectives were presented to their colleagues. A survey was taken at the completion of the series of sessions to assess if the series of sessions improved their understanding of each other's role. This poster will describe this superior team development activity, the results of the survey and list other similar activities that can be undertaken to develop a superior team.

01-31

SAFETY AND FEASIBILITY OF CRANIECTOMY WITH DURAPLASTY AS THE INITIAL SURGICAL INTERVENTION FOR SEVERE TRAUMATIC BRAIN INJURY

Nora Cullen, BSc, MD, MSc, FRCPC

Background: Decompressive craniectomy has historically served as a salvage procedure to control intracranial pressure after severe traumatic brain injury (TBI). We assessed the safety and feasibility of performing craniectomy as the initial surgical intervention. Methods: Of 29 consecutive patients undergoing emergent decompression for severe TBI with horizontal midline shift greater than explained by a removable hematoma, 17 had traditional craniotomy + brain resection and 12 underwent craniectomy.

Results: The craniectomy group had lower Glasgow Coma Scale scores at surgery (median 4 vs. 7, $p=0.04$) and more severe radiographic injuries (using specific measures). Mortality, Glasgow Outcome Scale scores, Functional Independence Measures and length-of-stay in both the acute care setting and the rehabilitation phase were similar between the surgical groups.

Conclusions: Despite more severe injuries, patients undergoing initial craniectomy had similar outcomes to those undergoing traditional surgery. A randomized evaluation of the effect of early craniectomy on outcome is warranted.



01-32

USING EMG GUIDANCE TO LOCALIZE COMPARTMENT PRESSURES IN THE LOWER LEG

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Objective: To test the feasibility of using EMG guidance to measure compartment pressures (CPs) in the tibialis posterior (TP) and flexor digitorum longus (FDL) muscles.

Methods: 11 healthy subjects (22 legs) were studied. Time required to measure the CPs, and optimal contraction methods to activate the TP and FDL muscles were evaluated. The EMG output of the TP and FDL muscles was quantified by measuring the area after the signal had been rectified and low pass filtered. Two trials for each contraction method were carried out to evaluate reliability.

Results: The method was shown to be highly reliable ($r>0.8$). The TP and FDL muscles were easily located with the Botox needle because the EMG output from both muscles was markedly different, whether using the reciprocal or co-contraction method. The time required to measure CPs was less than 3 minutes.

Conclusions: EMG is an excellent guide for muscular localization. The technique is fast and the equipment required is commonly available in many physiatric offices. Since the failure to decompress the tibialis posterior compartment that exists in some individuals is a major reason for unsuccessful surgery, this method may help to improve the success rate of fasciotomy in patients with chronic deep posterior compartment syndrome.



01-43

THERMOREGULATION IN SPINAL CORD INJURY

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Thermoregulation is mainly controlled by the hypothalamus, however, a complex network of behavioural, physiologic and neurological mechanisms interact. Preoptic neurons control the body's set point temperature by excitatory and inhibitory influences on effector neurons. Temperature is also influenced by heat transfer mechanisms and generated by inefficient biochemical reactions. Fever occurs as a result of pyrogens and other mediators that decrease the firing rate of warm sensitive neurons, thus increasing the set point temperature. Fever in spinal cord injured patients is due to infectious or inflammatory processes in approximately 70% of the time. Therefore, fever in a spinal cord injured patient does not preclude a full septic work up. Sympathetic nervous system dysfunction occurs in spinal cord injury above the mid-thoracic level. This results in reduced efferent sympathetic flow and altered peripheral vasoactivity, which leads to impaired temperature effector mechanisms such as shivering and sweating. Efforts to avoid extreme weather changes are also essential. Specific guidelines were made at the 1996 Atlanta Paralympics in order to decrease the chance of heat induced illness.



01-49

STROKE REHABILITATION: tPA'S NEGLECTED BIG BROTHER

Michael W.C. Payne, University of Western Ontario, London, ON

Background and Purpose: The purpose of this literature review is to determine the impact of tPA versus rehabilitation on stroke outcome and the cost-effectiveness of each therapy.

Results: Only one study has demonstrated clinical benefit for tPA, with improved outcome measurements noted up to one year following treatment. tPA must be given within three hours of symptoms, limiting the number of acute stroke patients eligible for treatment to around 5%. Conversely, stroke rehabilitation is available for over 50% of stroke patients, with outcomes of stroke units favourable up to ten years following stroke. Early initiation of rehabilitation therapy and more intensive therapy also improve efficacy. Greater cost savings with stroke rehabilitation over tPA are the result of decreases in length of hospital stay.

Conclusions: tPA is an effective therapy for stroke, but rehabilitation is available for ten times the patients and has improved clinical outcomes with greater cost-effectiveness.