



60th ANNUAL SCIENTIFIC MEETING ABSTRACTS

*June 20–23, 2012
Hyatt Regency Toronto, Toronto, ON, Canada*

PROGRAM

THURSDAY, JUNE 21, 2012

07.30–09.00

Amputee Special Interest Group Meeting

International Rehabilitation Special Interest Group Meeting

Pain Management Special Interest Group Meeting

Traumatic Brain Injury Special Interest Group Meeting

09.00–12.00

Neuroplasticity Symposium ... The Changing Brain

Principles of Neuroplasticity and Basic Science Research

Education in Pediatric Learning Disabilities

Plasticity in Adult Neurorehabilitation

Dr. Gordon Winocur

Ms. Tara Anchel

Dr. Robin Green

FRIDAY, JUNE 21, 2012

07.30–09.00

Medical Legal Special Interest Group Meeting

Dr. E. Lyle Gross

Stroke Special Interest Group

Opportunities for Stroke Rehabilitation

The Evidence for the Long-Term Rehabilitation Management of Stroke

Dr. Robert Teasell

Dr. Mark Bayley

Dr. Robert Teasell

Spinal Cord Injury Special Interest Group Meeting

Study of Human Central Nervous System Stem Cells (HuCNS-SC) in Patients with Thoracic Spinal Cord Injury - Update

Clinical Experience with Long-Acting Fampridine

Clinical Experience with Bladder Botulinum Toxin

Setting the Agenda for SCI Rehabilitation Research in Canada

Ms. Jane Hsieh

Drs. Christine Short and Colleen O'Connell

Dr. Karen Ethans

Dr. Vanessa Noonan

09.00–17.00

Scientific Program

Does Barefoot Running Reduce the Likelihood of Chronic Injury in Runners? A Discussion of Biomechanical Principles

Gene Expression in Patients with Severe Knee Osteoarthritis: Comparing Those with to Those without Contracture

A Qualitative Study of Factors Influencing the Decision to have an Elective Amputation

Dr. Jordan Raugust

Dr. Mark Campbell

Dr. Deanna Quon

Host Presentations

Integration of the Canadian Stroke Best Practice Guidelines with the Canadian Stroke Core Indicators and the Accreditation Canada Process

How to Bullet Proof Your Narcotic Prescription Practices?

Dr. Mark Bayley

Dr. Andrea Furlan

Humanities Lecture

Peak Clinical Performance – Lessons from the Edge

Dr. Dave Williams

Spinal Cord Injury Symposium – Therapeutic and Service Implications from Lessons Learned in Ontario Across the Continuum of SCI Care

Role and Timing of Decompressive Surgery for SCI: Results of the STASCIS Trial

Dr. Michael G. Fehlings

Walking Rehabilitation: Time for a New Paradigm
Electrical Stimulation Therapy
Case Studies in Program Evaluation
Health Service Utilization After SCI
Health Utilities from an Aging SCI Cohort
Is Not Over Yet – Long Term Spinal Column Problems Following SCI

Prof. Molly Verrier
Dr. Milos R. Popovic
Dr. Sander Hitzig
Dr. Susan Jaglal
Dr. Catharine Craven
Dr. Henry Ahn

09.00–12.00

Medical Education Special Interest Group Meeting

Neuromuscular Special Interest Group Meeting

Pediatrics Special Interest Group Meeting

Resident Career Planning

SATURDAY, JUNE 23, 2012

08.30–12.30

The Power of Physical Activity and Exercise – A “How To” Symposium

Ms. Danielle Barry-Hickey and
Dr. Paul Oh

The Good, the Bad and the Ugly of Wanting to be a Clinician Scientist

Dr. Andrei Krassioukov

13.30–16.30

Symposium: The Best Practice Approach to Back Pain – Assessment, Treatments and Outcomes

Case Review with Transponders

Dr. John Flannery

Back and Diagnostics – Practical Understanding of Diagnostic Studies – Clinical Practice

Dr. Y. Raja Rampersaud

The Not-Quite-Evidenced Approach to the Chronic Middle Aged Back, in the Non- Multi-Disciplinary Office Setting

Dr. Paul Winston

Interventional Options to Management of Back Pain Vertebral Augmentation and Blocks

Dr. Roger M.L. Smith

Practical Aspects of Physical Modalities

Dr. Peter Kim

A01

IMPROVING THERAPY STAFFING LEVELS FOR STROKE REHABILITATION IN ONTARIO: A COST ANALYSIS

E. Leci; M. Meyer; S. Pereira; A. McClure; N. Foley; K. Salter; R. Teasell

University of Western Ontario, London, ON

Objective: To estimate the cost of improving staffing levels in Ontario to levels that allow for adherence to the Canadian Best Practice Recommendations (CBPG), which recommend 3 hours of therapy/day. **Methods:** Data from a provincial survey, literature and CBPG were used to determine necessary staffing ratios. Current staffing levels in Ontario were compared to this, to provide estimates of the additional number of therapists needed to comply with CBPG. The cost of hiring these additional therapists was calculated and a sensitivity analysis was performed. **Results:** It was estimated that approximately 6 patients per OT and PT, and 15 patients per SLP are required to provide the recommended amount of therapy. Currently, 96% of Ontario stroke rehabilitation facilities fail to meet these staffing levels. To meet recommended levels, 79.6, 90.63 and 41.41 additional full-time equivalent PTs, OTs and SLPs need to be employed in Ontario respectively. This would cost approximately 12.5 ± 3 million CAD/year. **Conclusion:** Ontario stroke rehabilitation facilities are unable to comply with CBPG regarding therapy time due to low staffing levels. At a cost of 12.5 ± 3 million CAD/year, staffing levels in Ontario could be raised to the level required to provide this standard of care.

A02

VIRTUAL REALITY EXERCISE TRAINING FOR STROKE REHABILITATION PATIENTS

H. Finestone¹; H. Sveistrup²; M. Bilodeau²; A. Taillon-Hobson¹; D. McEwan²; L. Tseng²

¹Élisabeth Bruyère Hospital, Bruyère Continuing Care, Ottawa, ON, ²University of Ottawa, Ottawa, ON

Objective: To demonstrate that virtual reality (VR) exercise therapy, as an adjunct treatment, improves balance and weight bearing on the affected side in stroke rehabilitation inpatients. **Design:** Randomized controlled trial. **Subjects/Patients:** Patients from inpatient stroke rehabilitation unit. **Methods:** Inclusion criterion: ability to stand independently for >1 min. Participants are assigned to treatment group (conventional therapy + VR exercise while standing, n=30) or control group (conventional therapy + VR exercise while sitting, n=30). They receive 10–12 sessions of VR exercise lasting 20–30 min (include snowboarding, soccer goaltending and juggling) requiring lateral movements, shifting base of support and reaching. Outcomes, measured before VR therapy and 1 week and 1 month after VR therapy is completed, include Berg Balance Scale (BBS), Functional Independence Measure, Chedoke-McMaster Stroke Assessment, Two-Minute Walk Test, Time Up & Go Test, Quasi-Static Measures (COP measures), Intrinsic Motivation Inventory and Ottawa Sitting Scale. **Results:** BBS scores (n=10) improved over the three time points in the treatment group (50.7, 54.5 and 54.8, respectively), compared with 47.5, 48.0 and 53.0 in the control group. **Conclusion:** Study is ongoing. Further results will be presented at the meeting. VR may be a promising adjunct to conventional inpatient stroke rehabilitation care.

A03

DETERMINANTS OF THE LIKELIHOOD OF RETURNING TO WORK IN A CHRONIC PAIN POPULATION

H. Hamer; R. Gandhi; S. Wong; A. Yak; N. Mahomed

Altum Health - University Health Network, Toronto, ON

Objective: The main objective of our study was to find patient level predictors of successful return to work (RTW) in a chronic pain population. **Design:** Retrospective cohort study. **Subjects:** The study included 1268 injured workers who participated and were discharged from the chronic pain program with 55.0% being male at a mean age of 46 years. **Methods:** We reviewed data from our registry of care provided for injured workers in Ontario. Relevant covariates, including demographic data, time from injury and functional scores were recorded. Our primary outcome, RTW, was assessed at 3 months post-discharge. Descriptive statistics and logistic regression were used to identify those factors predicting a successful RTW. **Results:** For those referred less than 15 months from injury, the proportion of clients working was 34.9% as compared to 18.7% for those referred greater than 15 months ($p<0.001$). Logistic regression revealed that female gender, younger age, earlier time since injury, work sector and presence of a RTW coordinator were significant predictors of a successful RTW ($p<0.05$). **Conclusion:** Workers compensation boards should strive to refer injured workers to treatment programs as early as possible to achieve a more successful RTW. Additionally, an interdisciplinary approach that views clients holistically should be implemented when treating chronic pain populations.

A04

KEEPING PACE WITH DIAPHRAGMATIC PACING IN CANADA

A. Barry¹; V. Sreenivasan²

¹University of Ottawa, Ottawa, ON; ²Division of Physical Medicine and Rehabilitation, The Ottawa Hospital, Ottawa, ON

Background: The Canadian incidence of traumatic spinal cord injury is ~1400 cases/year. Ventilator assistance is required by approximately 5.5% at discharge to the community. Alternatives to mechanical ventilation, namely diaphragm pacing systems (DPS), can improve outcomes. **Case Summary:** A 20-year-old with C1 complete injury underwent the first laparoscopic DPS procedure in our province for spinal cord injury. The patient was unable to wean from ventilator over 3 months. Funding from his First Nation's community facilitated implantation with assistance from an international surgical expert. The device aided rehabilitation outcomes, including independent power mobility using head controls, and simplified travel. Speech quality and communication improved. The patient tolerated volitional breathing for short periods. Post implantation, pan-resistant pneumonias ceased. Community reintegration will occur with increased ease, as more housing options are available. **Literature Review:** Fewer than 5% of appropriate patients are implanted with DPS. Benefits include liberation from a ventilator, enhanced phonation, fewer respiratory infections, trends towards improved survival and community reintegration. Approximate cost of home mechanical ventilation per neuromuscular patient is \$136,000 US/year. Financial savings are discussed. DPS is not yet approved in Canada. **Conclusion:** Increased awareness is needed for DPS as means to achieve rehabilitation outcomes in high tetraplegia.

A05

CARDIOVASCULAR FITNESS TESTING CONSIDERATIONS FOR PERSONS WITH TETRAPLEGIA

C. Moore¹; M. Miyatani¹; B. Craven²; P. Oh²

¹Toronto Rehabilitation Institute, Toronto, ON; ²Dept. of Medicine, Toronto Rehabilitation Institute, University of Toronto, Toronto, ON

Objective: To describe the challenges associated with implementing maximal exercise testing recommendations among adults with chronic tetraplegia. **Design:** Cross-sectional. **Subjects/Patients:** Twenty adult men and women with chronic tetraplegia (C3–C8, AIS A–D; time post injury 14.0±11.9 yrs; Age 53.7±11.0 yrs). **Methods:** Participants performed a maximal continuous ramp test via arm or leg ergometry to identify VO_{2peak} . Work rate was increased at 30 kpm/min or 60 kpm/min for arm ergometry, and 100 kpm/min for leg ergometry at one minute intervals. **Results:** Fifteen participants (VO_{2peak} 11.2±3.72 ml/kg/min; peak workload 219±156 kpm, duration 5.1±2.0 min) completed arm ($n=13$) or leg ($n=2$) testing. Five participants did not complete the test due to insufficient hand strength ($n=3$) or shoulder pain ($n=2$). One participant achieved physiologic peak; arm/leg fatigue ($n=11$), general fatigue ($n=1$), dyspnea ($n=1$), and abdominal spasms ($n=1$) were reasons for early test termination. **Conclusion:** The benefits of maximal exercise testing can be attained in individuals with tetraplegia by customization of testing protocols. Recommended provisions include: 1) reduced work loads of <30 kpm/min for arm and <100 kpm/min for leg ergometry; 2) height adjustable ergometers; 3) grip adaptations and; 4) leg ergometry for those with LEMS >20.

A06

USE OF BENZODIAZEPINES AFTER STROKE: ARE WE ADHERING TO BEST PRACTICES?

C. Cassidy¹; E. Leci²; M. Meyer²; S. Janzen²; R. Teasell²

¹University of Western Ontario, London, ON; ²University of Western Ontario; Lawson Health Research Institute, London, ON

Background: Motor recovery is frequently listed as patients' most important goal of stroke rehabilitation. Evidence shows that benzodiazepine medication impairs motor recovery in animals and likely has a similar effect in humans who have suffered a stroke. Canadian Best Practice Recommendations state that benzodiazepines should be avoided in the post-stroke population, at least during the recovery phase. **Purpose:** To examine adherence to Canadian Best Practice Recommendations in a specialized inpatient Stroke Rehabilitation unit in London, Ontario as they pertain to the use of benzodiazepines. **Methods:** The charts of 120 patients admitted for stroke rehabilitation at Parkwood Hospital were reviewed for frequency and type of benzodiazepine prescriptions. **Results:** 26.7% of patients admitted for stroke rehabilitation were prescribed benzodiazepines while they were inpatients. Most of the prescriptions were initiated prior to admission to the rehabilitation unit and were simply continued into the rehabilitation phase; they were for use as needed. **Discussion:** These results indicate that despite current (2010) Best Practice Recommendations, 26.7% of patients were prescribed benzodiazepines while admitted to hospital following their stroke. This identifies an area of potential improvement in providing evidence-based, patient centred care following stroke.

A07

LEVODOPA TO ENHANCE MOTOR RECOVERY AFTER BRAIN TUMOUR

J. Ennis; D. Harvey; E. Ho; V. Chari; A. Graham; S. Nesathurai

McMaster University, Hamilton, ON

Objective: To evaluate the role of Levodopa/Carbidopa (LD/CD) to improve motor recovery and functional ability subsequent to

remote brain tumour excision. **Design:** Case report utilizing N-of-1 randomized, placebo controlled format. **Patient:** An outpatient with residual hemiparesis secondary to removal of a benign oligoastrocytoma. The patient was two years post-surgery, and reached a clinical plateau prior to the study. **Methods:** LD/CD 100/25 mg daily versus placebo, combined with a structured 6 week physiotherapy regimen. LD/CD or placebo was given in randomized 1 week blocks, for a total of 3 weeks of LD/CD compared with 3 weeks of placebo. The Fugyl-Meyer Assessment (FMA) was used to assess baseline motor function, and then measured weekly after each study week. **Results:** The mean FMA score for LD/CD weeks was 6.90 points above the mean score for placebo, with results significant at $p<0.05$. The patient elected to continue with the LD/CD after the trial. **Conclusions:** LD/CD may have a beneficial effect on improving functional recovery after brain tumour excision. Motor function was improved despite the patient being 2 years from surgical excision, and having previously reached a clinical plateau.

A08

CHALLENGES IN THE DIAGNOSIS AND MANAGEMENT OF FOOT DROP: INTRANEURAL AND EXTRANEURAL GANGLION CYSTS. A CASE SERIES

H. MacKenzie¹; T. Miller¹; D. Ross²

¹Department of Physical Medicine and Rehabilitation, St. Joseph's Health Care, London, ON; ²Department of Surgery, Division of Plastic Surgery, St. Joseph's Health Care, London, ON

Introduction: Intraneural and extraneural ganglia are the result of a shared pathophysiologic process where increased intraarticular pressures cause joint capsule and synovial membrane herniation. Originating from the proximal tibiofibular joint (PTFJ) ganglion cysts can produce peroneal nerve compression. Ganglia are an important diagnostic consideration in the patient presenting with foot drop. **Objective:** We highlight an approach to investigation and management in order to minimize disability and maximize outcome. **Results:** We present two cases of foot drop. Electrodiagnostic evaluation demonstrated a focal peroneal nerve axonopathy and magnetic resonance imaging (MRI) identified a cystic mass originating from the PTFJ. In Case 1, ultrasound guided aspiration resulted in initial clinical improvement followed by cyst recurrence. Both patients underwent surgical excision. In Case 1 an extraneural ganglion was found, whereas the ganglion was intraneural in Case 2. Both patients had an excellent functional recovery and no longer required an ankle-foot orthosis. **Conclusion:** Intraneural and extraneural ganglia can be indistinguishable clinically, on imaging, and even at the time of surgery. Outcomes are related to duration and severity of nerve compression. Electrodiagnostic evaluation and MRI are necessary to assess nerve dysfunction and determine prognosis. In order to prevent recurrence, surgical excision is preferred over cyst aspiration.

A09

NEUROMUSCULAR PARTITIONING OF SUBSCAPULARIS BASED ON INTRAMUSCULAR NERVE DISTRIBUTION PATTERNS

J. Warden¹; S. Roberts²; Y. Chang²; A. Samarakoon²; R. Baker²; C. Boulias¹; F. Ismail¹; A. Agur²

¹Division of Physiatry, Department of Medicine, University of Toronto, Toronto, ON; ²Division of Anatomy, Department of Surgery, University of Toronto, Toronto, ON

Background: Chemodeneration of subscapularis improves shoulder range of motion and decreases pain associated with spastic hemiplegia. Understanding its innervation pattern would be useful in guiding injections that target motor endplate zones. **Objective:** To document the extra- and intramuscular innervation patterns of subscapularis, throughout the muscle volume. **Design:** Anatomic

dissection of the innervation to 30 embalmed specimens. *Methods:* Nerve branches to subscapularis were identified and dissected to their point of muscle entry. Specimens were photographed ($n=23$), and intramuscular branches were dissected, digitized, and reconstructed in 3D within the muscle volume ($n=7$). Common patterns of neuromuscular partitioning were identified. *Results:* Four intramuscular innervation patterns were observed based on the number of extramuscular branches, partitioning the muscle into two (superior and inferior; $n=9$) or three (superior, middle, and inferior; $n=21$) parts. The superior part was innervated by the posterior cord ($n=29$) or suprascapular nerve ($n=1$); the middle part by the posterior cord ($n=19$) or axillary nerve ($n=2$); and the inferior part by the posterior cord ($n=11$), axillary nerve ($n=16$), or both ($n=3$). *Conclusion:* Although extramuscular innervation to subscapularis is variable, the muscle demonstrated neuromuscular partitioning based on intramuscular innervation. Injection in multiple locations may be required to achieve maximal effect for chemodenervation.

A10

A REVIEW OF THE EVIDENCE FOR GAIT AND MOBILITY THERAPEUTIC INTERVENTIONS INITIATED MORE THAN 6 MONTHS POST STROKE

D. Lanc¹; R. Teasell²; L. Lobo²; S. Pereira²; N. Foley²; T. Miller³

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Objective: To review the evidence for later gait and mobility therapeutic interventions post stroke. *Methods:* Review of the literature was conducted for articles where gait and mobility interventions were initiated more than 6 months post stroke. These were assigned a quality score and levels of evidence determined. *Results:* There were 126 studies including 96 RCTs. There was strong evidence for the motor learning approach, augmented physical therapy to improve gait, balance training, task-specific gait training, treadmill training, biofeedback using auditory or visual feedback or EMG biofeedback to improve gait, cardiovascular training, functional electrical stimulation and gait retraining, TENS electrical stimulation and botulinum toxin to reduce spasticity and ankle foot orthoses to improve gait. There was moderate evidence for mental practice improving sit to stand and antispastic medications or intrathecal baclofen reducing spasticity. There was conflicting evidence that partial body weight support and treadmill training results in improved gait performance, strength training results in improvements in ADL and gait, robotic devices are superior to conventional gait training and botulinum toxin improves functional outcomes. *Conclusions:* There was extensive evidence demonstrating the benefit of many interventions designed to improve gait and mobility initiated over 6 months post stroke.

A11

THE ACHES AND PAINS OF CARDIAC REHABILITATION: EXAMINATION OF A MUSCULOSKELETAL CLINIC IN CARDIAC REHABILITATION

H. MacNeill

Bridgepoint Health, Toronto, ON

Purpose: To describe participants in a cardiac rehabilitation program who were referred to a musculoskeletal clinic and the extent of their involvement in a cardiac rehabilitation program. *Methods:* A retrospective chart review was done on 51 participants who were referred to the musculoskeletal clinic between February 1, 2009 and March 31, 2010. Data on demographics, clinic information,

cardiac rehabilitation and musculoskeletal outcomes were collected. Analyses included descriptive statistics and non-parametric analysis of outcome measures. *Results:* Of the cardiac rehabilitation participants that were referred to the musculoskeletal clinic, 88.2% reported pre-existing musculoskeletal conditions. Most common region of diagnosed musculoskeletal conditions included knee(s) (45.1%), back (25.5%) and shoulder(s) (17.6%). There was a significant improvement from initial to final mean Numerical Pain Rating Scale scores ($p=0.001$) and peak oxygen consumption measures ($p=0.002$). *Conclusion:* A musculoskeletal clinic within a cardiac rehabilitation program could allow for musculoskeletal conditions to be addressed in an effective manner and potentially minimize their negative impact on cardiac rehabilitation participation and outcomes.

A12

BONE HEALTH IN BOYS DUCHENNE MUSCULAR DYSTROPHY ON LONG-TERM DAILY DEFLAZACORT

A. Mayo¹; B. Craven²; L. McAdam³; W. Biggar³

¹University of Toronto, Keswick, ON; ²Dept. of Medicine, Toronto Rehabilitation Institute, University of Toronto, Toronto, ON; ³Holland Bloorview Kids Rehabilitation Hospital, Toronto, ON

Introduction: Quality of life in Duchenne Muscular Dystrophy (DMD) has improved significantly with corticosteroid treatment. However, corticosteroids decrease bone mass and increase vertebral fracture risk. *Methods:* We report assessments of bone health in 39 boys with DMD on long-term deflazacort (0.9 mg/kg/day) therapy. Bone health was defined by lumbar (L1–L4) BMD, long-bone and/or symptomatic vertebral fractures. Lumbar BMD was reported as height-adjusted Z-scores at initiation of deflazacort (T0) and 1–2 year intervals thereafter. Subcapital body fat percentage and ambulatory status were recorded. *Results:* At T0, 39 boys age 6.6 ± 1.6 years had height-adjusted BMD Z-score -0.5 ± 0.8 , and $23.5\pm 5.0\%$ body fat. Height-adjusted Z-scores remained stable with years of deflazacort until loss of ambulation and accrual of body fat. Nine long-bone fractures occurred in 8 ambulating boys, two before T0. Seven vertebral fractures occurred in 6 non-ambulatory boys after ≥ 5 years of deflazacort with height-adjusted Z-score -1.8 ± 0.7 , and $47.8\pm 12\%$ body fat. *Conclusions:* Bone health in DMD is influenced by disease progression, corticosteroids, Z-scores and fat mass accumulation. Adjustments for short stature must be considered during BMD interpretation. Percent body fat and ambulatory status are useful bone health indicators. Routine use of height adjusted Z-scores is advocated for use in routine clinical practice.

A13

TIME OR DISTANCE? PATIENT PREFERENCE OF AMBULATORY CAPACITY REPORTING FROM AN AMPUTEE REHABILITATION CLINIC

M. Payne¹; A. Maeng²; B. Death³

¹University of Western Ontario, London, ON; ²Schulich School of Medicine and Dentistry, London, ON; ³Dept of PM&R, London, ON

Objective: To determine if relying on self-reported distance regarding ambulatory capacity alone was sufficient for this patient population. *Methods:* We administered waiting room questionnaires and semi-structured interviews over 8 clinics to a convenience sample of patients with major lower extremity amputations (44 patients (age 61.2 years, range 19 to 86), below knee amputations (84%)) to inquire about patient preference in discussing and describing their prosthetic ambulatory capacity. *Results:* Sixteen of 41 patients (39.0%) clearly stated a preference for discussing gait performance in terms of time or duration of walking, rather than distance (31.7%), while 29.3% had no preference. Open ended questions of distance revealed many patients automatically reported distance by informal units (27.0%) rather than in metric (29.7%) or imperial (43.2%)

units. Disagreements between questionnaire and interview reporting were common, with poor intra-person time/distance concordance in >30% across a variety of comparisons. *Conclusions:* Despite physician and researcher general preference of determining gait capacity by self-report of only distance, patients may be more comfortable reporting capacity in time or duration of gait, and should be given the opportunity to do so. Accuracy of time versus distance reporting is unknown. These findings have clinical and research implications.

A14

PROTEIN PRODUCTION IN PATIENTS WITH SEVERE KNEE OSTEOARTHRITIS: COMPARING THOSE WITH TO THOSE WITHOUT CONTRACTURE

M. Campbell; H. Uthoff; O. Laneville; G. Trudel

University of Ottawa, Ottawa, ON

Objective: To correlate protein levels from differentially expressed genes in the posterior knee capsule in patients with knee flexion contracture and severe osteoarthritis (OA). *Design:* Case-controlled design. *Subjects:* Twelve patients for total knee arthroplasty (TKA) due to primary OA: 6 with knee flexion contracture in the operative knee and 6 without. *Methods:* Posterior knee capsule tissue was harvested during TKA. Immunohistochemistry (IHC) was used to examine protein expression based on differentially expressed genes discovered by our group: CHAD, Sox9, and Cyr61. IHC staining assessed cellular location, tissue type, percentage of staining cells, and intensity. *Results:* A higher percentage of cells expressed CHAD and there was more intense staining for Sox9 in the contracture group (both $p < 0.05$). No difference was found for Cyr61. Staining was nuclear for CHAD (non-adipocytes) and nuclear and cytoplasmic for Sox9 (non-adipocytes) and Cyr61 (adipocytes and non-adipocytes). *Conclusions:* OA knee flexion contracture worsens functional status. The mechanism for developing contracture in OA is unknown. CHAD is a member of a protein family found to play an anti-fibrotic role. Sox9 is known for its chondroprotective role. Further research on the role and modulation of these proteins may allow directed pharmacologic and/or gene therapy towards contracture prevention in OA.

A15

POSITIVE AND NEGATIVE AFFECT IN INDIVIDUALS WITH SPINAL CORD INJURIES

J. Salter; S. Smith; K. Ethans

University of Manitoba, Winnipeg, MB

Objectives: To identify the specific characteristics of emotional experiences that are affected by spinal cord injury (SCI). *Design:* Participants completed standardized questionnaires assessing depression level, positive and negative affect, and personality traits. *Methods:* Thirty-six individuals with complete (ASIA A) SCI and 36 age-, gender-, and education-matched healthy controls participated in this study. The level of SCI was classified as cervical (C1–C7), upper thoracic (T1–T5), for lower thoracic/upper lumbar (T6–L2). Participants completed the Beck Depression Inventory, the Positive and Negative Affect Schedules, the NEO Neuroticism Questionnaire, and the harm avoidance scale of the Tridimensional Personality Questionnaire. *Results:* Participants with SCI experienced significantly less positive affect than did controls but the groups did not differ in their experience of negative affect. SCI participants were more depressed with scores improving with greater number of years post-injury. Personality variables did not predict results on the BDI-II or PANAS-X, suggesting that the emotional impairments were a result of SCI, not pre-existing personality traits. *Conclusion:* SCIs are characterized by specific emotional dysfunction related to the experience of positive emotions, rather than a tendency to ruminate on negative emotions. These results suggest that individuals with SCI would benefit from rehabilitation programs that include training in positive psychology.

A16

SPINAL INHIBITION VARIES WITH FUNCTIONAL STATUS IN ADULTS WITH CEREBRAL PALSY

E. Condliffe; M. Gorassini

University of Alberta, Edmonton, AB

Objective: To examine if excitation of spinal circuits by sensory inputs is abnormal (i.e., lacks activation of inhibitory spinal networks) in spastic cerebral palsy (CP). *Design & Subjects:* A cohort of adults with CP ($n=13$, 30 ± 10 yrs) was compared to neurologically intact control subjects (NI) ($n=9$, 32 ± 9 yrs). *Methods:* Soleus surface electromyography and single motor unit responses to cutaneous stimulation (200 μ s, 5 pulses @300 Hz, <pain threshold) of the foot medial arch were recorded with steady background muscle activity. The presence of spinal inhibition was characterized by an early latency decrease or pause in motor unit firing. Response magnitude was expressed as a percentage of background activity and integrated in time (%*s). *Results:* 9/9 NI subjects demonstrated an inhibitory component to their response at a spinal latency (onset <80ms post-stimulation) with a mean magnitude of $-1.6 \pm 0.9\%*s$. Spinal inhibition was present in 9/13 subjects with CP, though at a lower magnitude ($-0.7 \pm 0.6\%*s$, $p < 0.05$). 4/13 CP subjects showed no evidence of inhibition. Interestingly, response magnitude in CP subjects was correlated with Gross Motor Functional Classification System score ($R=0.75$, $p < 0.01$). *Conclusions:* After perinatal brain injury, sensory activation of spinal inhibitory circuitry varies with functional motor status and suggests that spinal inhibition is preserved by daily motor activity.

A17

EFFECT OF NABILONE ON PHANTOM LIMB PAIN

S. Khanahmadi; R. Skrabek; A. Arneja

University of Manitoba, Winnipeg, MB

Objectives: To determine the effect of Nabilone on controlling Phantom Limb Pain and Quality of Life. *Design:* The study is a pilot randomized, double-blind, placebo-controlled trial. *Participants:* Eight patients from Amputee outpatient clinic and Day Hospital completed the study. *Methods:* The treatment group received 0.5 mg of Nabilone, titrated up to 1 mg BID by the end of fourth week before going into a 4-week washout period. Subjects were seen 4 times throughout the 8 weeks. Main Outcome Measure were Visual Analog Scale (VAS), SF-36, Depression Anxiety Stress Scales (DASS). *Results:* Nabilone was very well tolerated. We found significant rise in the VAS, DASS (Depression Subscale) and DASS total score, after the washout period (Week 8) in the Nabilone group. We were not able to find any significant differences in changes in the outcome measures between the two groups, after the treatment phase (By the end of week 4). There were also no statistically significant changes in the means of outcome measures during the treatment phase (1st four weeks), within each group. *Conclusion:* The strong rebound pain and depression post washout period, in the treatment group, should encourage investigators to continue studying this medication in phantom limb pain patients.

A18

ADHERENCE TO BEST-PRACTICE GUIDELINES FOR MANAGEMENT OF NEUROGENIC BOWEL DYSFUNCTION AFTER SCI

S. Janzen¹; S. Mehta¹; A. McIntyre¹; E. Loh²; R. Teasell³

¹Lawson Health Research Institute, London, ON; ²St. Josephs Healthcare London, Parkwood Hospital, London, ON; ³St. Josephs Healthcare London, Parkwood Hospital; Lawson Health Research Institute, London, ON

Objective: To evaluate adherence to the clinical practice guidelines for the management of neurogenic bowel dysfunction after spinal

cord injury (SCI) by front line clinicians and physicians in an inpatient SCI rehabilitation unit. *Methods:* A retrospective chart audit was completed on 100 patients admitted to the SCI rehabilitation unit between July 2009 and February 2011. Records were examined for demographic parameters, assessment and treatment modalities. *Results:* Bowel dysfunction was noted for 64% of SCI patients; 51.6% specifically noted neurogenic bowel dysfunction. Only 4 charts had differentiated between upper and lower motor neuron bowel issues. There was no evidence that the type of neurogenic bowel dysfunction influenced the patient's bowel care routines. *Conclusion:* Despite the existence of separate bowel management protocols for reflexic (i.e., upper motor neuron) and areflexic (i.e., lower motor neuron) bowel issues, there was a lack of distinction between such dysfunctions for each patient at this center. The discrepancy in actual practice and best practice warrants a change that results in greater guideline compliance and improved outcomes for individuals with SCI. Examination of barriers and facilitators for the uptake and implementation of these guidelines into practice is integral.

A19

HAND HYGIENE IN THE REHABILITATION INPATIENT: OUR STAFF'S ROLE

S. Rajasekaran

University of Saskatchewan, Saskatoon, SK

Objective: We aimed to assess patient hand hygiene following three interventions; accessibility, visual cuing, and staff cuing. *Patients:* We observed inpatients on the Rehabilitation Ward at Saskatoon City Hospital. *Methods:* Patients were observed during lunchtime. In week 1, no interventions were used (preexisting gel dispenser at both entrances). In week 2, gel dispensers were placed on lunch tables. In week 3, sign posts were also placed on lunch tables. In week 4, staff also cued the patients prior to handing them lunch trays. *Results:* In week 1, 0% (0/18) patients cleansed their hands. In the ensuing weeks, the rates were as follows: week 2, 5% (1/22), week 3, 0% (0/22), week 4, 94% (17/18). We assumed hand-cleansing observations were independent after each intervention and used the Fisher's exact test to show a significant difference ($p < 0.001$) in the proportion of patients who washed their hands in week 4. *Conclusion:* Accessibility and visual cuing were not effective on their own or in combination, but when staff cuing was also added patient compliance with hand hygiene significantly improved. All patients on our rehabilitation ward are now cued to wash their hands prior to receiving their lunch trays (gel dispensers on all tables).

A20

ADHERENCE TO BEST PRACTICE GUIDELINES AND ORGANIZATIONAL POLICIES FOR USE OF PHYSICAL RESTRAINTS POST-ABI

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Objective: To evaluate adherence to the Acquired Brain Injury Knowledge Uptake Strategy (ABIKUS) guidelines that recommend restrictive interventions be subject to professional review and be administered in accordance with organizational policies. *Methods:* A retrospective chart audit was conducted of 102 patients admitted to a neuro-rehabilitation unit between March 2009 and 2011 to evaluate adherence to the restraint policies. The medical chart was reviewed for consent from the patient/substitute decider, type of restraint, and date and time of application. Audited physical restraints included wrist, shoulder, leg, pelvic or waist straps and wheelchair seatbelts. Video monitoring and wandering bracelets were analyzed independently. *Results:* Physical restraints were used at least once on 35 patients (range 1–5/person). Verbal consent was documented

for 14%. Wandering bracelets were used on 17 patients, for whom verbal consent was recorded for 41%, and video surveillance was used for 12 patients, with written consent obtained for 83%. The date and time of restraint applications was not consistently documented. *Conclusions:* A gap was identified between actual and best practice. Failure to comply with organizational policies presents a number of potential ethical and legal issues. More detailed charting of restraint use is needed, as well as improved attainment of written consent.

A21

KNOWLEDGE TRANSLATION INITIATIVES TO INCREASE THE DETECTION AND IMPROVE MANAGEMENT OF SUBLESIONAL OSTEOPOROSIS AFTER SCI

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Objective: There is currently regional disparity in the clinical detection and management of sublesional osteoporosis (SLOP) in persons with spinal cord injury (SCI). We aimed to facilitate practice change through knowledge translation initiatives. *Subjects/Participants:* Clinicians, rehabilitation professionals, scientists and stakeholders. *Methods:* "Best evidence" and proposed clinical practices were disseminated via systematic literature review, a published clinical paradigm and dissemination of Fragments 1.0, a print and web-based tool-kit for the detection and management of SLOP <http://www.scifragments.com/>. These resources aimed to highlight the importance of assessing knee-region bone mineral density (BMD) for the detection of SLOP, identification of patients with high fracture risk and selection of appropriate treatment intervention(s). Resources were disseminated via International and National conferences, journal publications, local patient education events and circulation to interested rehabilitation professionals. *Results:* A common knee-region BMD protocol is now routinely used at 4/15 tertiary SCI rehabilitation centres (Calgary, Toronto, Hamilton and Quebec). *Conclusions:* Using a multi-modal approach (conference presentations, print and web-based media), knowledge translation efforts have initiated practice change in the detection and treatment of SLOP. We anticipate our continued efforts will facilitate changes in healthcare policy to increase access to diagnostic testing and the best available therapy to reduce fracture incidence.

A22

BARRIERS TO MAXIMUM WALK TEST ADMINISTRATION AT DISCHARGE FROM AN INPATIENT AMPUTEE REHABILITATION PROGRAM

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Objective: To determine barriers to completion of a standardized Maximum Walk Test (MWT) at discharge from our inpatient Amputee Rehabilitation Program. *Methods:* Retrospective chart review of consecutive patients discharged from inpatient Amputee Rehabilitation Program over 2 year period from January 2010 to December 2011. *Results:* 191 discharges occurred over the study period; the study group had a mean age of 63.5 years (SD \pm 14.2 years), were 71% male, with the majority having a below knee amputation (67.0%) and/or diabetes (73.3%). Average length of stay was 28.1 days (SD \pm 13.2 days). MWT including distance and time was completed in 149 (78.0%) of the discharges, with the main limiting factors being

fatigue (23.0%), lower limb pain (11.5%), and shortness of breath (9.4%). For 22.0% of discharge MWT, no limiting factor was identified. 42 discharge MWT were not completed due to non-ambulatory status (33.3%), acute illness (16.7%), skin/stump problems (11.9%) or a variety of other reasons (21.4%). *Conclusions:* This data provides limitations for MWT at discharge from an inpatient amputee rehabilitation program. Knowing these limitations may direct care from a clinical standpoint, and provides valuable data for research planning to further examine outcome measures in this population.

A23

CURRENT USE OF CONSTRAINT-INDUCED MOVEMENT THERAPY POST-STROKE: WHAT'S STANDING IN OUR WAY

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Background: Constraint Induced Movement Therapy (CIMT) aims to improve function in the hemiplegic upper extremity (UE). It involves intensive, repetitive, task-specific training to the affected UE, while restraining the unaffected limb. *Objective:* To determine if CIMT is being used by occupational therapists (OT) at our facility, during inpatient stroke rehabilitation and to identify barriers, if any, to the implementation of this intervention. *Methods:* A retrospective chart audit of individuals admitted to inpatient stroke rehabilitation at Parkwood Hospital was conducted to identify potential CIMT candidates and if this therapy was offered. Candidacy was determined using criteria outlined in the literature. A semi-structured interview was then conducted with the neuro-rehabilitation OT's, to discuss the use of CIMT at Parkwood. *Results:* Chart reviews were completed for 120 individuals. Eighteen (15%) met eligibility criteria; none (0%) received this therapy. The semi-structured interview identified the following issues: a lack of knowledge about CIMT, insufficient resources, patient compliance, patient safety, short lengths of stay and patient acuity post stroke. *Conclusions:* Although CIMT is a treatment option for certain individuals with stroke, it is not being offered at our facility because of lack of information, time and resource constraints, and concerns surrounding patient compliance and safety.

A24

A REVIEW OF THE EVIDENCE FOR THERAPEUTIC INTERVENTIONS FOR HEMIPLEGIC SHOULDER INITIATED MORE THAN 6 MONTHS POST STROKE

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Introduction: Long-term stroke management is a developing area of interest. Hemiplegic shoulder pain (HSP) is very common post stroke with mixed etiology often leading to delayed identification and treatment. *Objective:* To determine the evidence for therapeutic interventions targeting HSP ≥ 6 months post stroke. *Design:* Systematic review. *Methods:* A search of PubMed, EMBASE, CINAHL, and Scopus was performed. Articles where HSP therapeutic interven-

tions were initiated ≥ 6 months post stroke were reviewed. *Results:* There were 50 studies including 15 RCTs identified. There is strong evidence that functional electrical stimulation helps correct shoulder subluxation but does not reduce pain. There is moderate evidence that aggressive range of motion (ROM) therapies, using overhead pullies increases pain while gentle exercises to improve ROM are better tolerated. There is conflicting evidence that botulinum toxin injected into overactive internal rotators, primarily subscapularis, reduces pain and improves passive ROM. There is conflicting evidence that intra-articular steroid injections improve HSP. *Conclusions:* There are many studies addressing therapeutic interventions ≥ 6 months post stroke for HSP. There is moderate evidence that aggressive ROM exercises worsens pain and mixed evidence that botulinum toxin and corticosteroid injections reduce pain.

A25

USING BEST PRACTICE GUIDELINES TO TREAT AGITATION IN REHABILITATION PATIENTS POST BRAIN INJURY

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Objective: To assess compliance with the Acquired Brain Injury Knowledge Uptake Strategy (ABIKUS) that recommends behavioural assessment data be used when managing agitation in acquired brain injury (ABI) patients. Focus was on the use of the Agitated Behavior Scale (ABS) tool, where a score ≥ 28 indicates the threshold for use of pharmacological treatment. *Methods:* Charts from 102 patients consecutively admitted to an ABI rehabilitation unit between March 2009–2011 were audited. Data collected included: medication types and administration, ABS scores and behavioural notes. *Results:* Overall, 58% of patients received a medication typically used to treat agitation (Lorazepam, Olanzapine, Methotrimeprazine and Quetiapine). Of those, 51% had clear documentation that one or more of these medications were being used to treat agitation. Agitation medications were administered in a PRN form 317 times, only 3.5% ($n=11$) of which had a correlating ABS score documented. Of these, only 4 met the threshold for pharmacological treatment. *Conclusions:* Use of the ABS allows for a patient's behavioural patterns to be easily monitored over time and ensure medications are given in a systematic and evidence-based manner. However, currently, there is no consistency in the administration of the ABS tool for pharmacological treatment of agitation.

A26

DEMOGRAPHIC VARIABLES IN PEOPLE SUSTAINING SPINAL CORD INJURIES FROM MOTOR VEHICLE COLLISIONS

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Objective: To discover the demographic variables in patients sustaining a spinal cord injury secondary to a motor vehicle collision in a Canadian province between 1997 and 2007. *Design:* Retrospective, database analysis. *Methods:* Using data from a provincial trauma registry, and a provincial health insurance program and excluding individuals with moderate or severe traumatic brain injury, 431 individuals were identified. Individuals were classified as complete and incomplete in the following categories: C1–C7, C8–T6, T7–L1, L2–S5 (incomplete only). They were also classified by age as under 30, 30–59 and 60 and over. *Results:* In this population with motor vehicle collisions as the cause of spinal cord injury, 75% were male.

Only 15% were over the age of 59. Complete injuries accounted for only 27% of the total. The most common injury overall was the C1–C7 incomplete injury. *Conclusion:* This data implies that the demographical variables in spinal cord injury post motor vehicle collision differ from the general demographics of patients with acute spinal cord injury. Database limitations make breakdown of the degree of incomplete injury impossible.

A27

RECORDING AND ARCHIVING ACADEMIC SESSIONS ONLINE IN A PHYSIATRY POSTGRADUATE TRAINING PROGRAM

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Objective: To record how often and for what purposes residents use online academic sessions archived using a cost-effective solution. *Design:* Screen capture technology (\$300) was used to record presentations (academic half day and visiting professorship) that were archived on a website (\$100/year) accessible by registered users. The website logged when videos were accessed and users were cued to complete an online survey. Five of the eight residents in our program participated in this project and 23 videos were archived (sample-www.screencast.com/t/gEeEdm5o9). *Results:* Our results (18 surveys, videos accessed 60 times) indicate 100% of respondents would use the site again, 100% agreed/strongly agreed the content was educational, 50% used the site to prepare for their own presentation and 40% used the site because they were absent. *Conclusion:* Our data suggests residents in our program review presentations they were absent for and to prepare for their own talks with this cost-effective solution; stronger conclusions will be made when more responses are collected. This practice could be easily replicated by other training programs. Thus, we will share our initiative at the education special interest group meeting at our specialty's upcoming annual meeting, with the goal of ultimately sharing content between physiatry programs nationally.

A28

CASE REPORT: STROKE PREVENTION IN A PATIENT WITH MYOTONIC DYSTROPHY TYPE 1 AND ATRIAL FIBRILLATION

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Introduction: Atrial fibrillation or flutter present in up to 25% of patients with myotonic dystrophy (MD) and carry an increased risk of stroke. Stroke inpatients with MD is likely under-reported and warrants clinical consideration, given the functional implications. *Objectives:* To raise clinical awareness of stroke management in MD patients with atrial fibrillation, with the aim of improved primary prevention of stroke. *Case summary:* A 49-year-old woman presented with abdominal pain, caused by infarctions of her spleen and kidney. In hospital, she developed symptoms of a right MCA stroke, presumed cardioembolic in origin given long-standing atrial fibrillation and atrial flutter treated with digoxin only. Neurology diagnosed MD Type 1, based on typical facial features, muscle wasting, percussion myotonia, first-degree AV conduction block and a positive family history. The patient also had endocrine abnormalities such as borderline diabetes and thyroidopathy, early cataracts, and hypersomnolence. Stroke superimposed on MD led to significant functional and rehabilitation challenges which may have been preventable had antiplatelet therapy or oral anticoagulation been initiated. *Conclusion:* Currently no guidelines exist for primary stroke prevention in MD with atrial fibrillation or atrial flutter. Given the devastating consequences of stroke, an antiplatelet agent is least recommended; oral anticoagulation should be considered if other risk factors are present.

A29

TONING IT DOWN: A CONSENSUS FOR STANDARDIZED ASSESSMENT IN SPASTICITY

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Objective: To develop a “basket of outcome measures” for the assessment of outcome following spasticity interventions. *Design:* A 3 round electronic modified Delphi process was used to achieve expert consensus. *Participants:* Twenty-nine clinicians from centers across Canada, involved in the management of spasticity. *Methods:* A literature search was conducted to identify important outcomes in persons with spasticity and commonly used outcome measures. In Round 1 participants were given the opportunity to contribute to this list. Detailed reviews for each measure were provided to participants. In Rounds 2 and 3 participants selected their preferred outcome measure in each area and a consensus was reached as to which measures were to be included as part of a standardized assessment in persons with spasticity. *Results:* Key areas for assessment included pain, tone, ROM, skin integrity, function, caregiver burden, goal attainment and quality of life. Forty-three measures were identified for consideration in the consensus development process. Consensus was achieved on the best available assessment tools in the key areas of assessment, and followed International Classification of Functioning, Disability and Health (ICF). *Conclusion:* A set of valid and reliable outcome tools was identified to assist with better documentation and evaluation of treatment effectiveness following spasticity interventions.

A30

USING SCOPING REVIEW METHODS TO DESCRIBE & EVALUATE CANADIAN SCI REHABILITATION SERVICE DELIVERY.

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Objective: To describe the spectrum of Canadian SCI rehabilitation service delivery. *Design:* Scoping review. *Participants:* Fifteen tertiary SCI programs across Canada contributed data regarding current SCI patient volume, equipment, resources, administrative structure, local clinical and research expertise, and service providers. *Methods:* A scoping review methodology was employed, based on Arksey and O'Malley's York Framework. This method involves identifying and assessing the breadth, range and nature of SCI practices, and analytically interpreting for trends and gaps. The information collated is then reviewed and revised by relevant stakeholders and content experts. *Results:* The project will culminate in the production of the E-Scan Atlas, which will contain aggregate demographic information for all participating sites, chapters on seventeen rehabilitation goals, as well as a section highlighting individual patients and how rehabilitation goals uniquely apply to each. A report card providing priority ratings and targets/priorities for facilitating practice implementation in 2020 will be featured within each chapter. *Conclusion:* The E-Scan will inform stakeholders by highlighting essential elements, and identifying missing, overlapping, and unnecessary elements in clinical practice. Furthermore, it will enable identification of key priorities, best practice indicators; spotlight best practice organizations, as well as inform and support future practice advancement and research initiatives.

A31

HOW EVIDENCE BASED IS OUR MANAGEMENT OF MSK DISORDERS? A PILOT STUDY**S. Macaluso***Parkwood Hospital, St. Joseph's Health Care, London, ON*

Introduction: Physicians are increasingly being expected to use an evidence-informed approach in their medical practice. The management of musculoskeletal (MSK) disorders is one area where clear evidence-based guidelines are often lacking. **Objective:** To determine academic physicians' current use of medical literature in their management of musculoskeletal disorders. **Design:** Cross-sectional, survey design collecting data regarding which medical resources physicians use, how often they use them, and what barriers they identify that impede the practice of evidence based medicine. **Subjects:** Physicians from various disciplines including Rheumatology, Orthopedics, Family Medicine and Psychiatry were invited to participate in this pilot study. **Methods:** Participants were invited via email to complete an online survey. **Results:** The most commonly used medical resources were medical websites with 73% of respondents using them at least weekly. The least used resources were meta-analyses with 8% never using them, and the majority using them less than once per month. Barriers identified were a perceived lack of relevant research evidence and the time it takes to access the literature. Overall, 76% of respondents felt their management of MSK disorders was evidence-based. **Conclusion:** Physicians across many disciplines, with varying levels of experience, prefer the use of web resources in helping them manage MSK disorders. These physicians identify a lack of research evidence and the time it takes to access the literature as barriers to evidence based practice.

A32

ADHERENCE WITH ANKLE FOOT ORTHOSIS USE IN AN AMBULATORY MS POPULATION**J. Kraushaar; K. Knox; D. Nickel***University of Saskatchewan, Department of Physical Medicine & Rehabilitation, Saskatoon, SK*

Objective: Examine ankle foot orthosis (AFO) adherence, subjective walking improvement, and patient-reported reasons for non-adherence in an ambulatory MS clinic sample. **Design:** Descriptive study. **Subjects:** Eighteen (6 male; 12 female) patients with multiple sclerosis (MS) prescribed a brace between 2008 and 2011 consented to participate. Braces included: Foot-Up, solid AFO, and non-solid AFO. Median Kurtzke EDSS at prescription was 6.0 (EDSS 6.0 indicates intermittent or constant assistance required to walk 100 m). At follow up, median age was 59 years (range 37–76) and median disease duration from onset was 29.5 years (range 6–56). **Methods:** Structured telephone interview. **Results:** Seven participants (39%) continued wearing their brace after a median duration of 326 days (range 95–1099). Six of these felt the brace improved walking. Reasons for disuse included challenges with fitting, brace bulkiness, durability, supply, donning, footwear, mobility decline, and the belief that the brace was not needed or could cause muscle loss. **Conclusion:** Less than half of the participants continued to wear their brace. Those who continued to wear their brace reported that it improved walking. Multiple reasons provided for non-adherence with AFO prescription suggest opportunities to improve patient benefit and reduce inefficiencies.

A33

A REVIEW OF THE EVIDENCE FOR UPPER EXTREMITY INTERVENTIONS INITIATED MORE THAN 6 MONTHS POST STROKE**S. Pereira; L. Lobo; N. Foley; T. Miller; R. Teasell***St. Joseph Health Care, Lawson Health Research Institute, London, ON*

Objective: Long-term stroke management has developed into an area of great interest. The objective of this review was to examine the effectiveness of upper extremity (UE) interventions initiated ≥ 6 months post stroke. **Design:** Systematic review. **Methods:** Multiple databases were searched. Studies examining the outcome of UE interventions initiated ≥ 6 months after stroke were reviewed. Levels of evidence for each intervention were determined based on the system adopted by the Stroke Rehabilitation Evidence-Based Review. **Results:** In total, 121 RCTs and 33 non RCTs were reviewed. There is strong evidence that constraint-induced movement therapy, functional electrical stimulation, robotics and virtual reality therapy improve function. There is strong evidence that extrinsic feedback improves motor learning and that botulinum toxin significantly decreases spasticity, while splinting does not. There is moderate evidence that strength training improves strength, EMG biofeedback is not superior to other therapies, mirror therapy improves function and that stretching may increase ROM and reduce pain. Conflicting evidence exists with regard to the superiority of bilateral arm training over unilateral training and the effectiveness of repetitive task-specific training, trunk restraints, mental practice and TENS. **Conclusion:** A strong level of evidence supports the use of many UE interventions ≥ 6 months post stroke.

A34

PREGABALIN AS A TREATMENT OPTION FOR NEUROPATHIC PAIN IN THE SETTING OF RADICULOPATHY: A CASE SERIES**S. Salsman; C. Short***Nova Scotia Rehabilitation Centre, Halifax, NS*

Objective: We report three cases of low back pain with radiculopathy successfully managed with pregabalin. **Design:** Case series. **Subjects:** Three outpatients experiencing back pain with confirmed radiculopathy. **Methods:** Based on reported pain intensity and functional levels pre and post treatment. **Results:** In all cases, patients presented with back pain with diagnostically confirmed radiculopathy. In one case, pregabalin 75 mg BID significantly decreased pain, and was effective until time of surgery. In the second case a dose of pregabalin 150 mg BID significantly decreased radicular pain and had a therapeutic effect on MS-related spasticity. In the third case, radicular pain was effecting ambulation. Pregabalin (300 mg BID) resulted in resolution of pain and return to independent walking. No significant medication side effects were reported. In two cases pregabalin was superior to opioids for pain control and surgical management was avoided. **Conclusions:** Pregabalin may have an important therapeutic role in the management of back pain with radiculopathy. It may be opiate sparing in some cases. It may also allow some individuals to avoid surgical management; or act as a bridge until surgery for definitive pain management can be accessed. Clinical trials are warranted.

A35

A MANAGEMENT MODEL FOR INDIVIDUALS LIVING WITH A CHRONIC SPINAL CORD INJURY

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Objective: To create a Chronic Disease Management Model for Spinal Cord Injury using a three pronged approach: Self-Management, Education, and an individualized exercise program. **Design:** Case series. **Subjects:** A convenience sample of 17 individuals with complete or incomplete spinal cord injury living in the community for at least 1 year. Thirteen subjects completed all three components. **Methods:** The self-management portion consisted of six 2.5 hour sessions following the Stanford University Chronic Disease Self-Management Program (My Toolbox). Each session was moderated by two individuals who had completed formal My Toolbox moderator training, one of whom had an SCI. Outcome measures included the standardized questionnaire for the Stanford University Program, and a Goal Attainment Scale for physical measures. Secondary outcomes were calculated maximal lifting capacity for the pectorals, back and biceps and cardiovascular capacity. **Results:** Individuals improved in Self-Management particularly for coping strategies. Eight were able to achieve their personal goals. Maximal lifting capacity improved in 8/9 subjects with six month evaluations. Cardiovascular status did not change. **Conclusion:** A chronic disease management model can be applied to spinal cord injury patients living in the community post rehabilitation.

A36

WHAT PREDICTS THE PROVISION OF INPATIENT REHABILITATION FOR CHILDREN WITH SEVERE TRAUMATIC BRAIN INJURIES?

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Objective: To determine factors that predict whether children with severe pediatric traumatic brain injury (TBI) receive inpatient rehabilitation. **Design:** Prospective cohort study. **Patients:** Previously healthy children with severe TBI hospitalized at four hospitals in northern and central Ohio, USA, with Level 1 trauma centers. **Methods:** Data was drawn from a larger prospective cohort longitudinal study of patients with pediatric TBI. Data was collected between 2003 and 2006. **Results:** Of the 53 patients with severe TBI (lowest post resuscitation GCS 8 or less), 31 received inpatient rehabilitation and 22 did not. Logistic regression indicated that children were more likely to receive rehabilitation if they had a longer duration of impaired consciousness, lived in a single-parent home (71% versus 50% for two-parent homes), and were female (86% versus 49% of males), as well as if rehabilitation was available at the hospital where they were treated acutely (73% versus 48%). Rehabilitation was not related to socioeconomic status or race. **Conclusion:** The

provision of inpatient rehabilitation following severe TBI in children depends not only on injury severity, but also on the availability of rehabilitation and demographic factors. However, disparities are not apparent on the basis of socioeconomic status or race.

A37

COMPLEMENTARY AND ALTERNATIVE MEDICINE USE IN ADULTS WITH CEREBRAL PALSY: NEEDS, BARRIERS

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Objective: To determine motivators for use of complementary and alternative medicine (CAM) and impact of quality of life in adult cerebral palsy. **Design:** Qualitative case-control study. Structured survey questions were completed either on paper or online. Inclusion criteria: >18 years cerebral palsy. Exclusion criteria: cognitive impairment. Structured survey had questions about demographics, use of CAM and Quality of Life. The questions were based on WHO Disability Assessment Schedule (Quality of Life), Canadian Community Health Survey and national 2006 US survey. **Results:** 169 patients were invited. 17 completed survey (8 Males/ 9 Females). Average age 43.7 (20–88). Average school years 14.8 (8–18) 81.2% were living with family or independently. Prevalence of CAM use was 70% with the most popular modalities being herbal & vitamin supplementation, massage, chiropractic and aquatic therapy. 67% of CAM users identified subjective benefits. There was no significant difference in quality of life between CAM and non-users. Subjects using CAM had an average disability score of 28.8% while those who had not averaged 53.0%. **Conclusions:** Survey suggests CP adults use CAM because it fits their lifestyle or they perceive it is more effective than conventional medicine for treating pain and decreased functioning. Barriers to CAM use include expense, lack of information and accessibility.

A38

AN EMOTIONAL INTELLIGENCE BASED CURRICULUM IN A POSTGRADUATE RESIDENCY TRAINING PROGRAM

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Objective: A pilot project to assess the implementation of an emotional intelligence (EI) based curriculum into a medical residency training program. **Design:** Residents ($n=5$) first completed an emotional quotient inventory assessment (EQ-i). The curriculum consisted of one book (read on own) and four articles (reviewed in journal club format). The same EQ-i and a post curriculum survey were administered after residents completed the syllabus. **Results:** The mean percent change in EQ-I scores was -8.0% and was not statistically significant ($p>0.05$) using the Wilcoxon rank sign test. All participants agreed/strongly agreed the curriculum improved their leadership competency, and the way they interact with patients and colleagues. All participants thought EI is important to develop in physicians and an EI curriculum should be implemented into our training program. **Conclusion:** Our results suggest that an EI based curriculum may be favoured by residents and may change their experiences with patients and colleagues and also develop their leadership competencies. Our results need to be further explored with a larger group to assess EQ-i changes. We plan to explore the implementation of an optional EI course for all medical student/residents at our University in the future.

A39

CASE SERIES: METHYLENE BLUE IN THE TREATMENT OF DISCOGENIC LOW BACK PAIN

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Background: The impact of chronic low back pain is considerable. The intervertebral disc is considered the etiologic source in up to 40% of patients, with considerable previous efforts directed at developing reliable and efficacious treatments. Recent publications using a one time treatment of methylene blue dye showed statistically significant, clinically relevant improvements in pain and function. Methylene blue is thought to denervate the small nociceptive fibers that grow into the annulus fibrosis, implicated in discogenic pain. **Study design:** Retrospective Case Series. **Setting:** Academic Pain Management Centre. **Methods:** This case series examines clinical response in 8 patients treated with methylene blue for discogram positive discogenic back pain. **Results:** Application of this treatment showed only 1 clinical success at our centre. Four patients had time limited clinical response in pain and/or function between 2 weeks and 5 months. **Discussion:** We review the differences in our selection and administration protocol, and other previous studies examining treatments for discogenic pain (e.g. Intradiscal Electrotherapy, Intradiscal Steroids, Intradiscal Biacuplasty, Rami Communicans Radiofrequency Thermo-Coagulation and Chymopapain). **Conclusions:** Discogenic low back pain continues to be an elusive clinical entity to treat. We have reserved further treatment with methylene blue until other controlled trials are published.

A40

CARDIOVASCULAR RESPONSE TO SEXUAL ACTIVITY FOLLOWING SPINAL CORD INJURY

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Objectives: To characterize cardiovascular changes during sexual activity in individuals with spinal cord injury (SCI) compared to able-bodied individuals. **Design:** Literature review. **Methods:** Keyword search. **Results:** Search resulted in 471 abstracts related to this topic in able-bodied subjects, of which 10 were reviewed. 117 abstracts related to this topic in SCI subjects, of which 12 articles

were appraised. In able-bodied individuals, sexual activity resulted in a mild-modest increases in heart rate and blood pressure peaking at orgasm, returning to baseline shortly after. In the SCI population, cardiovascular changes ranged from none to severe autonomic dysreflexia (AD). AD was recorded during penile vibrostimulation or electroejaculation procedures in individuals with SCI above T6. The severity of AD increased with higher lesions levels and could be asymptomatic. Studies with frequent and accurate monitoring reported AD more often; variability could not be explained solely by the completeness or level of the SCI. **Conclusion:** In able-bodied individuals sexual activity results in a mild-modest increase in cardiovascular parameters. In the SCI population, cardiovascular changes during sexual activity depend on the likelihood of triggering AD. Future research regarding this topic must use frequent and accurate measurements of cardiovascular parameters to avoid missing periods of asymptomatic AD.

A41

CASE REPORT OF A PATIENT WITH ALLERGIC REACTIONS AND NON-RESPONSIVENESS TO BOTULINUM TOXIN TYPE A

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Introduction: A patient with rapid-onset of allergic reaction combined with partial therapy resistance after injections of high doses of Onabotulinumtoxin A was successfully switched to Incobotulinumtoxin A with good therapy response. **Case Report:** A 39-year-old woman presented in September 2009 with pain in the neck, head, shoulders, back and buttocks and hypertonia in muscles of these regions after a car accident in 2000. She has been treated with Onabotulinumtoxin A since April, 2008 with doses up to 1400 U per month and injection intervals ranging from 1 to 11 weeks (average 4 weeks). In October 2009 she was treated with 400 U Onabotulinumtoxin A for her cervical dystonia and lower back dystonia. In November 2009 she was switched to a lower dose of Incobotulinumtoxin A (300 U) because the efficacy of Onabotulinumtoxin A treatment was already declining. In September 2010, she was switched back to 400 U Onabotulinumtoxin A because of practical drug availability issues, and reported swelling in hands and feet that developed within 2–3 days post injection. Swelling in hands and feet together with local injection site reactions, nausea and flu-like feeling first appeared half a year after the Onabotulinumtoxin A therapy was initiated. Since December 2010, she receives Incobotulinumtoxin A injections (300U; every 3 month) with an excellent predictable response and no adverse drug reactions.

RE01**DOES BAREFOOT RUNNING REDUCE THE LIKELIHOOD OF CHRONIC INJURY IN RUNNERS? A DISCUSSION OF BIOMECHANICAL PRINCIPLES****J. Raugust***University of Calgary, Calgary, AB*

Chronic injuries continue to plague runners despite forty years of advancement in running shoe technology. This has spurred the emergence of support for barefoot running as a technique to reduce chronic injury. There is strong biomechanical evidence that adoption of a forefoot strike running style, as observed in barefoot runners, reduces impact forces. These forces have been established as important contributors to chronic overloading and injury. Therefore, some experts have proposed that the forefoot running style identified in barefoot runners may reduce the risk of injury more than technologically advanced footwear. In this essay, we evaluate the literature comparing barefoot and conventional shod running. Further, we suggest that health care providers may need to reconsider the assumption that shoes with more passive protection and support are the gold standard for injury prevention in athletes.

RR01**GENE EXPRESSION IN PATIENTS WITH SEVERE KNEE OSTEOARTHRITIS: COMPARING THOSE WITH TO THOSE WITHOUT CONTRACTURE****M. Campbell; H. Uhthoff; O. Laneville; G. Trudel***University of Ottawa, Ottawa, ON*

Objective: To identify genes differentially expressed in the posterior knee capsule in the setting of knee flexion contracture in severe osteoarthritis (OA). *Design:* Case-controlled. *Subjects:* Twelve patients for total knee arthroplasty (TKA) due to primary OA: 6 with knee flexion contracture in the operative knee and 6 without. *Methods:* RNA was extracted from posterior knee capsule tissue

during TKA. Gene expression between the 2 groups was compared using DNA microarray. Protein products for differentially expressed genes were researched in the National Center for Biotechnology Information (NCBI) Gene and studied for their potential role in OA and contracture disease processes. *Results:* Three genes, CHAD, Sox9, and Cyr61 showed increased expression in the contracture group. Band densitometry of reverse transcriptase polymerase chain reactions was increased for CHAD ($p=0.040$) with a trend towards significance for Sox9 and Cyr61 ($p=0.055$ for both). CHAD and Cyr61 may regulate fibrosis. Sox9 may promote cartilage regeneration in OA. *Conclusions:* Knee flexion contracture in OA worsens functional outcome. The mechanism for developing contracture in OA is unknown. Imbalance between pro- and anti-fibrotic gene expression may cause posterior capsule fibrosis. Further research may indicate pharmacologic and gene therapy interventions towards restoring this balance, thus preventing contracture.

MSE01**SPORT-INDUCED CONCUSSION: A CLINICALLY FOCUSED REVIEW****S. Hoerber***Edmonton, AB*

Sport-induced concussion is an increasingly difficult and important issue to understand for any physician. This paper addresses concussion in a logical, clinically focused manner with the intent of providing any physician with enough background and resources to confidently manage patients who present with sport-induced concussion. Drawing from national and international resources, the best practice guidelines include using assessment tools such as the SCAT2 prior to participation, immediately post injury, and to monitor progress. Treatment of concussion involves a graduated return to play protocol with stages of increasing intensities. Once the athlete has progressed in activity intensity to a stage that is similar to normal game play, consideration for full return can be made. It should be emphasized that the return to play decision is the most important part of concussion management because athletes who return early are at high risk for re-injury and significant long-term sequelae.

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