



61st ANNUAL SCIENTIFIC MEETING ABSTRACTS

*May 29–June 1, 2013
Hilton Montreal Bonaventure, Montreal, Quebec, Canada*

These abstracts are scientifically evaluated by the organizing committee and not by the journal.

PROGRAM

THURSDAY, MAY 30, 2013

08.00–09.00	Amputee Special Interest Group Meeting – Fontaine F <i>Vascular Transfemoral Amputees – Who will successfully use a prosthesis?</i>	Facilitator: Dr. Nancy Dudek
08.00–09.00	Pain Management Special Interest Group Meeting – Fontaine G <i>An Update on Interventional Procedures for Pain</i>	Facilitator: Dr. Eldon Loh
08.00–09.00	Stroke Special Interest Group Meeting – Fontaine H <i>Virtual Reality Exercise Therapy in the Stroke Rehabilitation Patient</i>	Facilitator: Dr. Robert Teasell and Speakers: Drs. Hillel Finestone and Sean Dukelow
08.00–09.00	Neuromuscular Special Interest Group Meeting – Westmount	Facilitator: Dr. Paul Winston and Speaker: Dr. Angela Genge
08.00–09.00	Pediatrics Special Interest Group Meeting – Jacques Cartier <i>Pediatric Scoliosis – Challenges in Treatment</i>	Facilitator: Dr. David Berbrayer and Speaker: Dr. Neil Saran
09.00–10.00	Applications of Ultrasound Imaging and Elastography for Myofascial Pain – Westmount	Speaker: Dr. Siddhartha Sidkar
10.00–10.15	Meridith Marks Award for Excellence in Education Recipient Presentation – Westmount	Award Recipient: Dr. Suzan Dojeiji
10.45–11.00	Paper of the Year – Westmount <i>“Time to Rethink Long-Term Rehabilitation Management of Stroke Patients”</i>	Winner: Dr. Robert Teasell
11.00–12.00	Mediterranean Diet, Exercise and Cardiovascular Prevention – Westmount	Speaker: Dr. Martin Juneau

FRIDAY, MAY 31, 2013

08.00–09.00	Breakfast Symposium: Medical Professional: Incorporating Your Practice and How To Get the Most Out Of It – Westmount	Speakers: Mr. Michel Trudel and Ms. Cathy Bergeron
09.00–10.00	Scientific Program	
09.05–09.20	Resident Essay Contest Presentation <i>“Incidence of spasticity after stroke and subarachnoid hemorrhage – a review of literature”</i>	Winner: Dr. Alan Tam
09.25–09.40	Resident Research Contest Presentation <i>“Honorary Authorship: Frequency and Associated Factors in Physical Medicine and Rehabilitation Research Articles”</i>	Winner: Dr. Sathish Rajasekaran
10.00–12.00	Complex Regional Pain Syndrome Symposium – Westmount	
10.00–10.35	Parallels between Human CRPS and an Animal Model of Chronic Post-ischemia Pain	Speaker: Dr. Terrence Coderre
10.35–11.20	Treatment of Complex Regional Pain Syndrome: A review of the evidence	Speaker: Dr. Roderick J. Finlayson
11.20–11.40	Graded Motor Imagery Program – A therapeutic modality for the treatment of complex regional pain syndrome	Speaker: Mr. Mohanad Omar-Hosseini
12.15–13.15	International Rehabilitation Special Interest Group Meeting – Fontaine F	Speakers: Drs. Nora Cullen, Colleen O’Connell and Joy Wee
12.15–13.15	Medical Education Special Interest Group Meeting – Fontaine G <i>Competency-Based Medical Education (CBME): Preparing for change</i>	Facilitator: Dr. Jennifer Yao
12.15–13.15	Spinal Cord Injury Special Interest Group Meeting – Fontaine H <i>Hot Topics in SCI Rehabilitation</i>	Facilitator: Dr. Andrea Townson
12.15–13.15	Medicolegal Special Interest Group Meeting – Longueuil	Facilitator: Dr. E. Lyle Gross
12.15–13.15	Traumatic Brain Injury Special Interest Group Meeting – Pointe-aux-Trembles	Facilitator: Dr. Chantal Vaidyanath and Speaker: Dr. Elaine de Guise

- 13.30–16.15** *Workshops – Sessions Run Concurrently. Each session runs three times.*
- Incorporating the McKenzie Evaluation into your Physical Examination of the Patient with Spinal Pain – Longueuil* Speaker: Mr. Max Folkersma
- Botulinum Toxin Injections for Migraine – Fontaine F* Speaker: Dr. Martin Veilleux
- Information Technology for the Physiatrist – Using Your Tablet Effectively – Fontaine G* Speakers: Drs. Jacqueline Kraushaar and Shane Wunder
- Practical Tips for Treating Benign Positional Vertigo – Pointe-aux-Trembles* Speakers: Mr. Michel Abouassaly and Mr. Howell Lin
- Practical Radiology for the Physiatrist; Interpretation of Spine MRI - Westmount* Speaker: Dr. Thomas Moser
- Physiotherapy for Low Back Pain: Case-based Clinical Reasoning Using the Most Recent APTA Guidelines – Fontaine H* Speaker: Dr. Richard Preuss
- Exercise Programs for those with Neurologic Disabilities – Jacques Cartier* Speaker: Ms. Lynne Dawson
- 19.00–21.00** *Discover Montreal at the McCord Museum – Award of Merit and Meridith Marks Award for Excellence in Education Presentation*
- 2013 Award of Merit Recipient: Dr. Thomas A. Miller
 2013 Meridith Marks Award of Excellence in Education Recipient: Dr. Sue Dojeiji

SATURDAY, JUNE 1, 2013

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- 08.30–10.30** *Mild Traumatic Brain Injury Symposium – Westmount*
- 08.30–08.55** *Clinical Presentation and Treatment of Mild TBI* Speaker: Dr. Simon Tinawi
- 08.55–09.20** *Putting in Place an Effective Team for Mild TBI* Speaker: Mme Mitra Feyz
- 09.20–09.45** *Neuropsychological Assessment in Mild TBI* Speaker: Dr. Elaine de Guise
- 09.45–10.10** *Prognosis of Mild TBI* Speaker: Dr. Jehane Dagher
- 12.00–13.00** *Lunch Symposium – Travelling with a disability: A challenge filled with rewards! – Westmount* Speaker: Dr. Isabelle Ducharme, Keroul
- 13.00–14.00** *Virtual Reality in Rehabilitation – Westmount* Speaker: Dr. Catherine Mercier
- 14.30–16.30** *Tendonopathy Symposium – Westmount*
- 14.30–15.00** *Anatomy and Physiology of the Normal and Pathologic Tendon* Speaker: Dr. Johan Michaud
- 15.00–15.30** *Ultrasound Guided Injection of Platelet-Rich Plasma in the Treatment of Tendinopathy* Speaker: Dr. Martin Lamontagne
- 15.30–16.00** *The Role of Orthoses in the Management of Tendonopathies* Speaker: Dr. Natalie Habra
- 16.00–16.30** *The Role of Surgery in the Treatment of Tendonopathy of the Shoulder* Speaker: Dr. Dominique Rouleau

SECTION 1 ACCREDITATION

This event is an Accredited Group Learning Activity (Section 1) as defined by the Maintenance of Certification program of the Royal College of Physicians and Surgeons of Canada, approved by the Canadian Association of Physical Medicine and Rehabilitation.

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Through an agreement between the Royal College of Physicians and Surgeons of Canada and the American Medical Association, physicians may convert Royal College MOC credits to AMA PRA Category 1 Credits™. Information on the process to convert Royal College MOC credit to AMA credit can be found at www.ama-assn.org/go/internationalcme.

A 01

CONCUSSION IN PEDIATRIC ICE HOCKEY PLAYERS: DESCRIPTION OF CHARACTERISTICS BASED ON A PREVIOUS HISTORY OF A CONCUSSION OR MILD TRAUMATIC BRAIN INJURY

J. D. Raugust, J. E. Latter

University of Calgary, Department of Clinical Neurosciences, Division of Physical Medicine and Rehabilitation

Objective: Describe characteristics of pediatric ice hockey players who have and have not been diagnosed with a concussion or mild traumatic brain injury (mTBI). **Study design:** Cross-sectional survey. **Setting:** Summer hockey camps in Calgary, Alberta, Canada. **Participants:** Parents of 1,425 pediatric ice hockey players. **Observation technique/Interventions:** Parents of pediatric hockey players were asked to provide demographic information about their child and indicate if their child had ever been diagnosed with a concussion or mTBI. **Outcome measurements:** Results were reported in descriptive form. **Results:** The response rate to surveys administered was 98.4%. Eleven percent of pediatric ice hockey players had previously been diagnosed with a concussion or mTBI. Those with a history of concussion were on average 2.2 years older and more experienced. When athletes were divided by current position, the percentages with a previous diagnosis of concussion were: 8.8% of defense, 12.5% of forwards and 14.7% of goalies. Of those who had been exposed to body checking, 20% had previously been diagnosed with a concussion, in contrast to 5.9% with no body checking exposure. **Conclusions:** The percentage of pediatric ice hockey players who have been diagnosed with a concussion in our population is quite large. It appears that exposure to body checking may increase the risk of such an injury. Additionally, playing goalie may not be as protective as is often assumed. Future studies are necessary to confirm these preliminary findings and should be designed to account for interactions between patient factors. **Key words:** concussion; mild traumatic brain injury; pediatrics; hockey.

A 02

FATIGUE AND PHYSICAL ACTIVITY IN ADULT CEREBRAL PALSY – PILOT CASE SERIES STUDY

D. Berbrayer

University of Toronto, Department of Medicine, Sunnybrook Health Sciences Centre

Objective: To determine prevalence of fatigue among adult cerebral palsy (CP) and relationship physical activity levels. **Design:** Examine the effect of a condition (fatigue) on outcomes (physical activity) in a selected CP population. **Setting:** University Centre. **Participants:** Adults with CP (>18 years). **Exclusion:** Severe intellectual disabilities. **Interventions:** Demographic information collected included gender, age, education level, living situation and income source. Current and past mobility levels were assessed using the Gross Motor Function Classification System (GMFCS). Physical fatigue was assessed using two questionnaires – Fatigue Questionnaire and Fatigue Severity Scale (FSS). Physical activity was assessed by Physical Activity Scale for Individuals with Physical Disabilities (PASIPD). **Results:** 13 patients with CP, average age 35 years (21–62 years). There were 7 males, 6 females. 50% completed high school and 50% completed college. 50% live with parents, while 42% live independently with a partner or alone. 67% rely on disability benefits, while 1/3 have paid work. 50% of the CP patient reported motor impairment in all four limbs. 85% had an other symptom with bowel or bladder being the most common. 8 CP classified as GMFCS 1–2 and 5 CP GMFCS 3–4. 5 females and 2 males had fatigue. Fatigue was present in 5 CP GMFCS 1–2 and 2 CP GMFCS 3–5. **Conclusion:** Linear regression analysis between fatigue severity (FSS) and physical activity levels (PASIPD) showed no correlation ($p>0.05$). Ambulatory patients experience more fatigue. 63% with mild motor impairment (GMFCS Class 1–2) experiencing severe fatigue compared with 40% with severe motor

impairment (GMFCS Class 3–5). **Key words:** cerebral palsy; fatigue; physical exertion; mobility limitation; psychomotor disorders.

A 03

EXPLORING DEPRESSION AND FUNCTIONAL INDEPENDENCE, EDUCATION, AND EMPLOYMENT IN ADULTS WITH SPINA BIFIDA

D. Berbrayer

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Background: Depression is common among persons with Spina Bifida; the implications for rehab service delivery have yet to be described. **Objective:** To describe the associations between depression and functional independence, leisure activity and employment among adult Ontarians with Spina Bifida? **Design:** Case Control Study. **Setting:** University hospital. **Participants:** Adult Spina Bifida (>18 yrs) with myelomeningocele. **Methods:** Fourteen participants consented and completed a series of questionnaires including Hopkin's Symptom Checklist (HSC), Functional Independence Measure (FIM), Franchay Activities Index (FAI), Education and Employment Checklist (EEC), & self-generated tool at baseline and one year. A HSC score >1.75 was used to define presence of depression. Pearson's correlation coefficients were used to explore associations between depression and FIM, FAI and EEC at baseline. **Results:** Seven participants scored >1.75 on HSC. Mean (SD) for FIM, FAI and EEC were 106 (8.48), 42.5 (9.19), 50 (9.82) and were not different between groups ($p=0.86$). The correlations between depression and FIM was ($r=0.21$) depression and FAI ($r=0.86$), depression and EEC. Details from the HSC revealed 5 participants with depression vs. 2 of the controls believed education level affected mood ($p=0.43$); and social status affected mood ($p=1.00$). **Conclusions:** Future studies should include a larger sample size and account for important confounders and effect modifiers.

A 04

TREATMENT OF INFERTILITY IN MEN WITH SPINAL CORD INJURY: A RETROSPECTIVE COHORT STUDY

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¹Université de Montréal, Dept of Rehabilitation Medicine, Institut de réadaptation Gingras-Lindsay de Montréal (IRGLM) ²Université de Montréal, Urology Division, Centre hospitalier de l'Université de Montréal (CHUM)

Objective: Present the outcomes of assisted reproductive technology (ART) in a group of couples with spinal cord injury (SCI) male partners. **Design:** Retrospective study. **Setting:** Outpatient Clinic of a Rehabilitation Center and Procrea fertility clinic. **Materials and methods:** A review was conducted of the records of 32 couples with SCI male partners who were treated for infertility at the IRGLM, Procrea clinic or at a hospital center. A semen sample was obtained either by manual stimulation, penile vibratory stimulation, electroejaculation or testicular sperm extraction. ART technique was selected according to the sperm parameters. **Results:** The mean age of the men was 29 years (23–48) and of their female partners, 29 years (25–41). The average sperm count was 110.4 M/ml \pm 16.2 and the average sperm motility rate was 12.3% \pm 16.5. Among the 11 couples treated with intravaginal insemination, 9 pregnancies occurred among 7 couples. No pregnancies resulted from intrauterine insemination (2 cases). Among the 18 couples treated with *in vitro* fertilization, 12 pregnancies were reported among 10 couples. The pregnancy rate/cycle was 43%. Following these ART techniques, the pregnancy rate reached 55%. Four pregnancies occurred from the use of donor sperm in 8 couples. Overall, 21 men with a SCI (65% of the group) became fathers to at least one child. **Conclusion:** Fertility treatments are effective for couples with SCI male partners and secondary infertility. **Funding acknowledgement:** IRGLM. **Key words:** assisted reproductive technology; infertility; spinal cord injury.

A 05

A SINGLE-BLIND, CROSS-OVER TRIAL OF HIP ABDUCTOR STRENGTH TRAINING TO IMPROVE FUNCTIONAL PERFORMANCE AND BALANCE CONFIDENCE IN PATIENTS WITH UNILATERAL, TRANSFEMORAL AMPUTATION

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Objective: To evaluate hip abductor strength-training for patients with unilateral transfemoral amputation (TFA). **Design:** Single-blind, cross-over trial with randomization. **Setting:** West Park Healthcare Centre. **Participants:** 17 patients with TFA. **Intervention:** Subjects completed 8-week training programs consisting of twice weekly hip abductor strength training or arm ergometry. Subjects were randomly assigned to receive either the experimental or active placebo intervention first. A physiotherapist blinded to group assignment conducted baseline and post-intervention assessments. **Outcome measures:** Timed Up & Go (TUG), 2 Minute Walk (2MW) test, Activities Specific Balance Confidence Scale (ABC), Houghton Scale and measures of thigh girth and hip abductor strength. A two-way cross-over ANOVA was used for baseline and post-intervention treatment phase comparisons. **Results:** There were no baseline differences between treatment phases for the TUG, 2MW, ABC, Houghton scale, or sitting or side-lying abductor strength ($p > 0.05$ for all), though supine strength was greater for the experimental phase ($p = 0.03$). At the end of 8-weeks, there were significant treatment effects demonstrating improvements in TUG and ABC ($p < 0.01$ for both) as well as the 2MW ($p < 0.05$), sitting and side-lying abductor strength ($p = 0.05$ for both), but not for supine strength, prosthetic use, nor thigh girth measures ($p > 0.42$ for all). **Conclusions:** This study suggests that patients with unilateral transfemoral amputation can improve functional performance and balance confidence following intense hip abductor strength training. **Funding acknowledgement:** Funding for this study was provided by the Canadian Diabetes Association. **Key words:** Amputation; amputees; hip abductor; resistance training; functional capacity; balance confidence. **Disclaimer:** A manuscript for this study is currently under review by the Journal of Rehabilitation Medicine.

A 06

PROVIDING FEEDBACK TO MANUFACTURERS OF LOW COST PEDIATRIC WHEELCHAIRS

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Context/Objective: The objective of this project was to support the World Health Organization's recommendations on the provision of manual wheelchairs, facilitating appropriate manufacture and distribution of manual wheelchairs. **Design:** Comparisons of different makes of 12-inch and 14-inch wide wheelchairs. **Setting:** Primary school for children with disabilities in Kenya. **Participants:** Children with disabilities attending a boarding school in Kenya who require wheelchairs were recruited. Twenty-seven were involved in physiological assessments, and 26 in clinical assessments of 12-inch wide chair use; and 28 involved in physiological assessments in use of 14-inch wide chairs. **Interventions:** Single subject design allowed direct comparisons of different wheelchairs. **Outcome measures:** Physiological and participatory outcome measures allowed feedback to be provided to manufacturers of wheelchairs. **Results:** Physiological advantages were seen in wheelchairs with solid tires. Opportunities for improvement were identified for all wheelchairs, and collaboration between national and international wheelchair manufacturers was facilitated. During the course of the project, therapists in Kenya received training in wheelchair prescription and skills training. Suggestions for

improvements were fed back to participating wheelchair manufacturers who expressed appreciation for such feedback. **Conclusions:** We conclude that such comparisons provide a practical and useful feedback loop that is required for ongoing continuous improvements in low-cost wheelchair design and use. **Trial Registration:** This trial is registered with the National Institute of Health NCT01530425. **Funding acknowledgement:** Donations by wheelchair manufacturers (Association of the Physically Disabled of Kenya, Joni and Friends, Hope Haven), LeTourneau University, Queen's University and BethanyKidS. **Key words:** wheelchairs; pediatric wheelchairs; guidelines.

A 07

DEFINING SUCCESS AND SATISFACTION WITH FUNCTIONAL ABILITIES AFTER UPPER LIMB AMPUTATION: A QUALITATIVE STUDY

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Context/Objective: Prior research has equated prosthesis non-use to failure in an upper extremity amputee (UEA). However, anecdotally, some amputees consider themselves successful, and more functional, without a prosthesis. Therefore, a better understanding of what makes an UEA successful is needed. **Design:** Participants were identified through a chart review from the outpatient amputee clinic at a tertiary care rehabilitation hospital in Ottawa, Canada. Adults ≥ 2 years since an acquired, unilateral, traumatic upper extremity amputation at the transradial, elbow disarticulation, or transhumeral level were invited to participate. Semi-structured interviews were conducted. Data was analyzed using modified grounded by three data analysts to achieve triangulation. **Setting:** Participants were recruited from a tertiary care outpatient amputee rehabilitation clinic in Ottawa, Canada. **Participants:** Twelve unilateral, traumatic UEAs. **Results:** Preliminary analysis indicates that acceptance, determination, and independence are keys to successful rehabilitation. Both prosthesis users and non-users identified themselves as functionally successful. Independence was highly valued, and was a motivating factor influencing determination. Using a prosthesis is a very individualized decision, playing a major role in function for some, but no role for others. **Conclusion:** Functional success involved acceptance of the amputation and the achievement of independence. The prosthesis enabled some to achieve success, but played no role for others. Therefore, previous definitions of successful UEA rehabilitation that require prosthetic use must be revisited. This new understanding of success should impact outcome measures for UEA rehabilitation programs, and services available to UEAs. **Funding acknowledgement:** Physicians' Services Incorporated Foundation, Resident Research Grant, March 2012, R12-09. **Key words:** amputees; personal satisfaction; qualitative research; rehabilitation; upper extremity.

A 08

SPIRITUAL CARE IN PATIENTS WITH SPINAL CORD INJURY DURING INPATIENT REHABILITATION – A QUALITATIVE STUDY

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Context/Objective: Spinal cord injury (SCI) is often a devastating, life-changing condition which brings about many changes with which patients must learn to cope. The literature has shown that patients with SCI use spiritual coping as a means of dealing with their illness, and medical professionals are encouraged to inquire and support its use as appropriate. However, literature is lacking in regards to the practical aspects of caring for patients spiritually. This study provides insight into how to practically provide spiritual care to patients with SCI during inpatient rehabilitation. **Design, setting & participants:** Qualitative, semi-structured interviews were conducted with 10 participants

with SCI prior to being discharged from inpatient rehabilitation. The interviews were audio-recorded, transcribed verbatim and analyzed using a qualitative conventional content analysis methodology. *Results:* The participants' understanding of spirituality varied greatly between individuals. However, many themes emerged in terms of providing care from a spiritual perspective. Spiritual care during the inpatient rehabilitation setting should be individualized to each patient. It should take into account their individual understandings of spirituality, their backgrounds, as well as the level of acceptance of their injuries and physical deficits. Patient autonomy is paramount when providing spiritual care. The importance of the relationship between the provider of spiritual care and the patient must also be recognized. Inpatient rehabilitation is a time of many changes for patients, and this must be taken into account when providing spiritual care. Ultimately, spiritual care is one tool to help provide hope and encouragement to patients during inpatient rehabilitation and should be utilized pragmatically for their benefit. *Conclusions:* Providing spiritual care during inpatient rehabilitation for patients with SCI must take into account the unique situations patients are in during this phase of their lives. No one spiritual intervention would be effective for all patients, and thus spiritual care must be tailored to each individual. *Key words:* adaptation; psychological; rehabilitation; spinal cord injuries; spirituality.

A 09

CONSISTENT AND PERSISTENT EFFICACY AND SAFETY OF REPEAT ONABOTULINUMTOXIN A DETRUSOR INJECTIONS IN PATIENTS WITH NEUROGENIC DETRUSOR OVERACTIVITY: A MULTICENTER, LONG-TERM STUDY

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Objective: To evaluate long-term efficacy/safety of repeat onabotulinumtoxin A injections in subjects with urinary incontinence (UI) due to neurogenic detrusor overactivity (NDO) who were inadequately managed with anticholinergics. *Design:* Multicenter, 3-year extension study. *Setting:* Urology and rehabilitation clinics or hospitals. *Participants:* Subjects with ≥ 14 UI episodes/week due to NDO who completed either of the phase 3 randomized, placebo-controlled trials (RCT) of onabotulinumtoxin A. *Interventions:* Repeat onabotulinumtoxin A 200 U or 300 U (same dose as RCT). Subjects who received placebo during the RCT received onabotulinumtoxin A here. *Outcome measures:* Change from study baseline (BL) in daily UI episodes (Week 6), volume/void, adverse events (AEs) and initiation of clean intermittent catheterization (CIC). Data were analyzed by onabotulinumtoxin A treatment cycle. *Results:* 387, 348, 283, 195, 108, 59, and 40 subjects received 1, 2, 3, 4, 5, 6, and 7 onabotulinumtoxin A treatments to date, respectively. Repeat onabotulinumtoxin A treatment consistently reduced the number of UI episodes/day; at week 6, mean changes from BL ranged from -3.1 to -4.4/day for onabotulinumtoxin A 200 U and -3.0 to -3.7/day for 300 U across treatment cycles 1–7. Volume/void doubled from ~150 mL at BL to ~300 mL across all cycles. Only 10 subjects discontinued due to AEs. Most common AEs were urinary tract infections and urinary retention. Risk of denovo CIC was 30.2%, 3.6%, and 4.9% in treatment cycles 1–3 and 0% in cycles 4–7. *Conclusions:* Consistent and persistent improvements in UI episodes and volume per void were observed, with no new safety signals, after repeat onabotulinumtoxin A treatment (up to 7 treatment cycles). *Trial Registration:* NCT00876447. Funded by Allergan.

A 10

A SURVEY OF RURAL AND URBAN FAMILY PHYSICIANS: ANALYSIS OF SPASTICITY HEALTH LITERACY AND AVAILABILITY OF APPROPRIATE SPASTICITY CARE

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Objective: Spasticity is a motor disorder that can negatively impact patient health. Spasticity often initially presents to family physicians, however physicians and allied healthcare providers with spasticity management expertise can manage it best. The purpose of this study was to quantify family physician spasticity health literacy, as well as compare spasticity resource availability between rural and urban areas to determine whether these factors are barriers to patients accessing higher-level spasticity care. *Design/Participants:* This study was a cross-sectional survey and a questionnaire was mailed to 500 rural and 500 urban Ontario family physicians. *Results:* Out of 1,000, 99 completed questionnaires were returned, 56 from rural and 43 from urban physicians. Only 23.7% of all respondents correctly identified the definition of spasticity, and only 49.0% felt adequately trained to recognize spasticity. There was a lack of consistency amongst respondents as to the treatment options most recommended for patients with focal, generalized, and refractory spasticity. Urban family physicians reported significantly higher availability of spasticity resources (support groups, occupational therapy, and physicians and surgeons with expertise in managing spasticity) while rural family physicians reported significantly higher problems with the availability of spasticity resources ($p < 0.05$). *Conclusions:* This study found that family physicians have low spasticity health literacy. Also, spasticity resource availability is significantly higher for urban family physicians than rural ones. Ultimately, these factors may present a barrier to many patients affected by spasticity accessing appropriate higher-level spasticity care. *Key words:* health services accessibility; muscle spasticity; professional competence; rural health; urban health.

A 11

ULTRASOUND GUIDED HYDRODISSECTION OF THE ROTATOR CUFF INTERVAL: INTRODUCTION OF A NOVEL TECHNIQUE IN THE TREATMENT OF PRIMARY ADHESIVE CAPSULITIS

H. Sangha

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Body: The pathological involvement of the coracohumeral ligament (CHL) in relation to the rotator cuff interval (RCI) appears to be a key component to the development of adhesive capsulitis. Surgical intervention for chronic dysfunction focuses on resection of these contracted structures of the RCI (1). More recently, attempts to hydro-rupture the capsule under fluoroscopy has been utilized but this method does not selectively expand the RCI, often leading to rupture at distant sites without necessarily separating contracted components or selectively targeting the pathologically involved region (2). Furthermore, recent evidence suggests preservation of the capsule via expansion is beneficial to induced capsular rupture (3). Finally, capsular distension is often poorly tolerated because of pain during the process as the entire shoulder is not anesthetized (2). In order to more specifically address the pathoanatomical changes of the involved region, a new technique to hydrodissect the contracted and adhered components of the RCI under real-time sonography is introduced. In this method, an attempt to provide separation of involved structures (in particular, the CHL from both the subscapularis and supraspinatus tendons, and long head of biceps) is presented. This technique allows for visualized separation of the CHL from these anterior shoulder structures of the RCI using an in-plane approach, and for the direct deposition of particulate steroid in between these structures. A discussion of promising initial results with respect to pain reduction, and increased ROM is presented through a case series. A call for further study comparing this technique against standard fluoroscopic distension (or for their potential complimentary roles), is made.

References:

1. Ozaki J, et al. Recalcitrant chronic adhesive capsulitis of the shoulder. Role of contracture of the coracohumeral ligament and rotator interval in pathogenesis and treatment. *J Bone Joint Surg Am* 1989; 71: 1511–1515.
2. Rizk TE, et al. Treatment of adhesive capsulitis (frozen shoulder) with arthrographic capsular distension and rupture. *Arch Phys Med Rehabil* 1994; 75: 803–807.
3. Kim K, et al. Capsule preservation improves short-term outcome of hydraulic distension in painful stiff shoulder. *J Orthop Res* 2011; 29: 1688–1694.

A 12

RE-THINKING POST-OPERATIVE NEUROPATHIES: A CASE OF POST-OPERATIVE BILATERAL ANTERIOR INTEROSSEOUS NERVE PALSIES

J. Trier, Gerald Wolff

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Context: The anterior interosseous nerve (AIN), a pure motor branch of the median nerve, typically innervates flexor pollicis longus (FPL), flexor digitorum profundus (FDP) to digits 2 and 3, and pronator quadratus (PQ). Several case reports of post-operative AIN palsy have been attributed to trauma, or direct compression of the AIN. Some have proposed that similar cases with no clear trauma may have an autoimmune or inflammatory mechanism, such as neuralgic amyotrophy (NA). **Findings:** A healthy 52-year-old female experienced a femur fracture from wakeboarding, for which she underwent internal fixation. There was no history of neck or upper extremity trauma. Post-operatively, she noted bilateral hand weakness. She had discomfort in her right forearm, and altered sensation in the right hand 3rd web space. Examination at 4 months revealed bilateral weakness of pronator teres (PT), PQ, FPL, and median FDP. Nerve conduction studies were within normal limits, except for a decreased median sensory response from digits 3 and 4. Needle electromyography revealed spontaneous activity in bilateral PT, right PQ, and bilateral FPL. No motor units were seen in AIN innervated muscles. **Conclusion/Clinical relevance:** Cases of post-operative AIN palsy have been attributed to trauma or compression of the AIN. However, the bilateral nature of this patient's AIN palsies argues against operative positioning as a cause. This case adds to the growing evidence supporting the theory that post-operative nerve palsies can be secondary to NA, and that post-operative NA may have a predilection for the AIN. **Key words:** brachial plexus neuritis; median nerve; muscle weakness; postoperative complications.

A 13

PREVALENCE OF ULNAR NEUROPATHY AT THE ELBOW AMONG WEIGHT LIFTERS: A PILOT STUDY

B. A. Selk¹, A. G. Linassi¹, D. Nickel¹, R. S. Li Pi Shan²

¹University of Saskatchewan, Department of Physical Medicine and Rehabilitation, Saskatoon City Hospital, ²University of Calgary, Division of Physical Medicine & Rehabilitation, Foothills Medical Centre

Objective: Sports-related nerve entrapment is an important known entity. This is the first study to describe the prevalence of electrodiagnostically confirmed ulnar neuropathy at the elbow in weight lifters. **Design:** Cross-sectional descriptive study. **Setting:** Fitness facility. **Participants:** Twenty-seven persons using a fitness facility. **Outcome measures:** Questionnaire, which included the Ulnar Neuropathy at the Elbow Questionnaire (UNEQ); physical exam; and electrodiagnostic testing. **Results:** 11.1% (3/27) of study participants who engage in regular weight lifting activities were found to have ulnar neuropathy at the elbow on neuroelectrophysiological testing. There was no significant correlation between age, years of weightlifting, frequency of arm exercises per week, duration of exercise session, and UNEQ score with electrodiagnostically confirmed UNE. There was a non-

significant ($p=0.069$) correlation between exam findings of UNE and electrodiagnostically confirmed UNE. **Conclusion:** The prevalence of ulnar neuropathy at the elbow in weight lifters was estimated to be 11.1%. **Key words:** electromyography; exercise; ulnar nerve compression syndromes; weight lifting.

A 14

EFFECTIVENESS OF A ONE-DAY, HANDS-ON WORKSHOP USING CADAVERS IN ACQUISITION OF KNOWLEDGE AND SKILL OF ULTRASOUND-GUIDED MUSCULOSKELETAL INTERVENTIONS

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Objective: Musculoskeletal (MSK) ultrasonography is becoming more widely used for office-based injections as it provides direct visualization of soft tissues and real-time needle advancement. Thus, ultrasound (US) education is becoming increasingly important to physiatrists and innovative training methods are being designed and implemented. This study aims to evaluate the effectiveness of a one-day, hands-on workshop using cadavers to learn US-guided MSK injections. **Methods:** A pre- and post-survey study was conducted targeting physiatry staff and residents attending CAPMR who had enrolled in an additional one-day US-guided MSK interventions workshop. The course consisted of introductory didactic teaching followed by expert-led, hands-on injection stations in the anatomy lab. Participants completed surveys documenting their comfort level, intention to use, and knowledge level before and immediately after the course. **Results:** 36 participants and 21 participants completed the pre- and post-surveys, respectively. Pre-workshop, 3.4% of participants stated they were at least adequately comfortable in using US for MSK injections, whereas 40% were after the course ($p=0.0019$). 41.5% of participants had some or high intentions of using US for MSK injections in the pre-survey compared to 45.3% in the post-survey. Prior to the workshop, 74% of participants correctly answered the knowledge-based questions versus 82.8% after the course. **Conclusion:** This study suggests that a one-day, hands-on course can increase comfort level but may not significantly improve skill acquisition in using US for MSK injections. Participants reported that their learning goals were addressed, but that they would benefit from smaller groups and more hands-on training time. **Key words:** interventions; musculoskeletal; teaching; ultrasound.

A 15

REHABILITATION OF BI-BRACHIAL NEURITIS AND BILATERAL RADIAL NERVE PALSIA IN HEREDITARY NEUROPATHY: AN ILLUSTRATIVE CASE

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Background: Hereditary neuropathy with liability to pressure palsies (HNPP) is an uncommon autosomal dominant demyelinating polyneuropathy. The condition is characterized by episodic focal compressive neuropathies which may result in significant impairment and disability. Symptoms generally improve with time and rehabilitation. **Objective:** To highlight the clinical and electrodiagnostic features of HNPP and to discuss rehabilitation management strategies for bilateral radial nerve palsy in a case of HNPP. **Case:** A 54-year-old female with known HNPP presented with acute onset of bilateral brachial neuritis causing hand intrinsic dysfunction,

radial nerve palsies, upper extremity sensory loss, and neuropathic pain. The bilateral upper limb neuropathic pain and hand intrinsic function improved but the severe bilateral radial nerve palsies persisted, causing functional limitations in dressing and performing pericare. Electrophysiological findings confirmed a diffuse sensory motor demyelinating polyneuropathy and superimposed focal radial nerve deficits, with conduction block localized to the spiral groove. Several therapeutic techniques enabled the patient to regain functional independence over a two-month period, particularly the use of custom-made dynamic low-profile radial splints. **Conclusion:** This case illustrates key clinical and electrodiagnostic features of HNPP and the impairments resulting from severe radial neuropathy in a patient with HNPP. The management (both non-operative and surgical) of bilateral radial neuropathies in HNPP presents unique challenges and this case highlights several rehabilitation strategies that helped to maximize outcome. **Key words:** dynamic wrist-hand orthoses; hereditary motor and sensory neuropathy; hereditary neuropathy with liability to pressure palsy; radial neuropathy.

A 16

RELATIONSHIP BETWEEN ANXIETY AND ANTICIPATION OF BOTULINUM TOXIN TYPE A INJECTIONS

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Objective: To investigate if anticipation of botulinum toxin type A injections induces anxiety, the prevalence of anxiety, and if anxiety is related to previous exposure to injections in patients visiting a spasticity clinic. **Design:** Non-randomized pre-post clinical trial. **Setting:** Outpatient spasticity clinic. **Participants:** In total, 40 patients with spasticity from any type of neurological lesion were recruited. **Interventions:** Beck anxiety inventory (BAI), blood pressure, heart rate and medication list were monitored at 2 time points (spaced 2–4 weeks): (1) the botulinum injection visit and (2) the control follow-up visit without an injection. **Outcome measures:** BAI. **Results:** Data was collected in 30 patients at both time points. Sub-group of patients with total BAI scores of 8 or more (indicating mild-to-moderate anxiety; $n=11$) demonstrated significantly lower anxiety in the control condition than in the botulinum injection condition (57% lower; $p<0.05$). Out of 40 patients, 33% patients experienced botulinum injection anticipation related mild-to-moderate anxiety (10% moderate anxiety; 23% mild anxiety). There was no correlation between botulinum injection cycles and anxiety. No association was found between anxiety, blood pressure, and heart rate. **Conclusion:** Although mild-to-moderate in range, anxiety prevalence of 33% induced by the anticipation of botulinum injections suggests a need for either pharmacological or environmental measures to lower anxiety levels in spasticity clinics. **Funding acknowledgement:** This project did not receive any external funding. Salary support (CP) provided through the West Park Foundation. Three of the authors (CB, FI, and CP) have received a grant from Allergan Inc. Canada to conduct a study not related to the current manuscript. **Key words:** botulinum toxin; muscle spasticity; anxiety; injection.

A 17

THE EVOLUTION OF THE ACQUIRED BRAIN INJURY REHABILITATION LITERATURE

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Objective: To examine the evolution of the acquired brain injury rehabilitation literature with respect to number, sample size, and quality of randomized control trials (RCTs) from 1980 to October 2012. **Methods:** Using the Acquired Brain Injury Evidence-Based Review (ERABI; www.abiebr.com) database, all RCTs in acquired brain injury rehabilitation were selected for inclusion. Data on author(s), year of publication, sample size, and Physiotherapy Evidence Database (PEDro) score was compiled. Statistical analyses were conducted using GraphPad Prism (V6.01). **Results:** 148 RCTs were included with a total sample size of 7,366 subjects and a mean sample size per study of 50.1±109.9 subjects. Despite that mean sample sizes fluctuated 1980 and 2012 with no overall increase, the number of RCTs in the published ABI literature grew at an average linear rate of 31.7% during this time. The overall mean PEDro score was 5.8±1.7, increasing from 4.6±2.5 in 1983–1988 to 6.4±1.7 in 2008–2012; the majority of studies (48.0%) were rated as fair methodological quality. 62.8% of studies were published by American authors, followed by Australian authors (7.4%). **Conclusions:** The number and quality of RCTs in ABI rehabilitation has been increasing over the past three decades. Overall, study quality was fair. **Key words:** acquired brain injury; evolution; randomized controlled trials; rehabilitation.

A 18

TONING IT DOWN – CANADIAN CONSENSUS ON OUTCOME MEASURES FOLLOWING SPASTICITY INTERVENTIONS

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Objective: To develop a standardized set of clinically useful outcome measures for the assessment of adults receiving treatment for spasticity. **Design:** A 3-round electronic modified Delphi process was used. Round 1 was designed to determine common areas of treatment focus as well as outcome measures being used currently. In Round 2, a comprehensive review of potential measures which met pre-set criteria was presented to participants, who then picked tools they believed to be the “best” in each area, within the ICF framework. Consensus was achieved if there was 75% agreement among participants. In Round 3, participants were asked to rate outcome measures based on feasibility, ability to capture change and usefulness of information gained for areas where consensus could not be achieved. **Participants:** 32 clinicians from centres across Canada involved in spasticity management. **Results:** Of 43 outcome measures identified initially, 11 were selected. Tools related to body structure and function included the Modified Tardieu Scale, Visual Analog Scale for pain, Manual muscle testing, Penn Spasm Frequency Scale and Goniometry. Activity level measures included the Berg Balance Scale, Goal Attainment Scaling (GAS), Timed Up and Go test and the FIM. The Modified Caregiver Strain Index was selected for the assessment of caregiver burden, while GAS was selected as the best tool for participation level outcomes. **Conclusion:** These outcome measures will be useful to clinicians involved in spasticity management across Canada and will assist with better documentation and standardization of assessment practices.

A 19

REHABILITATING THE JOURNAL CLUB: A REVIEW OF JOURNAL CLUB IN PHYSICAL MEDICINE AND REHABILITATION

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Background: Journal clubs exist in most Physical Medicine & Rehabilitation training programs and are recommended by the Royal

College of Physicians and Surgeons of Canada as a valuable aspect of the academic curriculum. There has been no consensus on how to best conduct a journal club. *Method:* A systematic review of the literature was undertaken to determine the most effective elements integral to conducting a successful journal club in Physical Medicine & Rehabilitation (PM&R) and in other medical subspecialties. *Results:* We reviewed both the information published on PM&R journal clubs and other subspecialties. We found only one article that specifically discusses journal clubs in PM&R, a survey of chief residents published in 1995 (Moberg-Wolff, et al). Our own journal club was primarily focused on critically appraising journal articles. In doing this review, we discovered that chief residents in PM&R rate *disseminating information* as their most important goal, *impacting clinical practice* as their second ranked priority, and *teaching critical appraisal skills* as a distant third. *Conclusions:* An organized journal club should have clearly-stated goals to ensure that it is a more comprehensive and valuable exercise for both residents and faculty. The main goals should be to disseminate information from the current literature, with a focus on evidence-based medicine, and to teach critical appraisal skills to residents. We hope that the information summarized will assist our colleagues in PM&R residency programs to conduct a more productive journal club. *Key words:* education; internship and residency; journal article; peer review; physical and rehabilitation medicine.

A 20

DO CANADIAN SPORT AND EXERCISE FOCUSED PHYSIATRISTS AND EMERGENCY PHYSICIANS GIVEN CONSISTENT SPORT-RELATED CONCUSSION MANAGEMENT ADVICE?

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Objective: Identify differences and gaps in the recommendations given by physiatrists and emergency physicians (EMs) for the management of sport-related concussion (SRC). *Design:* A 19-question self-administered internet-based validated survey. *Participants:* 147/354 (41.5%) physicians with diplomas of the Canadian Academy of Sport and Exercise Medicine (CASEM-MDs) and 158/739 (21.4%) physicians on the Canadian Association of Emergency Physicians database responded to the survey. The CASEM-MDs included 44 EMs who are also CASEM diploma holders. 7/103 (6.8%) non-EM CASEM-MDs are physiatrists. We compared these physiatrists with non-CASEM EMs. *Results:* Physiatrists are more likely to find the Zurich 2008 guidelines very or extremely useful ($p=0.0165$). 54% of EMs are not aware of any guidelines or are only aware of the 2005 guidelines. 4/7 physiatrists always use the SCAT2, compared with 65.3% of EMs who never use it. Physiatrists are less likely to prescribe NSAIDs ($p=0.0117$) or other non-narcotic analgesics ($p=0.0310$). However, physiatrists are more likely to prescribe massage/chiropractic therapy ($p=0.0104$) or neurovestibular rehabilitation ($p=0.0051$). 7/7 physiatrists always prescribe cognitive and physical rest, compared with 58.8% of EMs. *Conclusions:* There is a lack of consistency in the recommendations provided to patients following SRC. Existing knowledge translation strategies have not been successful in informing Canadian EMs of current best practices. Training in traumatic brain injury provides physiatrists with a thorough understanding of neurorecovery. As rehabilitation specialists, physiatrists are skilled at applying the concepts of return-to-learn and return-to-play. C is an ideal area for physiatrists to become involved in continuing medical education for physicians across Canada. *Key words:* brain concussion; continuing medical education.

A 21

SECONDARY TREATMENT FAILURE AS A RESULT OF NEUTRALIZING ANTIBODY FORMATION AGAINST BOTULINUM TOXIN: A CASE REPORT

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Context: Botulinum toxin (BTX) is a valuable tool in the management of spasticity. The effect typically lasts several months with patients requiring repeated injections to maintain the benefit. BTX is a foreign antigen against which the immune system can form antibodies. The risk increases with repeated administration and antibodies can result in treatment failure. Botox® was reformulated to lower the total protein load and Xeomin® is free of complexing proteins thus theoretically reducing the risk of immunogenicity. Antibody formation has since been thought of as a rare occurrence with little clinical significance. *Findings:* We present the case of a 49-year-old female treated with Botox® for spasticity following hemorrhagic stroke. She responded favourably to 5 treatments over 22 months and then became a secondary non-responder. Resistance was suspected when she failed a trial of Xeomin® and showed no response to an increased dose of Botox® or to unilateral facial injection with Botox®. Electrodiagnostic studies of the peroneal nerve and extensor digitorum brevis (EDB) showed no reduction in compound motor action potential amplitude following Botox® and Xeomin® injection. Resistance was confirmed on positive serum antibody testing. *Conclusions:* Despite new formulations, the development of antibodies causing secondary treatment failure continues to be an important clinical consideration. Bedside electrodiagnostic studies of EDB can help identify likely cases of resistance. Patients who develop resistance against one BTX-A preparation are unlikely to respond to other preparations of the same serotype. A stepwise approach to secondary non-responders, the diagnosis of resistance, and other treatment options is explored. *Key words:* antibodies; botulinum toxins; muscle spasticity.

A 22

MEASUREMENT OF COGNITIVE AND FUNCTIONAL IMPAIRMENTS IN PERSONS WITH MALIGNANT GLIOMAS: A PROSPECTIVE MIXED METHODS STUDY

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Objective: To investigate changes in cognitive and functional abilities in patients with newly diagnosed malignant glioma. *Design:* Prospective, mixed-method. *Setting:* Vancouver and Fraser Valley Cancer Agency. *Participants:* English-speaking adults with newly diagnosed malignant glioma (grade 3 or 4) with Karnofsky Performance Scale score ≥ 70 , who are receiving chemotherapy and radiation. *Interventions:* Subjects and caregivers completed quantitative measures of activity and cognitive function for up to 12 months post recruitment. Semi-structured interviews were done at 2 time points. These were coded and analyzed to identify key descriptive themes. *Quantitative Outcome measures:* Functional Assessment of Cancer Therapy – Brain (FACT-Br) v.3; Montréal Cognitive Assessment (MoCA), British Columbia Activity Checklist (BC-ACL). *Results:* Forty-one patients were recruited. Ten died and 5 deteriorated or were lost to follow-up. Over half of participants showed impairment on the MoCA at baseline. There were no significant changes in the MoCA and BC-ACL at 6 months, and no change in the FACT-Br at 12 months follow-up. Three descriptive themes emerged from interviews: loss of memory and adaptation; challenges with communication, comprehension, and confusion; and difficulty with

executive function. Responses indicated significant impairment at both baseline and 6 months in each of these categories. *Conclusion:* More than half of the high grade glioma subjects already show cognitive decline prior to radiation therapy. Their cognitive and physical functioning remained stable for up to 6–12 months post-diagnosis. However, the patients perceived cognitive change and used compensatory strategies to combat decline in memory and executive function. This mixed methods study provided richer understanding of the impact of glioma and its treatment on patient cognition and function. *Funding acknowledgement:* Brain Tumour Foundation of Canada; Hershey & Yvette Porte Neuro-oncology Endowment Fund; UBC Northern Medical Programs Seed Grant. *Key words:* malignant brain tumour; glioma; function; cognition.

A 23

FACTORS ASSOCIATED WITH RETURN-TO-WORK FOLLOWING WORK-RELATED UPPER EXTREMITY INJURIES

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Objective: Sick leave following workplace upper extremity injury is a major challenge as it is costly and negatively impacts workplace productivity. The purpose of this study was to find patient level predictors that are associated with return-to-work (RTW). *Design:* Retrospective cohort study. *Setting:* A multidisciplinary upper extremity treatment program in Ontario, Canada. *Participants:* The study included 224 injured workers discharged between January 2010 and December 2011 with 62% being male at a mean age of 48 years. *Outcome measures:* Relevant covariates, including demographic data, time from injury and functional scores were recorded. Our primary outcome, RTW, was assessed at 3 months follow-up. Bivariate analyses and logistic regression were used to identify those factors associated with a successful RTW. *Results:* For the 132 patients who were not working at intake, 47 (36%) were able to RTW 3 months post-treatment. Bivariate analyses revealed that female gender, younger age, higher education, lower intake PCS, *QuickDASH* and numerical pain scores, lack of depression, and use of RTW coordination services were significantly associated with a successful RTW outcome at 3 months post-treatment ($p < 0.05$). Logistic regression revealed that gender, education, intake PCS and *QuickDASH* scores and depression were significant predictors of RTW ($p < 0.05$). *Conclusion:* Pain and depression are both factors that are associated with RTW following workplace upper extremity injury. Additionally, RTW coordinators play an important role in improving work outcomes. Based on this, an interdisciplinary approach that views the patient holistically should be implemented when treating this population. *Key words:* return to work; vocational rehabilitation; upper extremity; pain.

A 24

SHOULDER MUSCLES ACTIVITY DURING RESISTANCE TRAINING EXERCISES OF THE IPSILATERAL UPPER LIMB WHILE WEARING A SHOULDER ORTHOSIS: AN EMG STUDY

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Objective: Strength training is usually postponed to 3 months after rotator cuff surgery to prevent the damaging effect of high muscle stress on repaired tendon. However non-injured muscles would also be affected by long term inactivity. There is insufficient evidence to support that resistance training with minimal loads can really affect the repair integrity by highly activating the rotator cuff muscles. The aim of this study was to quantify the effect of resistance exercises on

the muscle activity of a semi-immobilized shoulder. *Design:* Fifteen shoulder muscles of the dominant limb of 14 healthy subjects were evaluated using electromyography with 11 surface electrodes and 4 fine wire electrodes in the rotator cuff muscles. Whilst wearing an orthosis the subjects completed resistance tests including: elbow and wrist flexions with 3 loads, maximal squeezing and shoulder adduction against 3 foams with different stiffness. The peak activity of each muscle was normalized to maximal voluntary contraction (%MVC) and averaged across the subjects. *Results:* Shoulder muscles were activated less than 20%MVC during elbow and wrist flexions with 2 and 4 lbs loads. In maximal squeezing test rotator cuff activity increased significantly and in some cases exceeded 20%MVC. With all 3 foams during shoulder adduction tests, subscapularis, latissimus dorsi, triceps and pectoralis major had the highest activation level, which surpass 20%MVC, while supraspinatus and infraspinatus were minimally activated. *Conclusion:* Some resistance training exercises can minimally activate the rotator cuff muscles while may prevent the negative side-effects of muscle disuse on other upper limb musculature. *Funding acknowledgement:* Natural Sciences and Engineering Research Council of Canada (NSERC) Collaborative Research and Development Grant, Laboratoire Orthopédique Médicus. *Key words:* electromyography; orthosis; resistance training; rotator cuff; shoulder.

A 25

REVIEWING THE REVIEWS: HOW USEFUL IS THE RESEARCH IN HELPING GUIDE MANAGEMENT OF MUSCULOSKELETAL IMPAIRMENTS

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Introduction: The Cochrane Library has long been a respected site for the publication of systematic reviews and meta-analyses. One criticism of its reviews has been the frequency of inconclusive results and their lack of clinical direction especially pertaining to the management of musculoskeletal impairments. This study attempted to quantify whether this criticism was valid. *Methods:* Using the Cochrane Library online database a search was performed to identify reviews involving the “Knee” or “Shoulder”. Conclusions for reviews pertaining to non-surgical management of musculoskeletal ailments were then categorized as either being “Positive” (in support of the intervention), “Negative”, or “Inconclusive”. *Results:* A total of 170 reviews were initially identified (85 for the knee, 85 for the shoulder). Of these, 38 reviews meet our inclusion criteria related to the knee, and 29 for the shoulder. Five of these reviews overlapped. Overall, 50% had a positive conclusion, 13% a negative conclusion and 37% were inconclusive. *Conclusion:* A large proportion of the current Cochrane reviews of MSK treatments are inconclusive and do not provide useful clinical information to physicians. Fittingly, the conclusion of this study is that there is a need for more clinically-oriented online resources to synthesize the research data in a way that better guides clinicians management of MSK impairments. *Key words:* musculoskeletal; reviews; knee; shoulder.

A 26

A NOVEL MANNER OF STRATIFYING NSTEMI PATIENTS PRIOR TO BEGINNING CARDIAC REHABILITATION

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Objective: To select Non ST elevation MI (NSTEMI) patients for cardiac rehabilitation phase 1 program based on Global Registry of

Acute Coronary Events (GRACE) score. *Participants:* Case series of 198 patients aged 36–76 who received cardiac rehabilitation. *Methods:* Based on the analysis of GRACE score data, an algorithm for commencing a rehabilitation program was determined and patients were divided into 3 groups: low risk group with normal creatinine and Killip class I (no CHF), intermediate risk group with mild elevation of creatinine and Killip class II (rales or /and JVD), and high risk group with significant elevation of creatinine and Killip class III–IV (pulmonary edema and cardiogenic shock). The high risk group underwent coronary angiography followed by percutaneous coronary intervention before starting rehabilitation. Cardiac rehabilitation included the 14 step Dr. Wenger protocol. *Results:* By treating high risk NSTEMI patients based on a simple non-invasive screening GRACE score, we created a safe cardiac rehabilitation program. This strategy estimates when to start rehabilitation for the high risk group after coronary angiography and percutaneous coronary intervention. Considerable improvement of creatinine level and CHF was present ($p < 0.05$) in high risk patients groups at the time of discharge from rehabilitation. *Conclusion:* Detailed selection for cardiac rehabilitation phase 1 according to the GRACE score reduces post-MI risk and mortality in NSTEMI patients. *Key words:* cardiac rehabilitation; GRACE score; NSTEMI.

A 27

DRIVING FOLLOWING ACUTE LOWER LIMB PAINFUL EVENTS: A REVIEW

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Objective: Orthopedic procedures or injuries can temporarily prevent patients from driving. These restrictions have significant financial, medico-legal and legal implications on the patient, physician and society. We review the current guidelines and clinical studies available for acute lower limb painful events including total hip arthroplasty (THA) and total knee arthroplasty (TKA), knee arthroscopy, anterior cruciate ligament (ACL) reconstruction and lower extremity fractures. *Methods:* A literature search was performed on PubMed with the keywords 'driving', 'automobile', 'guidelines', 'hip', 'knee', 'ankle', 'foot', 'surgery', 'replacement', 'arthroplasty', 'fracture', and 'immobilization'. Studies from reference lists were also reviewed. Two authors assessed the relevant studies. *Results:* Our review found the following range of driving restrictions: Post-THA: 4 to 8 weeks. Post-TKA: no driving abstinence to 6 weeks for left-sided procedures; 2 to 8 weeks for right-sided procedures. Post-knee arthroscopy: 1 week. Post-ACL reconstruction: 2 weeks for left-sided procedures; 4 to 6 weeks for right-sided procedures. Post-lower extremity fractures: there is general consensus that patients requiring immobilization should not be allowed to drive until they are pain-free and have full function of their limb. There is divided opinion as to whether or not left-sided immobilization should prevent patients from driving automatic vehicles. Post-right ankle fractures: 4 to 9 weeks. *Conclusion:* There is limited evidence available to guide clinicians in deciding when patients may safely resume driving following acute lower limb events. Further studies are needed that measure parameters other than brake response time, have more frequent follow-up assessments and separately test right and left-sided procedures. *Key words:* automobile; driving; fracture, immobilization; surgery.

A 28

EXAMINING UNMET HEALTH AND SERVICE NEEDS OF PERSONS LIVING WITH SPINAL CORD INJURY AFTER HOSPITAL DISCHARGE IN SASKATCHEWAN: PRELIMINARY RESULTS OF A MIXED-METHODS STUDY

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Objective: To identify unmet health and service needs of those with traumatic spinal cord injury (tSCI) living in Saskatchewan. *Design:* Mixed methods. *Setting:* Saskatchewan, Canada. *Participants:* Adults with tSCI living in the community were invited to participate in the National SCI Community Survey and, separately, in a qualitative interview. Seventy-four completed the online survey. Sixteen completed the interview. *Interventions:* Not applicable. *Outcome measures:* Both the survey and interview examined day-to-day challenges with tSCI and healthcare experiences since initial discharge from hospital. *Results:* Of the participants who completed the survey, average age was 45.8 years, 51 were male, and most lived in an urban setting in their own home. Commonly reported unmet needs included SCI-specialized healthcare, long distance transportation, and income support. One in four (27%) reported needing health care in the past 12 months but not receiving it. Top reasons for not receiving care included the service not being available at the time, long wait times, and belief that the care received would be inadequate. Themes from the qualitative interviews revealed negative experiences in negotiating bureaucracy, limited choices in equipment, wellness programs, and self-management resources. Positive experiences within healthcare were reported when participants felt listened to and when provided with choice and whole person care. Additionally, participants believe they must become an expert in their own care in order to address gaps in the health and service community systems. *Conclusion:* People living with tSCI in Saskatchewan experience unmet needs in their healthcare and service delivery that can be potentially addressed. *Key words:* spinal cord trauma; healthcare delivery; quantitative research; qualitative research; physical medicine and rehabilitation.

A 29

FALLS IN PERSONS WITH AMPUTATIONS LIVING IN THE COMMUNITY – A DESCRIPTIVE STUDY

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Objective: To determine the prevalence and causes of falls events amongst people living in the community with lower extremity amputations. *Design:* Descriptive study. *Setting:* Community and outpatient based amputee service. *Participants:* Identified from an existing clinical data base and through attendance at a weekly interdisciplinary amputee service. *Main outcome measure(s):* Newly developed Saskatchewan Amputee Falls Evaluation Tool (SAFE-T), number of falls, etiology and location, falls requiring medical intervention, prevention strategies. *Results:* There were 55 study participants; 44 met exclusion criteria; 12 females (37.5%), 32 males (62.5%). 33 reported falling (75%) f=9/12 (75%), m=24 (75%). 67% fell in the first two years post amputation. Of the patients who had fallen, 42% required medical attention ranging in severity from minor trauma to surgical repair of wound dehiscence. 53% fell inside the home and 19% reported >20 falls. Those with highest fall rates wore their prosthesis greater than 12 h/day. Highest incidence of falls occurs in the home due to phantom limb sensation in the first two years then primarily loss of balance beyond that. Those who had undergone a home assessment reported no falls. *Conclusions:* A high percentage of people living in the community with an amputation have experienced a fall. They can result in significant morbidity and affect amputee rehabilitation outcomes. Early home inspection is associated with a reduction in the frequency of falls. *Key words:* amputation; falls accidental; physical medicine and rehabilitation; cross-sectional survey.

A 30

ASSESSMENT OF WORKPLACE BURNOUT AMONG HEALTHCARE PROVIDERS IN A REHABILITATION UNIT – A CROSS SECTIONAL SURVEY

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Objective: To determine if workplace burnout exists amongst clinical service providers in a multidisciplinary rehabilitation inpatient unit. **Design:** Cross sectional survey. **Setting:** Hospital-based publicly funded tertiary referral in-patient rehabilitation unit. **Participants:** Anonymous volunteer sample of 39 health care providers representing multiple rehabilitation disciplines. **Main outcome measures:** Emotional exhaustion, depersonalization, and lack of accomplishment measures from the Maslach Human Services questionnaire. **Results:** 39/60 (65%) responded. For the emotional exhaustion subscale, 54% of participants' (n=21) scores fell in the "High" category. For the depersonalization subscale, 21% of participants' (n=9) scores fell in the "High" category. For the personal accomplishment subscale, 49% of participants' (n=19) scores fell in the "High" category, and 21% (n=8) fell in the "Low" category. **Conclusion:** Emotion exhaustion is reported as a concern amongst this cohort of rehabilitation health care workers. Other aspects of burnout such as depersonalization and personal accomplishment were present but within normal ranges. **Key words:** burnout professional; physical medicine and rehabilitation; cross sectional survey.

A 31

USE OF CALCITONIN IN RECALCITRANT PHANTOM LIMB PAIN COMPLICATED BY HETEROTOPIC OSSIFICATION

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Context: A 72 year-old man with a traumatic left transradial amputation after a failed salvage attempt and significant residual phantom-limb-pain (PLP). The PLP involved the lateral 3 digits of the phantom hand presumed to be in a median nerve distribution. The PLP did not respond to non-pharmacological management and medication options were limited by side effects to some common agents and lack of response to others. Also, he strongly desired to avoid long-term medication options. Investigations demonstrated heterotopic ossification (HO), a finding of disputed frequency in the adult population. The HO was localized to, if not enveloping the median nerve. With the presence of HO, persistent PLP and the patient's request to avoid long-term medication management we turned to the literature to find one agent to meet the patient's needs and manage his symptoms. **Findings:** There is limited evidence for the medical management of PLP. We reviewed the suggested biochemical role nerve injury plays in HO formation and PLP development as well as the proposed mechanism of action of calcitonin to address HO and PLP at multiple stages of disease development and maintenance. The review resulted in a successful 4-week trial of intranasal calcitonin. **Conclusion/Clinical relevance:** This case exemplifies how respecting a patients autonomy regarding medical management provided an opportunity to better understand the disease process and explore alternative treatments. **Key words:** adult upper limb amputation; post-traumatic; phantom limb pain; heterotopic ossification; calcitonin.

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INTRATHECAL BACLOFEN THERAPY AND ACCURACY OF MEDTRONIC SYNCHROMED II PUMP: A CHART REVIEW

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Objective: To assess the accuracy, reliability and safety of intrathecal baclofen therapy (ITB) in subjects with implantable Medtronic SynchroMed II pumps. **Methods:** This is a retrospective chart review of 6 subjects followed by the ITB Pump program at Health Sciences Centre, Winnipeg, MB. **Data collection:** The data used for this study was collected from the private charts of the two physicians involved in the care of the subjects. Subjects were followed ranging from 1998 to 2012 for conditions involving severe spasticity such as spinal cord injury (SCI), multiple sclerosis (MS), and hereditary spastic paraparesis. The rate of delivery of baclofen was calculated at each refill follow-up appointment. **Outcome measures:** The primary outcome measures were: 1) accuracy of the pump (calculated at each refill) 2) long-term reliability of the pump (assessed by ability of the pump to maintain its accuracy over a long duration of time) and 3) safety of the pump (evaluated by tracking any complications). **Results:** The number of refills ranged from 12 to 33 per pump to a total of 121 refills. The accuracy of the pump ranged from 97–101% (mean= 99%). Over subsequent refills from the initial implant the accuracy did not vary significantly and the pumps maintained good reliability. There were no primary pump associated complications in any of the subjects. **Conclusion:** The Medtronic SynchroMed II intrathecal baclofen pump is an accurate, reliable and safe device for patients requiring intrathecal baclofen. **Key words:** baclofen; muscle spasticity; spinal cord injury.

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FRAGILITY FRACTURES AND OSTEOPENIA IN GUILLAIN-BARRE SYNDROME (GBS): CASE REPORT

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Context: Prolonged immobilization following spinal cord injury and stroke is a well established risk factor for osteoporosis. However, there are no studies showing development of the same following a chronic course of Guillain-Barre Syndrome (GBS). **Case:** A 72-year-old woman presented with rapidly progressive muscle weakness following a diarrheal illness. Her initial examination revealed areflexic paralysis in both upper and lower extremities. Electrodiagnostic studies diagnosed an acute motor axonal neuropathy (AMAN)-variant GBS. After undergoing rehabilitation for a year her motor recovery was extremely slow and believed to have plateaued. Sixteen months after the initial presentation, she developed fractures of the left 4th, 5th and 6th ribs following a bed transfer. One week later, she lost her balance during a sliding board transfer with the fall braced by a therapist. Imaging studies diagnosed a left proximal tibial metaphysis and medial malleolar fracture. Prior to these she did not have a baseline bone mineral density scan nor was on any medications for osteoporosis. She was started on calcium, vitamin D and bisphosphonates following the fragility fractures. **Conclusion:** The patient developed diffuse osteopenia and multiple fragility fractures after a 16-month course of an AMAN variant of GBS, which led to significant challenges in her rehabilitation and may have been prevented if she was on prophylactic treatment for osteoporosis. While GBS has a variable course and would conventionally not mandate the need of osteoporosis treatment; the chronic variants are at higher risk and should be considered for early osteoporosis screening and prevention. **Key words:** osteoporosis; bone disease; metabolic; Guillain-Barre syndrome.

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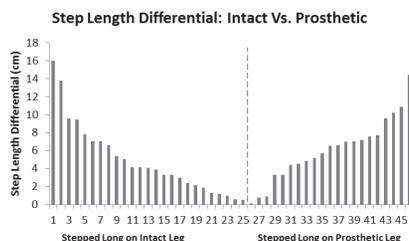
THE EFFECT OF THROMBOLYSIS ON PROGRESS THROUGH INPATIENT REHABILITATION AFTER STROKE: A COST COMPARISONM. Richardson¹, M. Meyer^{1,3}, R. Teasell^{1,2,3}¹Lawson Health Research Institute, ²Department of Physical Medicine and Rehabilitation, St. Joseph's Health Care, ³Schulich School of Medicine, University of Western Ontario, London Ontario

Context: Tissue plasminogen activator (tPA) has been found to significantly improve patient outcomes post stroke. Patients who receive tPA are less likely to be discharged to inpatient rehabilitation and those who do enter inpatient rehabilitation have been found to experience shorter lengths of stay. The cost effectiveness of tPA has been demonstrated previously; however, these studies have not accounted for shorter lengths of stay in inpatient rehabilitation. **Objective:** Given the high cost of inpatient rehabilitation, our objective was to estimate the potential cost savings associated with a decreased length of stay in inpatient rehabilitation for patients who receive tPA compared to those who do not. **Methods:** Mean decrease in length of stay in inpatient rehabilitation for patients who received tPA compared to controls was found in a population of patients admitted to hospital with an ischemic stroke in Ontario between July 1, 2003 and March 31, 2008. Average per diem cost estimates for inpatient rehabilitation were found in the published literature. Sensitivity analyses varying length of stay and per diem cost estimates were performed. **Results:** A patient who receives tPA costs \$885.34 less during inpatient rehabilitation on average compared to a clinically similar control who does not receive tPA. Potential cost savings range from \$172.42 to \$2,950.91 per patient on average. **Conclusions:** Future economic evaluations of tPA should consider adjusting for shortened length of stay in inpatient rehabilitation for patients who receive tPA compared to clinically similar controls who do not receive tPA. **Funding acknowledgements:** Ontario Stroke Network. **Key words:** health economics; rehabilitation; stroke; thrombolysis.

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INTERIM RESULTS OF A STUDY TO DEVELOP A NORMATIVE SPATIOTEMPORAL GAIT DATABASE FOR PATIENTS WITH UNILATERAL, TRANSTIBIAL AMPUTATIONT. Pauley¹, M. Devlin², R. Paner¹¹Nathan Clinical Research Institute, West Park Healthcare Centre, Toronto, ²West Park Healthcare Centre, Toronto, Division of Psychiatry, Department of Medicine, University of Toronto, Toronto

Objective: To develop a normative spatiotemporal gait database for patients with unilateral, transtibial amputation (TTA). **Design:** Observational. **Setting:** West Park Healthcare Centre. **Participants:** 46 patients with TTA. **Intervention:** Subjects attended a single data collection session involving a battery of walking tests on a GAITRite mat (CIR Systems), a 23' long device resembling a standard carpet seen commonly in the commercial setting corridors. Subjects completed two walks for each of 5 walking conditions in random order: self-paced, fast-paced (100 steps/min), counting backwards and/or carrying a tray. The focus of the current discussion is on the self-paced walks only. **Outcome measures:** Stride-to-stride variability in spatiotemporal gait parameters (stride length, velocity, double-support time). **Results:**



Though our original *objective* was to develop a normative spatiotemporal gait database for TTAs the variability in gait profiles precluded that goal. Where more uniformity in terms of relative step length was anticipated, TTAs demonstrated a surprising range of step length differential between the intact and prosthetic limbs. As seen in Fig. 1, subjects can be grouped into one of three categories: 1) step length >3 cm on the intact side (n=17), 2) step length >3 cm on the prosthetic side (n=18), 3) step length differential <3 cm (n=11). The results will be further discussed in terms of the implications for gait asymmetry for these groups, as well as the factors that correlate with each step length profile. **Conclusions:** The interim results of this study highlight the difficulty inherent in using a systematic approach to describe the gait characteristics of the TTA population. **Key words:** amputation; amputees; spatiotemporal gait.

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VIRTUAL REALITY EXERCISE THERAPY IN STROKE REHABILITATION – A RANDOMIZED STUDY

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Context/Objective: Exercise training using virtual reality (VR) – interactive simulations created with computer hardware and software – improves balance in adults with traumatic brain injury and adults with hemiparetic stroke. Rigorous randomized studies regarding its efficacy, safety and applicability are lacking. **Objective:** To determine whether VR therapy, as an adjunct treatment, 1) improves balance, weight bearing on the affected side and exercise performance in stroke rehabilitation inpatients and 2) is safe and feasible. **Design:** Blinded randomized controlled trial. **Setting:** Inpatient stroke rehabilitation unit. **Participants:** 60 patients who: 1) had ischemic or hemorrhagic stroke in cortical or subcortical region, 2) had resultant balance and gait deficits and 3) could stand independently for >1 min. **Interventions:** Conventional therapy + VR exercise (e.g., soccer goaltending, snowboarding, stacking boxes) while standing (treatment group; n=30) or conventional therapy + modified VR exercise while sitting (control group; n=30). VR consisted of 10–12 30-min sessions/day. **Outcome measures:** Berg Balance Scale (and if ≥ 48, Community Balance and Mobility Test), Functional Independence Measure, Chedoke-McMaster Stroke Assessment, Two-Minute Walk Test, pressure mat recordings, number of saves on goaltending. **Results:** Average FIM scores on admission were significantly higher for study participants than for nonparticipants (93 vs. 75, p<0.05). Preliminary analysis shows that participants in both the treatment and control groups significantly improved their performance on goaltending and measures of balance, but no significant between-group differences were noted. **Conclusion:** VR exercise therapy for stroke rehabilitation inpatients is safe and enjoyable. The inclusion criterion of standing unaided for >1 minute is limiting as it produces high-functioning stroke survivors. **Funding:** Heart and Stroke Foundation Centre for Stroke Recovery; Tony and Elizabeth Graham Virtual Reality Research and Training Centre. **Key words:** postural balance; rehabilitation; stroke; virtual reality therapy.

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PATIENT RECALL OF DIAGNOSIS AND TREATMENT INFORMATION IMPROVES WITH USE OF PAIN EXPLANATION AND TREATMENT DIAGRAM IN CHRONIC PAIN OUTPATIENT CLINIC

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Context/Objective: Patient education/recall is important in the effective treatment of chronic pain. However, patients often forget

what they are told during a consultation. The Pain Explanation and Treatment Diagram (PETD), a 1-page sheet that physician and patient fill out together during the initial consultation, provides a unified framework for discussing the various causes of chronic pain, including “pain risk factors” (lifestyle, sleep, exercise, ergonomic, psychological and social factors), and recording clinical recommendations. The patient receives a copy to take home. *Objective:* to determine patients’ recall of information regarding their diagnosis(es) and treatment and whether recall improves if patients refer to the PETD after their initial clinic visit. *Design:* Questionnaire study. *Setting:* Chronic pain outpatient clinic. *Participants:* All adults patients referred with persisting musculoskeletal pain who were administered the PETD between June 2009 and July 2012. *Interventions:* Telephone questionnaire. *Outcome measures:* Recall of items and perceived treatment efficacy. *Results:* 92 patients were eligible for the study; 29 (median age 54 years) completed the questionnaire. They had, on average, 20 informational items on their PETD. Thirteen patients reported referring to the PETD at home. They recalled a mean of 17.6% of items, compared to 5.2% for those who did not use the PETD ($p=0.004$). When prompted, the rates increased to 51.3% and 41.2%, respectively ($p=0.032$). Most felt that their treatments were successful or partially successful. *Conclusion:* The PETD assisted recall of pain risk factors, diagnoses and treatment among the patients who used it. It is a promising tool for management of painful conditions. *Key words:* chronic pain; pain management; patient communication; patient education; patient recall.

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PREVALENCE OF PAIN IN SPINAL CORD INJURY: A SCOPING STUDY

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Context: Pain is a major complication for people with a spinal cord injury (SCI). Prevalence of pain post SCI varies widely in the literature. *Objective:* To map the extent of research on prevalence of pain post SCI. *Methods:* Medline, EMBASE, EBM reviews, Cochrane, HTA, NHS Economic Evaluation, and Web of Science databases were searched for all relevant articles published until September 2012. Studies were selected for analysis if the following criteria were met: the SCI population was examined; epidemiological data on pain was provided; and study participants were ≥ 18 . Two investigators independently reviewed abstracts for inclusion and abstracted data. *Results:* Forty-nine articles from 18 journals met inclusion criteria. The most number of articles was published in Spinal Cord (33%), and had an American population (47%). Pain rates varied from 25% to 96.3%. Nociceptive pain rates ranged from 5–70%, and neuropathic from 6.9–65%. Information on level of injury was provided in 28% of the articles. Information on age, followed by completeness of injury was documented in 21% and 14% of articles, respectively. The most common type of pain reported was chronic pain (48%). A formal pain classification system was used in only 30% of articles. Although the years 2001, 2002 and 2004 had the highest rate of articles published, no significant trends were detected from the data during those years. *Conclusion:* Variability in prevalence rates may be due to the year the population is assessed, the type of study, and the definition of pain used in the study. *Funding acknowledgement:* Rick Hansen Institute and Ontario Neurotrauma Foundation 2012-ONF-RHI-MT-948. *Key words:* pain; spinal cord injuries; prevalence; review.

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COPING WITH PAIN POST-SPINAL CORD INJURY: A SCOPING STUDY

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Context: Pain is common among those with spinal cord injury (SCI), and significantly impacts quality of life. Improving coping skills is an important goal of inter-professional SCI pain management. *Objective:* To conduct a scoping study on pain coping strategies following SCI. *Methods:* EBM Reviews, EMBASE, Medline and PsycINFO were searched for relevant articles published prior to October 2012. Grey literature databases (Open Grey, ClinicalTrials.gov and CADTH) were also reviewed. To be selected, studies had to meet the following criteria: 1) study participants had an SCI, 2) were at least 18 years old, and 3) contain information on coping strategies. Two investigators independently reviewed abstracts for inclusion and abstracted data. *Results:* Twenty-eight records met the inclusion criteria with published journal articles accounting for 75%. The Journal of Pain ($n=4$) published the most articles, and the largest number of articles were distributed in 2009 ($n=5$). The majority of populations were American ($n=15$), and the most common types of study were questionnaires (52%). Coping strategies ranged from pacing, fighting spirit, and coping self-statements to substance misuse, dysfunctional coping and social isolation. Out of 18 coping-specific outcome measures, the Coping Strategies Questionnaire ($n=8$) and Chronic Pain Coping Inventory ($n=5$) were the most frequently used. *Conclusion:* Many studies have examined individuals coping with pain post-SCI, however the lack of standardized outcome measures may have restricted data analysis. To improve pain coping skills for those with a SCI, it is recommended that future studies examine outcome standardization to better determine efficacy of specific interventions. *Funding acknowledgement:* Rick Hansen Institute and Ontario Neurotrauma Foundation 2012-ONF-RHI-MT-948. *Key words:* pain; spinal cord injuries; adaptation, psychological; review.

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CASE REPORT: DYSAUTONOMIA IN SEVERE TBI

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Background: Dysautonomia is a clinical syndrome affecting a subgroup of TBI survivors. It is characterized by episodes of autonomic dysregulation (increased body temp, HR, RR, BP, and excessive sweating) and muscle overactivity (decerebrate or decorticate posturing, dystonia, rigidity and spasticity). Manifestations can lead to secondary hypertensive or hyperthermic encephalopathy and even death. *Case summary:* In the inpatient rehabilitation setting, a 22-year-old male with TBI secondary to anoxic brain injury displayed dysregulatory episodes. These episodes were consistent with dysautonomia, involving hyperthermia, elevated blood pressure, diaphoresis and posturing. Imaging with MRI showed diffuse brain atrophy with prominent white matter involvement & signal abnormality within the cervical and thoracic spine. Cervical and thoracic spine changes were likely secondary to prolonged hypoxic event. Literature review for management provided that there were no generally accepted therapeutic strategies. Investigations to identify possible triggers, and management strategies for same were explored. *Key words:* traumatic brain injury; dysautonomia.

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PREDICTING CONFIDENCE TO BE ACTIVE WITH MULTIPLE SCLEROSIS

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Context/Objective: Physical activity may improve function and quality of life in MS; however, maintaining activity levels remains a challenge. Among predictors of activity engagement, none are more central than confidence beliefs (Bandura, 1997). In terms of confidence sources, past experience and one's explanations of the experience feature. Our objective was to examine whether or not personal explanations improved the prediction of confidence to be active beyond that

predicted by past experience in MS patients. *Design:* Cross-sectional survey. *Setting:* Outpatient MS clinics. *Participants:* Forty-two persons with MS (30 women; 12 men). Mean age was 49.3 years, mean duration of disease was 18 years, and median EDSS score was 3.0 (range: 1.0–6.5). *Outcome measures:* Questionnaire, which assessed moderate and vigorous physical activity, perceived success/failure to meet Health Canada's guidelines (past experience), attribution dimensions (personal explanations), and self-efficacy (confidence). *Results:* Twenty participants (47.6%) perceived themselves as successful in achieving Health Canada's recommended activity level and 22 (52.4%) perceived themselves as unsuccessful. Perceived success/failure predicted 27.5% of the variance in efficacy using linear regression. Attributions predicted another 8.1% of the variance in efficacy. *t*-tests revealed that, compared to individuals who perceived themselves as unsuccessful, those who perceived themselves as successful reported more internal and controllable attributions ($p < 0.05$ in both cases). *Conclusion:* This study supports the importance of past experience in influencing confidence to be active. More importantly, potentially modifiable personal explanations, also may influence confidence suggesting that both past experience and one's interpretation of it may better inform efficacy beliefs. *Funding acknowledgement:* University of Saskatchewan College of Medicine Dean's Summer Project. *Key words:* exercise; multiple sclerosis; self efficacy.

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RETROSPECTIVE COMPARISON OF NON-TRAUMATIC AND TRAUMATIC SPINAL CORD INJURY IN BRITISH COLUMBIA: 2005–2010.

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Objective: To describe differences in demographics, neurologic, and functional outcomes following initial rehabilitation for non-traumatic spinal cord injury (NTSCI) and traumatic spinal cord injury (TSCI). *Design:* Retrospective chart review. *Participants:* All patients aged > 18 admitted to GF Strong Rehabilitation Centre for initial SCI rehabilitation between April 2005–March 2010. *Results:* 197 NTSCI and 346 TSCI subjects were included. Mean age for NTSCI subjects was 54 years and 59% were male. For TSCI subjects, the mean age was 43 and 77% were male. On admission to rehab, 14.6% of NTSCI patients presented with ASIA impairment scale (AIS) A, 6.1% B, 20.7% C, and 58.5% D compared to TSCI AIS A 40%, 27.4% B, 16.7% C, 28.8% D. Mean admission ASIA motor score was 75 (52–86) [median (25th–75th percentile)] and mean admission FIM motor subscale score was 47 (32–64) for the NTSCI group. Mean admission ASIA motor score was 50 (27–68) with a mean FIM motor subscale score 33 (19–50) for the TSCI group. Upon discharge, the mean ASIA motor scores were 79 (58–90) and 50 (38–80) for NTSCI and TSCI, respectively, with FIM motor subscale scores 78 (62–85) in NTSCI and 73 (39–82) in TSCI. Mean rehabilitation length of stay was 82 days for NTSCI and 109 days for TSCI subjects. *Conclusion:* Compared to TSCI patients, NTSCI patients are more likely to be older, female and to have less severe SCI as measured by AIS motor scores and FIM motor subscales. *Key words:* spinal cord injuries; spinal cord diseases; spinal cord myelopathy.

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DIAGNOSTIC ACCURACY OF GLUTEAL SIGN IN PATIENTS WITH LOW BACK PAIN; PROSPECTIVE MULTICENTER STUDY

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Context/Objective: We inferred from our clinical experience that many patients with radicular low back pain (LBP) have a trigger point on the upper outer quadrant of their gluteal area. We coined it Gluteal sign. The aim of this study was to evaluate the diagnostic accuracy of Gluteal sign in detecting nerve root involvement amongst patients with LBP. *Design:* Prospective multicenter diagnostic accuracy study, consecutive sampling. *Setting:* Three referral physical medicine and rehabilitation clinics. *Participants:* Three hundred and twenty five consecutive patients with LBP. *Interventions:* At first stage of the physical examination, the existence of Gluteal sign was evaluated by the examiners blind to patients' history (Index test). Test was considered positive; when pressure between 2 and 9 kg/cm² on upper outer quadrant of the patients' gluteal area elicited trigger point response. *Outcome measures:* Lumbar spine MRI in addition to electromyography and nerve conduction studies (Gold standard). *Results:* Participants constituted 185 patients with lumbar radiculopathy and 140 patients with non-radicular LBP. The specificity and sensitivity of the sign were 91.4% and 74.1% respectively. The area under the ROC curve was 0.827 (0.781–0.874). Positive likelihood ratio was 8.61 and negative likelihood ratio was 0.28. Diagnostic odds ratio was 30.75. *Conclusion:* The Gluteal sign is highly specific and very sensitive. It has very good diagnostic accuracy in differentiating patients with nerve root involvement from those with non radicular low back pain. *Key words:* diagnostic accuracy; gluteal trigger point; radiculopathy; sensitivity; specificity.

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SMARTPHONE APPLICATION DEVELOPMENT TO MEASURE LARGE JOINT RANGE OF MOTION

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Context/Objective: Recently, remote health monitoring has become more prevalent to deliver health care in the setting of rising costs and decreasing resources. However, the use of remote monitoring for patients undergoing rehabilitation is in its infancy. The purpose of this study was to determine the feasibility and validity of a smart phone application to measure an important rehabilitation outcome, joint angle range of motion. *Design:* A smart phone application was developed using Java coding language that incorporated the triaxial accelerometer (Android OS 2.1) to measure joint angle range of motion for the elbow from 10–120 degrees, without an external device. *Setting:* Tertiary rehabilitation centre laboratory. *Interventions/Outcome measures:* With a healthy subject in a seated position, and smart phone held in the right hand, the validity of the smart phone application for measuring joint angles of the elbow was determined compared to the gold standard of using a manual goniometer. *Results:* The mean difference for the 9 smart phone measurements compared to the gold standard measurement was +2.87 degrees, with a correlation of 0.99, demonstrating excellent validity for the smart phone application. The application was easy to use and did not require any additional equipment. *Conclusion:* The smart phone application demonstrated excellent concurrent validity for measuring upper extremity joint angle range of motion in a healthy subject, that may be a useful tool for remote rehabilitation monitoring. *Key words:* measure; joint; range of motion; telemedicine; remote; monitoring; rehabilitation; smart phone application.

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CHANGE OF KNOWLEDGE, ATTITUDES AND BEHAVIOURS AMONG ONTARIO PHYSIATRISTS IN MANAGING CHRONIC NON-CANCER PAIN WITH OPIOIDS BEFORE AND AFTER THE RELEASE OF THE CANADIAN OPIOID GUIDELINE

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Objective: To identify how the Canadian Opioid Guideline's dissemination and implementation strategies affected knowledge, attitudes and behaviours of Ontario Psychiatrists regarding the use of opioids for Chronic Non-Cancer Pain. **Design:** Pre- and post-test design. **Setting:** Electronic survey. **Participants:** Ontario psychiatrists. **Interventions:** We applied the same electronic survey to Psychiatrists practicing in Ontario, before and 2 years after the release of the Guideline. The guideline was disseminated by the College of Physicians and Surgeons of Ontario and it was delivered through a website, scientific journal publications, presentation at scientific meetings, continuing medical education, and various community workshops. **Outcome measures:** same electronic survey. **Results:** The response rate was low: 25% (35/142) before and 19% (28/150) after the Guideline. The demographics of the first and second survey responders were similar to the Ontario psychiatrist demographics. Two years after the release of the Guideline, 72% (18/25 subjects) have heard of the Guideline and 28% (7/25) physicians believed that the guideline changed their practices. However, there were no significant changes regarding responders' level of confidence in prescribing opioids, their definitions of chronic non-cancer pain, their monitoring parameters, frequency, decision and selection of opioids prescription. **Conclusions:** The transfer of research evidence into practice is a complex process. The low response rate and small absolute numbers of responses limits definitive conclusions. However it appears that despite effective dissemination, current guideline implementation strategies do not lead to knowledge, attitudes and behaviours changes of practicing physicians. Identifying strategies to optimize implementation capacity is needed. Dr. Andrea Furlan acknowledges personal funding from CIHR New Investigator Award. **Key words:** opioids; data collection; guideline.

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CASE REPORT: EARLY USE OF AUGMENTATIVE ALTERNATIVE COMMUNICATION STRATEGIES IN A PATIENT WITH LOCKED-IN SYNDROME

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Context: Locked-in syndrome (LIS) is a rare, but severe syndrome following injury to the ventral pons. It is characterized by quadriplegia, lower cranial nerve paralysis, anarthria and horizontal gaze paresis with preserved vertical gaze, blinking and consciousness. Thus, patients are aware of their deficits, but severely limited in their ability to communicate. Augmentative alternative communication (AAC) strategies can enhance a patient's ability to interact with their environment. **Case summary:** A 56-year-old man presented with classic LIS. A large basilar artery thrombus with extensive infarction of the ventral pons was confirmed on imaging. The patient was transferred to a tertiary centre ICU. Unfortunately, he was outside the window for radiological intervention. By 3 weeks, he regained functional horizontal eye movements and rotation of his neck. He was able to answer yes or no using eye and neck movements. However, this rudimentary communication did not allow effective participation in goals of care discussions or expression of symptoms (ie. ear pain, leading to a late diagnosis of infection with perforated tympanic membrane). He had significant emotional lability. The ICU team consulted Psychiatry to facilitate early AAC service implementation to improve the communication barrier. **Conclusion:** AAC service consultation does not routinely occur in the ICU of our hospital network. We present a case of successful early utilization of available rehabilitation and communication services in a patient with LIS. Early establishment of AAC, allowing expression of emotions and needs, will immediately improve quality of life and should be considered in cases of LIS. **Key words:** brain stem infarctions; communication aids for disabled; mutism; quadriplegia.

RE 01

INCIDENCE OF SPASTICITY AFTER STROKE AND SUBARACHNOID HEMORRHAGE – A REVIEW OF LITERATURE

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Subarachnoid hemorrhage makes up a small percentage of all strokes, but these patients experience a disproportionate share of morbidity and mortality amongst stroke patients. Spasticity is a post-stroke complication that can significantly impact quality of life. Previous post-stroke spasticity studies have focused mostly on ischemic stroke, with few studies including subarachnoid hemorrhage patients. The current review examined the literature on incidence of spasticity after stroke, with a focus on subarachnoid hemorrhage specifically. Two OvidSP (Medline) searches were undertaken. The first combined the terms stroke, spasticity and incidence or prevalence. The second search combined the terms spasticity and subarachnoid hemorrhage. The first search yielded 10 relevant primary studies, with spasticity incidence ranging from 20–80%. Two of the 10 studies included SAH patients, reporting spasticity incidence rates of 18% and 42%, respectively, although this was with a limited number of SAH patients. The search combining the terms spasticity and subarachnoid hemorrhage did not yield any publications with spasticity incidence data. Post-stroke spasticity studies to date have varying methodological flaws, but most report a spasticity incidence rate between 20 to 40%. There is insufficient data to draw conclusions about spasticity incidence after SAH as most post-stroke spasticity studies have excluded SAH.

RR 01

HONORARY AUTHORSHIP: FREQUENCY AND ASSOCIATED FACTORS IN PHYSICAL MEDICINE AND REHABILITATION RESEARCH ARTICLES

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Objective: To measure the prevalence of honorary authorship (HA) and identify factors affecting HA in Physical Medicine and Rehabilitation (PM&R) research. **Design:** Cross-sectional study. **Participants:** First authors of articles published in the Archives of Physical Medicine and Rehabilitation, Journal of Rehabilitation Medicine, and the PM&R journal between January 2009 and December 2011. **Methods:** An electronic survey was e-mailed to the participants. Questions pertained to their experience with HA, their authorship practices, whether they listed an honorary author on their publication, and their demographics. **Main outcome measurements:** The prevalence of perceived, unperceived and actual HA were the primary outcome measures. Multiple factors were analyzed to determine if they were associated with the primary outcome measures. **Results:** The response rate was 27.3% (248/908). The prevalence of perceived, unperceived and actual HA were 18.0% (44/244), 37.5% (93/248) and 55.2% (137/248), respectively. Factors independently associated with perceived HA included the suggestion that an honorary author should be included ($p < 0.0001$), being a medical resident or fellow ($p = 0.0019$), listing "reviewed manuscript" as one of the non-authorship tasks ($p = 0.0013$), and the most senior author deciding the authorship order ($p = 0.0469$). No factors were found to be independently associated with unperceived HA. Living outside of North America ($p = 0.0079$) and the most senior author decided authorship order was independently associated with actual HA. **Conclusions:** Our results suggest HA is relatively common in the PM&R literature and is affected by several factors. Furthermore, there is a large disparity between perceived and actual HA rates that warrants further investigation.

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