

# Abstracts of Scientific Papers and Posters Presented at Physiatry '23

February 21–24, 2023

## BEST PAPER PRESENTATIONS

### Faculty Category Award Winner

#### MEASURING THE EFFICACY OF PERCUTANEOUS CRYONEUROLYSIS IN THE MANAGEMENT OF PATIENTS WITH PLATEAUED OR REFRACTORY SHOULDER SPASTICITY

Paul J. Winston, MD, Mahdis Hashemi, MD, Eve Boissonnault, MD, FRCPC, Daniel D. Vincent, FRCPC, MD, ABDA, MRO, Fraser A. MacRae, BSC, Jia Song, MS, Meng-Hsuan Sung, MS, and Sandy Shi, MS

**OBJECTIVES:** To evaluate outcomes after cryoneurolysis in patients with spastic shoulder including range of motion (ROM), spasticity degree, and patient satisfaction with the procedure.

**DESIGN:** In this ongoing, intensive repeated-measures pilot study (NCT04670783), percutaneous cryoneurolysis was applied to lateral and/or medial pectoral nerves to treat shoulder spasticity. Shoulder ROM (maximal slow stretch V1) and spasticity were measured during flexion, abduction, and external rotation using the Modified Ashworth Scale (MAS [range, 0-4]). Goal Attainment Scale measured patient satisfaction (score range, -2 to +2, transformed into a T-score with a mean of 50). A Wilcoxon signed-rank test was used to analyze changes in V1 and MAS scores after cryoneurolysis. Forty-two patients underwent cryoneurolysis and 40 patients completed 90-day follow-up at the time of analysis.

**RESULTS:** Significant reductions in median (interquartile range) MAS scores from baseline to 90 days after treatment were observed during flexion (-1.0 [-1.5, -1.0];  $P < 0.001$ ), abduction (-1.0 [-2.0, -1.0];  $P < 0.001$ ), and external rotation (-1.0 [-2.0, -0.5];  $P < 0.001$ ). Significant increases in median (interquartile range) V1 ROM during flexion (20.0 [6.2, 43.8];  $P < 0.001$ ), abduction (20.0 [10.0, 45.0];  $P < 0.001$ ), and external rotation (15.0 [5.0, 35.0];  $P < 0.001$ ) were also observed. In a subset of patients who had completed follow-up at 9 months ( $n = 22$ ) and 12 months ( $n = 16$ ) at the time of analysis, significant improvements from baseline were maintained during shoulder flexion, abduction, and external rotation for both MAS ( $P \leq 0.00018$  and  $P \leq 0.0026$  at 9 and 12 months, respectively) and V1 ( $P \leq 0.0011$  and  $P \leq 0.0058$  at 9 and 12 months, respectively). There was a numerical increase of 10.5 points (28.77%) from baseline in mean Goal Attainment Scale score 90 days after treatment.

**CONCLUSION:** Percutaneous cryoneurolysis of the medial and/or lateral pectoral nerve was associated with improvements in shoulder ROM, spastic tone, and patient satisfaction at 90 days. Longer follow-up is ongoing to confirm sustainability of improvements.

### Resident Category Award Winner

#### IMPACT OF INTERDISCIPLINARY PEDIATRIC PAIN MANAGEMENT PROGRAM ON FUNCTIONING IN BOTH CHILD AND PARENT: A RETROSPECTIVE STUDY OF 465 CHILDREN WITH CHRONIC PAIN

Cara E. Vernacchia, DO, Kavita Gohil, DRPH, Diane Amstutz, PhD, and Gadi Revivo, DO

**OBJECTIVES:** 1) Evaluate the impact of interdisciplinary rehabilitation treatment on pain and functioning of children with chronic pain, 2) explore if certain chronic pain diagnoses were associated with lower levels of baseline physical and emotional functioning, and 3) elucidate if certain features of child or parent functioning (i.e. physical, emotional, social) were more responsive to treatment.

**DESIGN:** A retrospective chart review was performed for children who presented for evaluation for an interdisciplinary pain management program, which included physical therapy, occupational therapy, psychological counseling, and physician visits. Children and parents completed questionnaires (Bath Adolescent Pain Questionnaire and Bath Adolescent Pain- Parental Impact Questionnaire, respectively) that assessed their emotional, social, and physical functioning before, after,

and 1-2 months after program completion. Patients were stratified into five groups: complex regional pain syndrome, headache, musculoskeletal pain, visceral pain, and widespread pain.

**RESULTS:** The study included 465 children (120 males, 345 females) with mean age  $14.3 \pm 2.4$  years. Children's baseline pain and function, as assessed by questionnaires, were similar across all diagnoses and significantly improved following program completion.

These improvements were sustained at 1-2 month follow-up. Following treatment, parent's catastrophizing of their child's pain significantly improved in all diagnoses.

However, parental behavior in addressing their child's pain (i.e. negative pain behaviors such as helping child avoid pain or recommending rest), did not improve in majority of diagnoses. Additionally, the parent's relationship with their partner worsened following treatment.

**CONCLUSION:** Children with chronic pain showed sustained improvements in pain and functioning following an interdisciplinary pain management program. While parental catastrophizing improved, parental behavior in overprotecting their child did not, and parental relationships worsened, which may be attributed to only one parent attending sessions. These findings support the need for educating both parents and targeted interventions that improve parental behavior, decrease overprotection of their child, and improve partner relations to maximize functional outcomes.

### Medical Student Category Award Winner

#### VALUE-ADDED MEDICAL EDUCATOR EDUCATION: ENGAGING FUTURE MEDICAL EDUCATORS TO TRANSFORM CULTURAL HUMILITY TRAINING IN MEDICAL AND RESIDENT EDUCATION TODAY

Lon Yin Chan, BA, Alexandra R. Greenberg, MS, MSPH, Fradah Gold, BS, Haris Choudry, MD, Crystal Marquez, MD, and Shirley Eisner, PhD

**OBJECTIVES:** Value-added medical education refers to experiential learning of medical students to become competent clinicians. While this framework has been used in clinical training, we propose applying it to train medical students and residents to become medical educators: value-added medical educator education (VAMEE). With immersive learning to cultivate skills for institutional service and forming scholarly approaches to curriculum development, assessment and evaluation, trainees can have value-added roles as student educators under faculty guidance. We present a primary-care clerkship's student-developed and facilitated cultural humility session, made to support our diverse patient population and LCME requirements (Standard 7.6), as an example of VAMEE. This session and framework can be applied to PM&R to promote cultural and disability awareness for residents and students.

**DESIGN:** Student educators developed a virtual version of a case-based approach in breakout rooms. Adaptations were made with faculty supervision due to time constraints, need for engaging remote methods and students'/educators' feedback. Session participants completed pre-/post-surveys, linked through anonymous identifiers, on their confidence in addressing culturally-informed patient encounters, perceived usefulness of the session, and specific feedback.

**RESULTS:** Removing duplicates/incompletes of surveys yielded 99 paired-pre/post-responses. Pre-session ratings were 2.7, 2.9, and 2.5 (scale:0-4) on students' confidence in defining "cultural humility," applying it to primary-care, and approaching patients in a culturally-appropriate way. Post-session averages increased to 3.2, 3.4, and 3.1 (significant Wilcoxon-SR tests). Students learned something useful (mean 4.8 on scale 0-6).

**CONCLUSION:** VAMEE enhanced faculty's ability to quickly transform curricula with the pandemic. RESULTS show that not only trainees benefit by learning from peers but also student educators gain skills through this student-driven iterative process. Future directions include evaluating long-term clinical impact of the session and surveying student facilitators on the effectiveness of VAMEE in

### A CROSS-SECTIONAL SURVEY TO UNDERSTAND THE PERCEPTION OF CANCER REHABILITATION AMONGST HEALTHCARE PROVIDERS IN A RURAL COMMUNITY

Jodi Goldman, BS, Vishwa Raj, MD, Terrence Pugh, MD, Cynthia Tiongco, PhD, MOT, and John Norbury, MD

**OBJECTIVES:** Cancer survivors often present with complex medical impairments leading to functional limitations. As there is no cancer-specific rehabilitation physician in the community of interest, the purpose of the current study is to understand the perception of cancer rehabilitation amongst healthcare providers affiliated with a community medical school that serves a largely rural population.

**DESIGN:** An electronic survey was administered to volunteer participants at an academic physician practice, academic medical center, faith-based medical center, and acute inpatient rehabilitation facility (IRF).

**RESULTS:** Thirty-eight healthcare providers and learners in various specialties completed the survey. The cohort consisted of medical students (45%), physical therapists (21%), occupational therapists (11%), registered nurses (11%), resident physicians (7%), and case managers/social workers (5%) all of whom acknowledged that they care for patients with cancer. Eighty-nine percent of respondents agreed that rehabilitation providers should receive some level of training for treating patients with cancer, 95% agreed that it is necessary for these patients to receive screening on functional impairment, 84% agreed that oncologists should include rehabilitation as part of treatment discussion, and 92% agreed that a rehabilitation healthcare provider should be included as part of the oncology team.

However, 63% agreed that there are currently barriers to providing these patients with inpatient rehabilitation services. Lastly, 95% agreed that rehabilitation care could provide a smoother return to society, yet 63% believed this patient population is currently underserved by rehabilitation services.

**CONCLUSION:** Healthcare providers in this study acknowledge that incorporating rehabilitation services into cancer care may positively impact quality of life for patients with cancer. Yet, structural barriers and medical complexity potentially hinder collaborative efforts amongst oncology and rehabilitation.

### A MULTICENTRE ANALYSIS OF EMPLOYMENT POST-SPINAL CORD INJURY IN MALAYSIA

Chau Chung Chai, MBBS, Patrick Engkasan Julia, MBBS, PhD, Soo Chin Chan, MBBS, and Hasnan Nazirah, MBBS, PhD

**OBJECTIVES:** Employment outcome post-spinal cord injury (SCI) varies internationally due to different socioeconomic backgrounds. However, most previous studies were done in developed countries, with limited studies from developing countries like Malaysia. This research aims to study the employment rate, positive determinants of employment, and reasons for unemployment post-SCI in Malaysia.

**DESIGN:** We conducted a cross-sectional multicentre survey study in Malaysia. This study included eight hospitals with inpatient rehabilitation services and one SCI organisation throughout Malaysia. 280 SCI individuals from 18 to 64 years old with more than one year of SCI duration participated in this study. We administered International Spinal Cord Injury (InSCI) Questionnaires to them. We extracted and analysed the relevant components like demographics, injury-related and work-related data. We identified significant positive determinants of employment by using logistic regression analyses with  $p$ -value  $< 0.05$  between categorical independent variables and employment status. We described reasons for unemployment post-SCI in frequencies of percentages.

**RESULTS:** The employment rate post-SCI in Malaysia was 29%. Significant positive determinants of employment post-SCI in Malaysia identified from logistic regression analyses with higher odds of employment were female gender (OR [Odds Ratio]: 2.2, 95% CI [Confidence Interval]: 1.1-4.2); being married (OR: 1.9, CI: 1.1-3.4); and tertiary education (OR: 3.2, CI: 1.6-6.8). The five main reasons for unemployment post-SCI in Malaysia were health condition or disability (36.5%), inability to find suitable work (15.5%), not knowing how or where to seek work (11.5%), lack of accessibility to potential workplace (7.4%), and insufficient transportation services (6.2%).

**CONCLUSION:** This study reported a low employment rate post-SCI in Malaysia. Tertiary education was a strong positive determinant of employment. Based on this study's findings, suggested interventions focus on access to tertiary education, health condition optimisation, vocational guidance, exploration of telework

options, creating a barrier-free environment, and provision of sufficient transportation services can raise the employment rate post-SCI.

### A REVIEW ON PERIPHERAL NERVE STIMULATION IN HEMIPLEGIC SHOULDER PAIN

Vinicius Tieppo Francio, MD, Adam Fehr, PT, Benjamin Gill, DO, MBA, and McCassey Smith, MD

**OBJECTIVES:** Post-stroke hemiplegic shoulder pain (HSP) affects approximately 30% of survivors within 12 months of the stroke. A high rate of chronicity indicates limited treatment success. Spasticity and motor weakness are common residual deficits leading to glenohumeral joint instability, traction, capsulitis, and tendonitis, which may result in chronic HSP and central sensitization. This study reviews the use of peripheral nerve stimulation (PNS) in chronic HSP.

**DESIGN:** MEDLINE search of studies published within 2012-2022. All studies included were a mix of temporary, permanent, single, or multiple-lead PNS systems targeting nerves innervating the trapezius, supraspinatus, or deltoid muscles.

**RESULTS:** Seven studies were identified (2 randomized controlled trials, 2 case series, and 3 case reports). A case report showed complete pain resolution at 13 months (2011), while another case report found complete resolution in pain at 9 weeks, however with recurrence (2015). A recent case report noted significant pain reduction at one month follow-up (2021). A case series demonstrated at least 50% improvement in pain at 12 months with ongoing significant pain relief at 24 months in all subjects (2017). Two single-center randomized controlled trials (2005, 2014) demonstrated significant pain relief ( $>50\%$ ) and improved range of motion and biomechanics compared to conservative care up to 16-weeks. A 2022 society guideline noted that PNS offers modest short-term pain relief, improved function, and better quality of life for chronic HSP. Limitations to this review include limited publications and industry sponsored studies.

**CONCLUSION:** PNS is effective in HSP treatment, with few studies suggesting superior and longer duration improvement in pain and biomechanics up to 12-weeks when compared to placebo and conservative measures. Guidelines suggest there is Level I evidence (grade B) supporting the efficacy of PNS for treatment of chronic HSP. This review elucidates the importance of physiatrists to consider this intervention in the treatment of HSP.

### A STUDY ON GENETIC POLYMORPHISM AFFECTING FUNCTIONAL OUTCOMES IN STROKE PATIENTS

Min Wook Kim, PhD, MD, and Jaewon Kim, PhD, MD

**OBJECTIVES:** Stroke-related genetic variants are being discovered through genome-wide association study (GWAS). In addition to early rehabilitation intervention which is known to be associated with functional improvement for stroke, several studies have revealed that genetic factors are related to functional outcome of stroke patients. The aim of this study is to investigate the association of genetic variant and functional outcome in stroke patients.

**DESIGN:** Subjects with first-ever acute stroke who transferred to the rehabilitation department and underwent intensive rehabilitation intervention for 4 weeks were enrolled. Functional assessments were conducted before and 4 weeks after rehabilitation. 13 single-nucleotide polymorphisms (SNPs) (PTGS2 [rs20417, rs5275], COMT [rs4680], CRP [rs1130864], APOE [rs429358, rs7412], BDNF [rs6265], XRCC1 [rs25487], IGF1 [rs7136446], PTCH1 [rs2236406], PLAA [rs13299556], NTN4 [rs78734480], LOC105372028 [rs1842681]) were genotyped. The association of each genetic variant with functional outcome was evaluated.

**RESULTS:** A total of 23 subjects were enrolled. The CRP-CT polymorphisms was associated with better Fugl-Meyer assessment Upper Extremity (FMA-UE) of motor function compared to CC variant ( $p = .032$ ). APOE (rs7412)-CT variant was associated with poorer FMA-UE of motor function compared to CC variant ( $p = .019$ ). The BDNF-GG polymorphism was associated with better hand function test (grip strength and 3-point pinch) RESULTS compared to GA variant ( $p = .032$  and  $p = .03$ , respectively).

**CONCLUSION:** This study investigated whether there is a difference in the functional improvement of short-term follow up in patients with acute stroke patients in relation to the SNPs of several genes, which were discovered to be related to the functional outcome through GWAS. Genetic variants, particularly the CRP (rs1130864), APOE (rs7412), and BDNF (rs6265) polymorphism might contribute to variability in functional outcomes after stroke.