

Abstracts of Scientific Papers and Posters Presented at Physiatry '24

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BEST PAPER PRESENTATIONS

Faculty Category Award Winner

EFFICACY OF PERCUTANEOUS CRYONEUROLYSIS FOR WRIST OR HAND/FINGER SPASTICITY

Paul Winston, MD, Mahdis Hashemi, MD, Eve Boissonnault, MD, Daniel Vincent, MD, Fraser MacRae, BSC, Jia Song, MS, and Sandy Shi, MS

OBJECTIVES: To evaluate changes in range of motion (ROM), spasticity, and function after cryoneurolysis of wrist or wrist, hand, and fingers.

DESIGN: In this repeated-measures pilot study (NCT04670783), adults were eligible if they had refractory spasticity in wrist or hand/fingers that demonstrated further ROM and reducible spasticity in response to diagnostic nerve block. Participants received percutaneous cryoneurolysis of the wrist or wrist/hand/finger muscles. Wrist extension ROM was measured with a goniometer and spasticity was evaluated using the Modified Ashworth Scale (MAS; range 0-4 with 1+ converted to 1.5 for numerical calculation). The House Functional Scale (range 0-8) assessed hand function and the House classification assessed thumb deformity. Upper limb function was assessed using the Disability of the Arm, Shoulder, and Hand (DASH) questionnaire (30 questions; total score range 0 ["no disability"] to 100 ["most severe disability"]). A Wilcoxon signed-rank test analyzed changes from baseline in active ROM (AROM), maximal passive ROM (V1), and MAS scores after cryoneurolysis.

RESULTS: Of 15 participants receiving wrist cryoneurolysis, 12 participants also received hand cryoneurolysis. At 365 days after wrist cryoneurolysis, wrist extension MAS scores (n = 7) and V1 (n = 9) were significantly improved (mean [SD] change from baseline, -1.6 [0.7], P = 0.01, and 18.9 [21.8] degrees, P = 0.03, respectively). The mean (SD) improvement from baseline in wrist extension AROM (n = 3) at Day 365 was 31.7 (5.8) degrees (P = 0.09). At 365 days after hand/finger cryoneurolysis, hand function (n = 3) (mean [SD] change in House Functional Scale score from baseline, 0.7 [1.2]; P = 0.5) scores improved and 2/4 participants had ordinal House classification improvements. The mean (SD) change from baseline in DASH score at Day 365 (n = 6) was -13.8 (14.4) (P = 0.3).

CONCLUSION: Percutaneous cryoneurolysis of wrist or wrist/hand/finger nerves was associated with improvements in wrist active and passive ROM, spasticity, and thumb position classification 365 days after treatment.

Fellow Category Award Winner

DIGITALIZATION OF MEASURING PHYSICAL PERFORMANCE

Wolfgang Grosek, MSC, Daniel Wiznia, MD, Necolle Morgado-Vega, DO, Jessica Garza-ricce, PT, DPT, CBIS, Yeomgmi Kim, PhD, and Rummana S. Aslam, MD

OBJECTIVES: The Modified Physical Performance Test consists of different tasks with a point system to measure the performance of functional mobility. However, currently, this test has been conducted with observation and a stopwatch. This leads to inaccuracy, aberrance, and missing data. Our study aim was to design a method of digital scoring of physical tasks to standardize the test results.

DESIGN: This was a pilot observational study to compare the digitized test score of physical performance with the objective test score obtained by the treating therapist. The physical tasks measured were sub-tasks in the modified physical performance test (MPPT). The use of wireless wearable sensors enabled the measurement of physical performance. The two types of sensors used for these measurements are the Inertial Measurement Unit (IMU) and force sensors. The subjects were patients undergoing acute inpatient rehabilitation. Ten subjects undergoing musculoskeletal rehabilitation were randomly chosen. The wearable sensors were placed over clothing at various parts of the body. The sensors are designed to measure movement in different directions, angles, and timing of completing a task. Computer software was developed to evaluate the digital test score of physical task performance.

RESULTS: The outcome of the work showed a significant correlation between the digital test score and the evaluation of specialists in the corresponding field of

rehabilitation via the traditional MPPT score. A correlation of $r = 0.990$ could be determined via Pearson Correlation.

CONCLUSION: Digitalization of physical performance and function will provide accuracy and efficiency in measuring rehabilitation progress and enhance individualized and goal-directed rehabilitation planning. We are currently further developing the sensors and software to be applicable to additional tasks of physical performance in neuromuscular rehabilitation.

Resident Category Award Winner

REHABILITATION OUTCOMES OF BILATERAL LUNG TRANSPLANT PATIENTS DUE TO COVID-19

Vishal Bansal, MD, Karen Huang, MD, Taylor Moore, DO, Diana McShane, MD, Lenart Vega Leyva, MD, Rahat Hussain, MD, and Kristin Varacalli, DO

OBJECTIVES: Approximately 2,000 individuals receive lung transplants per year in the US. Since 2020 when COVID-19 (CV) emerged, the effects on the lungs can be devastating, necessitating bilateral lung transplants in some. Our institution has performed a number of these transplants, most of whom have then been admitted to Inpatient Rehab (IR). To review the outcomes of patients with bilateral lung transplant secondary to COVID-19 who then admitted to acute inpatient rehab. No data exists looking at the rehab outcomes of this novel rehab population.

DESIGN: Retrospective chart review at a Level 1 trauma center who underwent bilateral lung transplant secondary to CV. Qualitative measures: disposition to home, supplemental oxygen use. Rehabilitation outcomes: gait distance, gait GG, upper body dressing (UBD), lower body dressing (LBD), toileting and diet.

RESULTS: All patients were discharged home and had no oxygen requirements on discharge. Average gait distance and GG score on admission was 35 feet and 3.14 which improved to 392 feet and 4.71, respectively. In our cohort, 71.4% and 85.7% of patients had improvement in their UBD and LBD GG scores respectively. All patients demonstrated improvements in toileting/hygiene. On discharge, all but one patient progressed to a regular diet and thin liquids. Furthermore, the thirty-day readmission rate was zero. Additionally, no infections, DVTs/PEs, new wounds, neurological or cardiovascular events occurred.

CONCLUSION: Patients undergoing bilateral lung transplantation in the setting of COVID-19 face unique challenges and inpatient rehab helps achieve better quality of life and functional outcomes. Our data demonstrates that inpatient rehab is a key component to achieve better quality of life and functional outcomes in this transplant patient population

Medical Student Category Award Winner

MUSCLE ECHOGENICITY AND PRESSURE-PAIN THRESHOLDS IN INDIVIDUALS WITH SEVERE MUSCLE STIFFNESS AFTER CEREBRAL INJURY

Kaitlin Ballenger, BA, Nikhil A. Gopal, MBBS, Azin Etemadimanes, MD, Robert W. Nickl, PhD, Paria Arfa Fatollahkhani, MD, MSC, and Preeti Raghavan, MD

OBJECTIVES: Muscle stiffness and pain cause severe disability in people after cerebral injury. However, the relationship between muscle stiffness, muscle fibrosis and pain are not clear. The objective of this study was to examine muscles for fibrosis and assess muscle pain in individuals with severe spastic muscle stiffness before and after treatment with human recombinant hyaluronidase injections.

DESIGN: Twenty-three subjects with severe muscle stiffness (stiffness rating across all muscles = $3.8 \pm 0.12/4$) after cerebral injury were enrolled in a double-blind, randomized, placebo-controlled, Phase II trial of human recombinant hyaluronidase injections. The trial included evaluation at baseline, after the first injection (hyaluronidase or placebo), and at the final visit. All subjects had received both hyaluronidase and placebo in a random order by the final visit. Eight muscles on both upper limbs (pectoralis major-minor, middle deltoid, lateral biceps, medial biceps, brachioradialis, long head of triceps, lateral triceps and medial triceps) were

associated symptoms were headache/head pain (41.1%), dizziness (28.12%), and confusion (9.2%).

CONCLUSION: Significant decreases in concussions in 2020 and 2021 can be attributed to social restrictions that occurred during the COVID-19 pandemic and raises concerns about the undertreatment of concussions in female contact sports. Mechanism of injury in female concussions is sport specific with high rates of player-to-player and player-to-ground injuries. Finally, there were no significant differences in symptom presentation among the different contact sports analyzed.

PERCEIVED IMPORTANCE OF HEALTH DETERMINANTS AMONG LOWER LIMB AMPUTEES: INSIGHTS FROM A TERTIARY HOSPITAL IN MALAYSIA USING THE "MYSCORECARD" FRAMEWORK

Chung Khian Yew, MD, Chau Chung Chai, MBBS, and Tze Yang Chung, MBBS

OBJECTIVES: Lower limb amputation adversely affects the overall health and well-being of amputees. Prof. Dr. James Rimmer, head of the University of Alabama at Birmingham (UAB)/Lakeshore Research Collaborative introduced the comprehensive "MYSCORECARD," a holistic health management framework. "MYSCORECARD" comprise of three core domains (body, mind, and spirit), encompassing acronyms of eleven health determinants: "Minding your thoughts and emotions," "Your spiritual practice," "Self-care skills," "Core values," "Outdoor time in nature," "Relationships," "Exercise," "Contribution to others," "Arts and entertainment," "Rest and relaxation," and "Diet." This study aimed to identify important health determinants perceived by lower limb amputees and assess their fulfillment by using the "MYSCORECARD" framework.

DESIGN: In this cross-sectional study, seventy-seven participants (mean age 57.2, SD 11.8) were enrolled from a tertiary hospital in Malaysia. Data were collected through self-administered structured questionnaires in English, based on the "MYSCORECARD" framework. Pilot questionnaires underwent face validation and demonstrated reliability with Cronbach's Alpha exceeding 0.7 ($n = 10$, Cronbach's alpha = 0.91). Perceptions of health determinant importance in "MYSCORECARD" were assessed on a 4-point Likert scale (1 = Not important, 2 = Slightly important, 3 = Moderately Important, 4 = Very important) along with determinants' fulfillment status (yes/no). Descriptive analysis was used for statistical evaluation.

RESULTS: All "MYSCORECARD" health determinants were deemed important by lower limb amputees; "Self-care skills" ranked highest (mean: 3.78, SD 0.47) while "Outdoor time in nature" ranked lowest (mean 2.74, SD 0.97). No determinants were regarded as "not important". "Minding your thoughts and emotions" was most fulfilled ($n = 71$, 92.2%), while "Outdoor time in nature" was least fulfilled ($n = 28$, 36.4%) among lower limb amputees.

CONCLUSION: This study highlighted the perceived importance of all "MYSCORECARD" health determinants for lower limb amputees, urging further exploration of its integration into amputee rehabilitation for holistic well-being. The lowest ranking of "Outdoor time in nature" for both perceived importance and fulfillment necessitate further investigation for comprehensive addressing in amputee rehabilitation.

PHYSICAL ACTIVITY AND FITNESS LEVELS OF INDIVIDUALS WITH ATAXIA: A CROSS-SECTIONAL STUDY

Scott Barbuto, MD, Seonjoo Lee, PhD, Joel Stein, MD, Sheng-Han Kuo, MD, Lori Quinn, PT, Michael Spinner, MS, Therese Derovanessian, BS, and Yaakov Stern, PhD

OBJECTIVES: To investigate physical activity levels of individuals with ataxia and correlate fitness to ataxia severity.

DESIGN: DESIGN: Observational study Setting: Outpatient ataxia clinic in a large, tertiary, urban hospital in the US. Participants: Individuals with cerebellar ataxia ($n = 42$). Intervention: Not applicable. Main Outcome Measure: Participants were classified as sedentary or physically active using the International Physical Activity Questionnaire-Short Form (IPAQ-SF). Maximal oxygen consumption ($VO_2\text{max}$) as an indicator of fitness level was measured, and ataxia severity was determined by the Scale for the Assessment and Rating of Ataxia (SARA). Mixed effect models were used to correlate ataxia severity to fitness levels.

RESULTS: Most participants (28 out of 42) lived sedentary lifestyles, and these individuals had poor fitness levels (only 67.3% of their predicted measure). The main barriers to physical activity included lack of energy, lack of time, and fear of falling. There were no differences in age, sex, disease type, disease duration, ataxia severity, fatigue level, and medication use between sedentary and active groups.

Measures of $VO_2\text{max}$, maximal work, maximal heart rate, and anaerobic threshold demonstrated statistically significant differences between groups whereas maximal respiratory rate and expired ventilation/carbon dioxide production were similar between groups. When adjusting for age, sex, functional mobility status, and disease duration, ataxia severity was inversely correlated with fitness level in the sedentary group. There was no relationship between ataxia severity and fitness level in the four-teen individuals who were physically active.

CONCLUSION: Lower fitness levels were associated with more ataxia symptoms in the sedentary group. This relationship was not seen in individuals who were more active. Given the poor health outcomes associated with low fitness, physical activity should be encouraged in this population.

PHYSICAL MEDICINE & REHABILITATION RESIDENCY PROGRAM DIRECTOR SURVEY OF LESBIAN, GAY, BISEXUAL, TRANSGENDER, QUEER, AND INTERSEX INCLUSION

Oscar E. Dimant, MD, Daniel Marte, MD, Brittany Snider, DO, Asa Radix, MD, PhD, MPH, Jayme O'Connor, BS, and Steven Kirshblum, MD

OBJECTIVES: To discover the status of inclusion of LGBTQ+ healthcare and concerns in U.S. PM&R graduate medical education. We expected low levels of inclusion in both curricula and policies and low levels of access to improvement resources.

DESIGN: A REDCap survey comprising 22 multiple-choice questions and 1 open-ended question regarding the amount/type of LGBTQ+ topics included in formal curricula and policies. Participants were ACGME-accredited PM&R Program Directors.

RESULTS: Ninety-two directors were invited; 34 (37%) responded. Only 26.5% of programs include sexual minority (SM) content, 23.5% include transgender and non-binary (TGNB) content, and 17.6% include intersex content, while 73.5% have no formal curriculum. Over half of the directors (52.9%) do not have sources of information to improve their content while 32.4% have 1, 5.9% have 2, and 8.8% have 3 or more sources. However, the majority of respondents support formal curricula on SM (97%), TGNB (94%), and intersex (94%) topics. Of the responding programs, 55.9% of directors reported protective policies in place for SM residents, 52.9% for TGNB residents, and 44.1% for intersex residents. Sources of information to improve protective policies are lacking for 44.1% of programs, whereas 41.2% have 1, 8.8% have 2, and 5.9% have 3 or more sources.

CONCLUSION: A minority of ACGME-accredited PM&R Program Directors who participated in our survey reported that they have formal curricula on LGBTQ+ topics and a majority do not have curricular improvement resources. However, a majority believe that residency should include curricula on LGBTQ+ topics. Many reported protective policies in place for LGBTQ+ residents and the majority have access to at least one policy improvement resource. Further work is needed to shape the content of curriculum and address barriers to inclusion in curricula and policies.

PHYSICAL THERAPISTS' PERSPECTIVES ON PHYSICIAN PRESCRIPTIONS

Adam T. Fehr, PT, DPT, and Mark Drymalski, MD

OBJECTIVES: Physicians often refer to physical therapist yet communication between professions is frequently limited to the initial prescription. This study seeks to evaluate how practicing physical therapists perceive prescriptions they receive from physicians. Examination of this area may identify opportunities for improved communication between professions.

DESIGN: Descriptive electronic RedCap survey. Subjects recruited through Facebook, Instagram, and Reddit flyers posted by author.

RESULTS: 52.0% of respondents ($N = 175$) felt physician prescriptions contain too little information (28.6% the right amount, 19.4% too much.) 41.1% reported information on the prescription only rarely changing treatment (36.0% occasionally, 6.3% often, 3.4% very often.) 33.7% feel physician prescriptions are "mostly out of date" with the MSK/rehab evidence (25.1% "sometimes out of date.") 36.0% reported their clinical findings often conflicting with the physicians diagnosis (15.4% "very often," 44.6% occasionally, 4.0% rarely, 0% never) 4.0% "always follow" the specific treatment instructions listed on the prescription. 21.7% "rarely" follow, 34.3% sometimes, 7.4% never, and 16.6% "most of the time. 42.3% find specific treatment instructions to be detrimental (52.0% neutral, 5.7% helpful.) When asked to rate importance of including imaging findings on a 0-5 scale with 5 being "extremely important" 37.7% selected 4/5 and 24.0% 5/5. When asked the same regarding precautions/contraindications 63.3% selected 5/5.