

## Conference Proceedings

# Abstracts of the inaugural scientific poster presentation and award competition of the 2024 Royal College of Chiropractic Sports Sciences (Canada) Conference

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### Introduction

The Annual RCCSS(C) Conference provides a venue for researchers, presenters, and attendees to advance sports healthcare practice, education, and research. The 2024 Annual RCCSS(C) Conference was convened on November 1st – 3rd, 2024 in Toronto, Canada. New to the 2024 conference was the Inaugural Scientific Poster Presentation and Award Competition. The RCCSS(C) Research and Education Committee would like to thank the Foundation for the RCCSS(C), individual donors to the poster awards, the RCCSS(C) Conference Committee, and all peer reviewers involved in judging the poster submissions for making the Inaugural Scientific Poster Presentation and Award Competition possible. Below are the abstracts of the poster presentations and award winners.

### *First Prize Poster*

Quadriceps function and vertical hop performance in ACLR athletes: constraint dependent relationship

Nathan Boon, Walter Herzog, Matthew J Jordan.

*Introduction: Return of knee extensor (KE) capacity and plyometric function is crucial for athletes following anterior cruciate ligament reconstruction (ACLR). Repeat hop testing (RHT) is a common assessment for plyometric function, however the relationship between RHT performance and KE function requires exploration in ACLR athletes. External task constraints applied via verbal instructions influences the proportional contribution of the knee joint during RHT. Understanding this relationship may inform the utility of RHT in identifying knee function deficits in ACLR athletes. The purpose of this study was to compare the influence of two cueing conditions on single leg RHT performance and its relationship with KE function in injured and uninjured limbs of ACLR athletes.*

*Methods: Athletes 6–18 months post-ACLR (n=12) performed RHT (15 repetitions) under two cue conditions: 1) “hop as quickly as you can” (hop FAST) and 2) “hop as high and as quickly as you can” (hop HIGH). Jump height, contact time, and reactive strength index (RSI = jump height/contact time) were calculated. Isometric KE was evaluated at 90° flexion. Rate-of-torque development (RTD) was determined as torque at 100 ms following contraction onset.*

*Results: All variables were significantly different between the two cueing conditions for both limbs (p<0.05).*

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Jump height and RSI were significantly higher in the non-injured limb compared to the injured limb during the hop HIGH condition ( $p < 0.05$ ). KE torque and RTD independently explained a significant portion of variance in hop HIGH RSI ( $R^2 = 0.19-0.45$ ), but not hop FAST.

Discussion/Conclusion: The two cueing conditions significantly modified RHT kinetics regardless of limb injury status. The hop HIGH condition illuminated significant inter-limb differences in RHT performance and moderate associations with KE torque and RTD not observed during hop FAST. Clinicians managing ACLR athletes may employ an RHT using the hop HIGH cue to specifically evaluate knee joint function.

### Second Prize Poster

The prevalence of sleep disturbance among competitive athletes presenting for care at the Sports and Exercise Research Collaborative for Health Practice-based Research Network (SERCH-PBRN)

Rachel Mochulla, Shailey Patel, David Oh, Alexander Lee, Brad Muir, Scott Howitt, Chris deGraauw, Lara deGraauw, Mohsen Kazemi, Glenn Cashman, Cameron Borody, Peter Stilwell, Kent Stuber, Katie de Luca, Sheilah Hogg-Johnson

Introduction: Sleep disturbance influences athletic performance, recovery and training. Little is known about the prevalence of sleep disturbance among athletes. The Athlete Sleep Screening Questionnaire (ASSQ) is a validated questionnaire that assesses sleep quality, patterns, and disturbances among athletes and provides a sleep difficulty score.

Methods: Over a 6-week period, patients (athletes and non-athletes) aged 18+ who sought care from a SERCH-PBRN chiropractor were recruited to complete a survey about sleep. Only competitive athletes (varsity level and above) completed the ASSQ. The primary outcome was the sleep difficulty score (SDS), which is calculated from the ASSQ. Descriptive statistics were used to summarize patient demographic characteristics and the ASSQ SDS.

Results: 1954 responses were collected from 25 clinics, with 179 completing the ASSQ. ASSQ respondents had a mean age of 36.3 years, with 35% being female. Of these respondents, 73% were categorized as having some level

of sleep difficulty and 43% had moderate to severe sleep disturbance scores.

Discussion/Conclusion: To our knowledge, this is the first study to deploy the ASSQ to measure sleep disturbance amongst competitive athletes in community-based sports clinics. With 43% of competitive athletes having a moderate to severe sleep disturbance score, sports chiropractors should be aware of the prevalence of sleep disturbance among the athletes they treat.

### Excellence Award Posters

A cross-sectional analysis of the Sport and Exercise Research Collaborative for Health Practice-Based Research Network (SERCH-PBRN) of Canadian chiropractors working in sport

Jonathan Okrainetz, Alexander Lee, Brad Muir, Scott Howitt, Chris deGraauw, Lara deGraauw, Mohsen Kazemi, Glenn Cashman, Cameron Borody, Peter Stillwell, Kent Stuber, Katie de Luca, Sheilah Hogg-Johnson

Introduction: Practice-based research networks (PBRNs) provide the infrastructure to bring clinicians and researchers together to conduct research in real-life practice settings. PBRNs improve the generalizability of research, enhance recruitment capability, and facilitate quality improvement. The SERCH-PBRN was established to provide the Canadian sports chiropractic field with the framework to conduct practice-based research.

Methods: 54 SERCH-PBRN chiropractors from 9 Canadian provinces were recruited to complete a cross-sectional, descriptive survey – the PBRN Clinician Questionnaire.

Results: 51 SERCH-PBRN chiropractors completed the PBRN Clinician Questionnaire (94% response rate). Practitioner demographic, practice characteristics, and patient management highlights are reported in the provided tables and figures.

Discussion/Conclusion: To our knowledge, the SERCH-PBRN is the first sports chiropractic PBRN, providing a diverse, cross-country network of chiropractors working in sport. The SERCH-PBRN provides the sports chiropractic field with the infrastructure to conduct practice-based research.

Experimentally induced central sensitization leads to echotextural changes in neurosegmentally linked skeletal muscle in healthy humans

Adam Wade, Scott Howitt, Jaclyn Kissel, Pawel Bartlewski, John Srbely

*Introduction: Musculoskeletal injuries are most prevalent in athletes in sports. Athletes are likely to develop myofascial trigger points (MTrP) at some point in their careers. Central sensitization (CSens) and Neurogenic Inflammation (NI) are believed to be the driving force behind MTrP formation. To date no research has been done in humans to investigate the relationship between central sensitization and echotextural changes within segmentally linked myotomes utilizing an algorithm to analyze pixel densities in B-mode ultrasound images.*

*Methods: A convenience sample of 14 healthy athletic participants aged 18-26 (10 female, 4 male) was collected. A single-blinded cross-over design was performed using an experimental (Zostrix – 0.075% capsaicin) sensitizing agent and a control (Lubriderm) non-sensitizing agent applied topically to the skin. Topicals experimental/control were applied from C1-7 and across the upper trapezius laterally to both AC joints as well as both lateral elbows in a 10x10cm area. Wind-Up ratio (WUR) was performed with a 256 mN PinPrick Stimulator (MRC Systems, Heidelberg, Germany) at baseline, 10-, 20-, 30-minutes post intervention to validate CSens. B-mode ultrasound images were taken of the right biceps in transverse and longitudinal planes at baseline, 10-, 20-, 30-minutes post intervention. A two-way repeated-measures ANOVA was performed to assess differences in echotexture and sum score (SS) with the novel algorithm, r-Algo.*

*Results: A significant negative correlation was shown between mean pixel intensity changes and pooled SS on all images taken in the transverse plane ( $r=-0.46$ ,  $P=0.0003$ ). Conversely, a positive correlation between mean pixel intensity changes and pooled SS was seen on images taken in the longitudinal plane ( $r=0.38$ ,  $P=0.003$ ).*

*Discussion/Conclusion: Transverse image findings support our hypothesis of mean echointensity reduction in relation to SS increase whereas longitudinal images showed a positive correlation between mean echointensity change and SS. This is the first study in humans to use an algorithm to correlate echotextural changes with CSens by assessing pixel densities from B-Mode ultra-*

*sound images. Ultrasound may be an effective tool for detecting NI and segmentally linked CSens. These findings may have important clinical implications in the diagnosis of myofascial pain. Future research with high resolution equipment and muscle biopsies to identify inflammatory markers and their echotextural range is needed.*

Neuroplastic training in a male soccer player following foot drop due to an iatrogenic cause: a case report

Sayyid Hassan, Katie Sheridan

*Introduction: Mirror therapy is a technique implemented by placing a mirror in the sagittal plane in between the limbs whereby, a patient performs an action and imagines regaining control over the affected limb. This case report highlights the treatment of a 46-year-old male who presented for chiropractic care following surgery to repair his right-sided knee ligamentous structures and a tibialis posterior tendon transfer following a collision during a soccer game. Following the initial surgery, there was a severe right-sided peroneal nerve palsy as the right peroneal nerve was severed during surgery. The patient was referred for care to increase ankle range of motion and for neuroplastic functional training of the new tendon transfer. The patient started chiropractic care eight weeks following the second surgery and presented for care twice to thrice weekly for 12 months. This care plan consisted of multimodal chiropractic care but specifically focused on mirror therapy.*

*Methods: The patient was treated with a combination of soft tissue therapy, acupuncture, active care, mobilizations, and mirror therapy over one year. Education and re-assurance were also included in the plan of management.*

*Results: In the 12-months following chiropractic care, the patient regained active dorsiflexion and was able to return to work (the patient worked as a factory line worker) and duties such as: being able to stand for four hours and walking and climbing stairs as tolerated.*

*Discussion/Conclusion: Iatrogenic peripheral nerve injuries (PNIs) are uncommon and routinely treated with surgery if there is no spontaneous resolution. Mirror therapy is commonly used to restore motor function in patients following a stroke. This case report suggests a potential use for mirror therapy in patients who have suffered an iatrogenic laceration of a peripheral nerve.*