

The Graduate Health and Exercise Sciences Society  
Presents

# THE 5TH ANNUAL GRADUATE RESEARCH DAY

May 13, 2022 | 9am-4pm



THE UNIVERSITY OF BRITISH COLUMBIA  
Okanagan Campus



## PROGRAM

### Morning Session I

Moderators: Kaela Cranston & Bradi Lorenz

- 9:00 am **WELCOME AND  
OPENING REMARKS**  
Tanya Forneris | Kaela Cranston
- 
- 9:10 am Nique Bruce, P Ainslie, C McNeil  
**THE EFFECTS OF FREEDIVING AND  
SPEARFISHING ON NEUROMUSCULAR  
AND COGNITIVE FUNCTION**
- 
- 9:22 am Natalie Grieve, KD Cranston, ME Jung  
**CAN E-LEARNING BE USED TO  
EFFECTIVELY TEACH SMALL STEPS FOR  
BIG CHANGES COACHES?**
- 
- 9:34 am Connor Howe, R Hoiland, T Gibbons,  
A Steele, J Carr, G Vizcardo, M Tymko,  
T Schoenthal, V Cates, A Marullo, T  
Day, M Sekhon, P Ainslie  
**CEREBRAL OXYGEN DELIVERY AND  
CEREBRAL METABOLIC RATE ARE  
UNALTERED DURING MILD  
HYPOTHERMIA IN HUMANS**
- 
- 9:46 am Ruitong Gao, H Guo, Y Liu, Y Pang, X  
Zhang, X Lian, ME Jung, F Li  
**THE EFFECTS OF MESSAGE FRAMING  
ON SELF-MANAGEMENT BEHAVIOUR  
AMONG DIABETES: A RANDOMIZED  
CONTROLLED TRIAL**
- 
- 9:58 am Rowan Smart, B O'Connor, J Jakobi  
**AGE- AND SEX-RELATED  
UNDERESTIMATION OF BICEP BRACHII  
TENDON STRESS**
- 
- 10:10 am Liam Stewart, L Wainman, M  
Ahmadian, J Duffy, R Seethaler, P J  
Mueller, N Eves, CR West  
**DIRECT EVIDENCE OF A  
SYMPATHETICALLY-MEDIATED  
CARDIO-INOTROPIC RESPONSE TO  
BARORECEPTOR UNLOADING IN RATS**



- 
- 10:22 am Paige Copeland, MIB  
Debenham, PL Ha, K Newel, CJ  
McNeil, BH Dalton  
**CRISS CROSS'LL MAKE YOU  
STAND, STAND!: CROSSING FEET  
LEADS TO INVERSION OF LOWER-  
LIMB VESTIBULAR-EVOKED  
RESPONSES TO MAINTAIN  
BALANCE**
- 
- 10:28 am Jenna Sim, ME Jung  
**WHAT ARE WE MISSING?  
CONVERSATIONS WITH PEOPLE  
EXPERIENCING FOOD  
INSECURITY ABOUT TYPE 2  
DIABETES RISK**
- 
- 10:34 am Parisa Alaei, R Smart, C Calkins, J  
Jakobi  
**EFFECTS OF MENSTRUAL CYCLE  
HORMONES ON TENDON  
HYSTERESIS**
- 
- 10:40 am - **COFFEE BREAK**  
11:00 am PROVIDED BY UBCO FOOD  
SERVICES

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## PROGRAM

### Morning Session II

Moderators: Jonathan Low & Kaela Cranston

**11:00 am** Jay Carr, RL Hoiland, DB MacLeod, JC Tremblay, CA Howe, A Patrician, GB Coombs, PN Ainslie  
**CEREBROVASCULAR CO<sub>2</sub> REACTIVITY IN ISOVOLUMIC ANEMIA: BLOOD FLOW COMPENSATION, MAINTENANCE OF CEREBRAL O<sub>2</sub> DELIVERY, AND ADEQUACY OF CO<sub>2</sub> WASHOUT**

**11:12 am** Lisa Ha, G Oostlander-Enns, M Kennefick, M Debenham, B Dalton  
**CHARACTERIZATION OF VESTIBULAR-EVOKED RESPONSES IN THE TRICEPS BRACHII DURING ARM-SUPPORTED BALANCE**

**11:24 am** Alanna Shwed, K Tang, F Hoekstra, L McPhail, N Thorogood, CR West, SCI Guiding Principles Panel, HL Gainforth  
**IDENTIFYING MEANINGFUL RESEARCH PARTNERSHIPS IN SPINAL CORD INJURY GRANT APPLICATIONS: PRELIMINARY FINDINGS**

**11:36 am** Bryce Twible, L Ruggiero, C McNeil, B Dalton  
**THE EFFECT OF EXERCISE-INDUCED FATIGUE ON INTER-LIMB ASYMMETRIES IN ELITE YOUTH HOCKEY ATHLETES**

**11:48 am** Liisa Wainman, M Ahmadian, G Foster, CR West  
**ACUTE INTERMITTENT HYPOXIA IMPROVES ORTHOSTATIC TOLERANCE IN CHRONIC BUT NOT ACUTE SPINAL CORD INJURED RATS**



**12:00 pm** Aldovino Rapini, J Little  
**EFFECTS OF EXOGENOUS KETONE SUPPLEMENTATION ON TNF-ALPHA IN PEOPLE LIVING WITH TYPE 2 DIABETES**

**12:12 pm** Ana Sanchez, E Giroux, J Bassett-Spiers, CB McBride, B Munro, SCI IKT Guiding Principles Partnership, HL Gainforth  
**USING ENVIRONMENTAL SCAN METHODS TO UNDERSTAND FACTORS THAT INFLUENCE RESEARCH PARTNERSHIPS WITH SPINAL CORD INJURY (SCI) COMMUNITY-BASED ORGANIZATIONS (CBOS)**

**12:18 pm** Mathew Debenham, CD Bruce, CJ McNeil, BH Dalton  
**THE INFLUENCE OF NORMOBARIC HYPOXIA ON ACHILLES TENDON REFLEX INHIBITION: A PROPOSAL**

**12:24 pm** Kyra Braaten, ME Jung  
**THE ROLE OF FAMILY SUPPORT IN PREVENTING TYPE 2 DIABETES IN RURAL BRITISH COLUMBIA**

**12:30 pm - LUNCH BREAK**

**1:30 pm** Provided by UBCO Food Services  
LOCATION: FIPKE CENTER RM 204

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## PROGRAM

### Afternoon Session

Moderators: Nique Bruce & Alanna Shwed

#### 1:30 PM KEYNOTE ADDRESS

**Dr. Katrina Plamondon**

**WALKING GENTLY: A STORY OF EQUITY RESEARCH, AND BECOMING A HEALTH EQUITY RESEARCHER**

#### 2:30 pm - COFFEE BREAK

2:40 pm Provided by J&N Catering

2:40 pm Quinn Malone, C McNeil, S Passmore, C Glazebrook, B Dalton  
**DOES THE PRESENCE OF A VISUAL TARGET RANGE BEFORE AND DURING MOVEMENT CAUSE A VIOLATION OF FITTS' LAW?**

2:52 pm Sarah Lawrason, KA Martin Ginis  
**ASSESSING THE EFFECTS OF A PHYSICAL ACTIVITY MHEALTH INTERVENTION AMONG INDIVIDUALS WITH SPINAL CORD INJURY: A RANDOMIZED CONTROLLED TRIAL**

3:04 pm Gustavo Vizcardo-Galindo, CA Howe, RL Hoiland, HH Carter, PN Ainslie, JC Tremblay  
**IMPACT OF OXYGEN SUPPLEMENTATION ON BRACHIAL ARTERY HEMODYNAMICS AND VASCULAR FUNCTION DURING ASCENT TO 5050M**

3:16 pm Kaela Cranston, JAP Sim, ME Jung  
**"EVERY CLIENT DESERVES A PLACE TO FEEL SAFE": CANADIAN KINESIOLOGY STUDENT'S AND FITNESS FACILITY STAFF'S OPINIONS ON A BRIEF CULTURAL SAFETY AND INCLUSIVITY ONLINE MODULE**



3:28 pm Juliana Rancier, MIB Debenham, CD Bruce, CJ McNeil, BH Dalton  
**THE EFFECT OF NORMOBARIC HYPOXIA ON THE SURAL NERVE CUTANEOUS REFLEX DURING STANDING BALANCE**

3:40 pm Blanca Gala, M MacPherson, ME Jung  
**SELF- REFLECTIONS OF PHYSICAL ACTIVITY BEHAVIOUR: EXPLORING REAL-WORLD CONTEXTS**

3:46 pm Cori Calkins, S Kraeutner, J Jakobi  
**THE EFFECT OF MOTOR IMAGERY TRAINING ON COMMON SYNAPTIC INPUT TO MOTOR NEURONS AND FORCE STEADINESS IN OLDER ADULTS**

3:52 pm Laura Kuipers, F Hoekstra, T Hoekstra, SCI Exercise  
**COUNSELLING PANEL EXERCISE COUNSELLING FOR ADULTS WITH SPINAL CORD INJURY IN CANADA AND THE NETHERLANDS: AN INTERNATIONAL SURVEY STUDY**

3:58 pm - CLOSING REMARKS  
4:05 pm Kaela Cranston

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## ABSTRACTS

In Order of Presentation



Christina Bruce, P Ainslie, C McNeil

### **THE EFFECTS OF FREEDIVING AND SPEARFISHING ON NEUROMUSCULAR AND COGNITIVE FUNCTION**

Elite breath-hold divers (those who dive underwater on a single breath of air) commonly report extreme levels of fatigue following one or more dives. However, there have been few attempts to quantify dive-related impairments in neuromuscular and cognitive function. Therefore, the proposed study aims to quantify these indices of function in two types of breath-hold divers. Approximately 10 competitive freedivers (performing 1-2 deep dives to ~100metres of seawater; msw) and 15 competitive spearfishers (performing multiple dives to moderate depths of 10-50msw) will be assessed once before diving and twice post-dive (1-2h and 24h). Voluntary and electrically-evoked contractions of an intrinsic hand muscle will provide insight into dive-related effects on neuromuscular function (e.g., maximal voluntary force, muscle activation, and fatigability). Cognitive assessments will involve tasks that require manual dexterity, coordination, and inhibitory control (Purdue Pegboard test and Go/No-go Task). We hypothesize that all measures will be impaired 1-2h post-dive, in both groups. Due to increased total time under water, which may lead to greater nitrogen accumulation within the central nervous system, we predict greater impairments for the spearfishing than freediving group. Additionally, we hypothesize that all indices will recover to pre-dive values by 24h for both groups. Findings from this study will provide invaluable insight regarding the neuromuscular and cognitive effects of breath-hold diving, which could help to advance safety guidelines and training programs.

Natalie J Grieve, KD Cranston, ME Jung

### **CAN E-LEARNING BE USED TO EFFECTIVELY TEACH SMALL STEPS FOR BIG CHANGES COACHES?**

E-learning platforms have been shown to effectively teach generalized content and skills to health professionals, however less is known in the context of training diabetes prevention coaches. *Small Steps for Big Changes* (SSBC) is a community-based diabetes prevention program. SSBC guides adults with prediabetes through diet and exercise counselling sessions using a motivational interviewing (MI) approach to help empower behaviour modification. SSBC requires specific training prior to permitting coaches to counsel clients. An online course to deliver training was developed to train SSBC coaches. Effectiveness of the SSBC e-learning platform was assessed by pre- and post-training questionnaires on knowledge of type 2 diabetes, motivational interviewing, SSBC content, self-efficacy to deliver the program, and user satisfaction. MI knowledge ( $M_{pre}=4.00\pm1.63$ ,  $M_{post}=6.14\pm0.90$ ;  $p < 0.05$ ), SSBC content knowledge ( $M_{pre}=5.00\pm1.82$ ,  $M_{post}=8.29\pm0.95$ ;  $p < 0.05$ ) and self-efficacy to deliver the program ( $M_{pre}=7.94\pm1.15$ ,  $M_{post}=9.02\pm0.85$ ;  $p < 0.05$ ) were significantly increased from pre- to post e-learning training, while significant differences were not seen for diabetes knowledge ( $M_{pre}=7.43\pm1.90$ ,  $M_{post}=8.43\pm0.79$ ;  $p=0.11$ ). All participants reported positively on the user satisfaction survey with a mean score of  $4.64\pm0.26$ , on a 5-point Likert scale with 5 measuring high levels of satisfaction. These findings suggest e-learning platforms are a promising mode of training to teach diabetes prevention program knowledge, counselling skills, and to bolster confidence to deliver diabetes prevention programs, with high levels of satisfaction among users. This e-learning platform will allow SSBC to effectively train coaches with high fidelity, and ultimately, permit feasible expansion to any area with internet access.

## ABSTRACTS

In Order of Presentation

Connor Howe, R Hoiland, T Gibbons, A Steele, J Carr, G Vizcardo, M Tymko, T Schoenthal, V Cates, A Marullo, T Day, M Sekhon, P Ainslie

### **CEREBRAL OXYGEN DELIVERY AND CEREBRAL METABOLIC RATE ARE UNALTERED DURING MILD HYPOTHERMIA IN HUMANS**

Cerebral metabolic rate (CMR) has been reported to be reduced due to the direct effect of changes in core temperature on tissue metabolism ( $Q_{10}$  effect), and may provide a degree of cerebral protection under conditions in which cerebral oxygen delivery ( $CDO_2$ ) is challenged. However, this possibility has never been examined in healthy humans. In this study, the cerebral metabolic rates of oxygen ( $CMRO_2$ ), glucose ( $CMR_{glucose}$ ), lactate ( $CMR_{lactate}$ ), and  $CDO_2$  was assessed pre and post mild hypothermia in 14 participants (6-female). Radial arterial and jugular venous blood gases, paired with duplex ultrasound measurements of the internal carotid and vertebral arteries, were used to determine cerebral blood flow (CBF),  $CDO_2$  and CMR. Measures were obtained pre and post a 1.5-2°C reduction in core temperature induced via cold water (8°C) immersion and assessed using an esophageal thermistor. Global CBF was reduced ( $840 \pm 132$  vs  $727 \pm 177$  ml/min;  $P < 0.01$ ) with a mirrored increase in arterial oxygen content ( $CaO_2$ ;  $19 \pm 1$  vs  $22 \pm 2$  mL/dL;  $P < 0.01$ ) resulting in maintained  $CDO_2$  ( $161 \pm 27$  vs  $158 \pm 42$  mL/min;  $P = 0.6$ ). All measures of cerebral metabolism ( $CMRO_2$ ,  $CMR_{lactate}$ , and  $CMR_{glucose}$ ) were unaltered following core cooling. Mean arterial pressure was markedly increased ( $90 \pm 6$  vs  $111 \pm 10$  mmHg;  $P < 0.01$ ) while ventilation was increased ( $14 \pm 4$  vs  $43 \pm 10$  L/min;  $P < 0.01$ ) and the partial pressure of arterial  $CO_2$  ( $43 \pm 2$  vs  $38 \pm 3$  mmHg;  $P < 0.01$ ) was reduced following cooling. Despite reports of reduced CMR in pre-clinical studies and anesthetized patients, we did not observe any changes in healthy humans with mild hypothermia. Indeed, hypothermia induced increases in  $CaO_2$  appear sufficient to maintain  $CDO_2$ .

Ruitong Gao, H Guo, Y Liu, Y Pang, X Zhang, X Lian, M Jung, F Li

### **THE EFFECTS OF MESSAGE FRAMING ON SELF-MANAGEMENT BEHAVIOUR AMONG DIABETES: A RANDOMIZED CONTROLLED TRIAL**

Message framing refers to the way information is communicated, and might influence its persuasiveness on future attitudes and behaviours. Content can be structured to be 'gain-framed' by highlighting the positive consequences of adherence to recommendations, whereas 'loss-framed' describing the negative consequences of non-adherence. This research evaluated the effect of message framing in diabetes education on self-management behaviour in patients with type 2 diabetes (T2D), and to identify potential moderating effects of patient activation on message framing. 84 patients with T2D were randomized into gain-, loss-, or no-message framing groups, and received a 12-week intervention. The two message framing groups received 30 videos that were either gain- or loss-framed, accentuating desirable outcomes from good diabetes self-care in the former and undesirable outcomes from inadequate diabetes self-care in the latter. The control group received 30 videos about diabetes self-care without message framing. Self-management behaviour, self-efficacy, diabetes knowledge, and attitudes were measured at baseline and 12 weeks. Patients who watched either gain- and loss-framed messages showed significant improvement of self-management behaviour, self-efficacy, knowledge, and attitudes ( $p < 0.05$ ). Further analysis revealed an interaction between patient activation and message framing, with gain framing and loss message framing interventions being more effective in enhancing self-management behaviours in people with T2D with lower and higher level of activation, respectively ( $p = 0.002$ ). The use of message framing in diabetes education is a promising strategy for improving self-management behaviour. It also suggests the selection of appropriate message framing to enhance self-management behaviour according to the level of patient activation.



# ABSTRACTS

In Order of Presentation

Rowan Smart, B O'Connor, J Jakobi

## AGE- AND SEX-RELATED UNDERESTIMATION OF BICEP BRACHII TENDON STRESS

Tendon stress during muscle contractions is typically measured using resting cross-sectional area (CSA), but this does not account for decreasing CSA as the tendon lengthens. This study evaluated age- and sex-related influences of tendon CSA reductions on measured values of tendon stress. Nine young (YM) ( $22 \pm 1$  yrs) and old (OM) ( $76 \pm 4$  yrs) males, and eight young females (YF) ( $21 \pm 1$  yrs) performed isometric elbow flexion contractions at force levels ranging from 2.5% to 80% of maximal voluntary contraction (MVC). Distal biceps brachii tendon CSA was recorded on ultrasound at rest and during contraction to calculate tendon stress. Tendon CSA decreased 18.2% across force levels ( $p < 0.05$ ) and was largest in YM ( $23.0 \pm 2.90$  mm<sup>2</sup>) followed by OM ( $20.9 \pm 2.0$  mm<sup>2</sup>) and YF ( $17.1 \pm 1.54$  mm<sup>2</sup>) ( $p < 0.001$ ). Multi-level modelling was used to generate growth curves of tendon stress for each group. Growth curves were then analyzed using Johnson-Neyman regions of significance to determine force levels above which stress values differed between resting and contracted tendon CSA conditions. The difference between resting and contracted CSA stress measures was greatest in YM ( $20 \pm 4$  %) followed by OM ( $19 \pm 5$  %) and YF ( $17 \pm 5$  %). Contracted CSA stress was greater than resting CSA stress above 9.98% MVC in YM, 2.56% MVC in OM and 6.63% in YF ( $p < 0.05$ ). Biceps brachii tendon stress values are significantly greater using instantaneous compared to resting tendon CSA measures, and this difference is both age-specific for males, and sex-specific for YM and YF.

Liam Stewart, L Wainman, M Ahmadian, J Duffy, R Seethaler, PJ Mueller, N Eves, CR West

## DIRECT EVIDENCE OF A SYMPATHETICALLY-MEDIATED CARDIO-INOTROPIC RESPONSE TO BARORECEPTOR UNLOADING IN RATS

Contemporary discussion of the baroreflex includes the efferent vascular-sympathetic and cardio-vagal arms. Based on the anatomy of the sympathetic nervous system, however, the heart may also undergo sympathetically-mediated increases in cardiac inotropy during baroreceptor unloading, but this has not been empirically tested using a load-independent index of inotropy. We aimed to 1) determine whether left-ventricular (LV) inotropy increases in response to baroreceptor unloading, and 2) parse out whether increases are mediated via sympathetic activation or parasympathetic withdrawal. 10 male rats were anesthetized ( $\sim 1.7$ g/kg urethane) and instrumented with arterial and LV pressure-volume catheter to measure mean arterial pressure (MAP) and inotropy [maximal rate of pressure generation for a given end-diastolic volume ( $dP/dt_{\max}$ -EDV mmHg $\cdot$ s<sup>-1</sup> $\cdot$  $\mu$ l<sup>-1</sup>)] and placed in a servo-controlled lower-body negative pressure (LBNP) chamber to reduce MAP by 10% to mechanically unload baroreceptors. LBNP was repeated in the same animal following infusions of esmolol (blocks cardiac sympathetic transmission), atropine (blocks cardiac parasympathetic transmission), and esmolol+atropine (full cardiac autonomic blockade). Under control conditions,  $dP/dt_{\max}$ -EDV increased significantly ( $25.8 \pm 4.9$  vs  $29.9 \pm 6.7$  mmHg $\cdot$ s<sup>-1</sup> $\cdot$  $\mu$ l<sup>-1</sup>;  $p = 0.002$ ) during unloading. Sympathetic and full cardiac blockade significantly reduced baseline  $dP/dt_{\max}$ -EDV ( $10.8 \pm 2.1$  and  $13.5 \pm 3.0$  mmHg $\cdot$ s<sup>-1</sup> $\cdot$  $\mu$ l<sup>-1</sup>, respectively;  $p < 0.001$  for both), and abolished the response to baroreceptor unloading ( $10.6 \pm 2.1$  and  $14.3 \pm 4.0$  mmHg $\cdot$ s<sup>-1</sup> $\cdot$  $\mu$ l<sup>-1</sup>, respectively;  $p = 0.999$  for both). Parasympathetic blockade had no effect on baseline  $dP/dt_{\max}$ -EDV ( $26.1 \pm 5.5$  mmHg $\cdot$ s<sup>-1</sup> $\cdot$  $\mu$ l<sup>-1</sup>;  $p = 0.999$ ) and the increase in  $dP/dt_{\max}$ -EDV during baroreceptor unloading was maintained ( $30.5 \pm 8.3$  mmHg $\cdot$ s<sup>-1</sup> $\cdot$  $\mu$ l<sup>-1</sup>;  $p < 0.001$ ). These results provide direct evidence of a sympathetically mediated cardio-inotropic response to baroreceptor unloading in rats.

## ABSTRACTS

In Order of Presentation

Paige V Copeland, MIB Debenham, PL Ha, K Newel, CJ McNeil, BH Dalton

### **CRISS CROSS'LL MAKE YOU STAND, STAND!: CROSSING FEET LEADS TO INVERSION OF LOWER-LIMB VESTIBULAR-EVOKED RESPONSES TO MAINTAIN BALANCE**

Vestibular-evoked balance responses follow a craniocentric pattern, whereby postural adjustments of each muscle are modified to direct a whole-body balance response based upon the relative position of the head and feet. When standing with the feet crossed, it is intuitive that lower-limb muscle activity would need to be the inverse of the typical pattern observed when standing in anatomical position to prevent falling. However, it's unknown if the vestibular system can adapt to a novel foot-crossed posture to provide appropriate postural adjustments to the lower limbs when the functional consequence of the muscle activity is reversed. Thus, the aim was to investigate how crossing the feet alters vestibular-evoked balance responses in the lower limb. It was hypothesized that switching foot position would lead to reversal of the vestibular-evoked balance response in each medial gastrocnemius (MG) compared to an anatomical posture. Eight participants completed six, 90-s trials of stochastic electrical vestibular stimulation in three different foot positions (anatomical, right-foot-over-left, and left-foot-over-right). Electromyographic signals were recorded bilaterally from the MGs. Cumulant density functions were used to characterize vestibular-evoked balance responses. When participants' feet were crossed, compared to an anatomical position, vestibular-evoked balance responses were inverted for both MGs ( $p \leq 0.012$ ). However, the direction of the whole-body balance response remained consistent, regardless of foot position. Our results indicate that the vestibular system can adapt to provide appropriate postural adjustments to the lower limbs when the functional consequence of muscle activity is reversed, thus allowing for the maintenance of balance.

Jenna AP Sim, Mary E Jung

### **WHAT ARE WE MISSING? CONVERSATIONS WITH PEOPLE EXPERIENCING FOOD INSECURITY ABOUT TYPE 2 DIABETES RISK**

Individuals who are experiencing food insecurity are nearly two times more likely to have type 2 diabetes (T2D) than those who have secure access to safe and nutritious food. It is unclear whether people who are experiencing food insecurity in Kelowna are aware of their risk of developing T2D. *Small Steps for Big Changes* (SSBC) is a diabetes prevention program based out of Kelowna, BC. SSBC has been successful in helping individuals prevent the onset of T2D through improving diet and increasing physical activity, however most participants in the program have been white, middle-aged women from an upper-middle class socioeconomic status. The purpose of this study is to understand the capability, opportunity, and motivation that people who access the food bank in Kelowna have about learning their risk of T2D. Semi-structured interviews will be conducted with adults who access the Central Okanagan Food Bank in Kelowna. The theoretical domains framework will be used in the development of the interview guide. Interviews will be recorded and transcribed verbatim with participants then being offered the option to review, and edit, their transcript. Transcriptions will be coded using the COM-B model of behaviour (Michie et al., 2014) to identify the context of factors influencing awareness of T2D risk. Results from this study will inform potential changes to current recruitment methods for SSBC, and possible diabetes risk awareness interventions at the foodbank. Overall, this project aims to increase the equity and reach of SSBC to those who need it most.



## ABSTRACTS

In Order of Presentation



Parisa Alae, R Smart, C Calkins, J Jakobi

### **EFFECTS OF MENSTRUAL CYCLE HORMONES ON TENDON HYSTERESIS**

Tendon hysteresis is a measure of a tendon's ability to store and release energy during elongation. Sex-hormone levels fluctuate throughout the menstrual cycle and the influence on tendon mechanical properties are equivocal. How changes in estrogen and progesterone levels during the menstrual cycle influence tendon hysteresis has not been studied and this would lend insight into mechanical properties. Ten females ( $21.8 \pm 9.8$  years) were tested during the follicular and luteal phases of their menstrual cycle. Participants performed three isometric elbow flexion pyramid contractions up to maximum voluntary contraction (MVC) force. Distal biceps brachii tendon elongation was recorded on ultrasound during the contractions. Hysteresis was calculated as the difference in area under the tendon force-elongation curves for the ramp and de-ramp portions of the pyramid contractions. MVC was higher in the luteal ( $144.6 \pm 72.8$  N) compared to follicular ( $134.5 \pm 30.5$  N) phase ( $p=0.03$ ). Hysteresis did not statistically differ between the luteal ( $54.5 \pm 54.5$  %) and follicular ( $28.9 \pm 30$  %) phase ( $p=0.09$ ). During the ramp, and deramp phases tendon elongation increased and decreased approximately 5mm and 2mm, respectively ( $p<0.001$ ). Hysteresis was substantially higher, albeit non-significant in the luteal phase. Unique hormone concentrations per individual is a likely contributor to high variability in the hysteresis data. Future studies will measure hormonal levels, and use as a co-variate to better define the role of sex-based hormones on tendon properties.

Jay MJR Carr, RL Hoiland, DB MacLeod, JC Tremblay, CA Howe, A Patrician, GB Coombs, PN Ainslie

### **CEREBROVASCULAR CO<sub>2</sub> REACTIVITY IN ISOVOLUMIC ANEMIA: BLOOD FLOW COMPENSATION, MAINTENANCE OF CEREBRAL O<sub>2</sub> DELIVERY, AND ADEQUACY OF CO<sub>2</sub> WASHOUT**

This study investigated the influence of acute experimental anemia on global cerebral blood flow (gCBF), cerebral CO<sub>2</sub> transport, and cerebrovascular CO<sub>2</sub> reactivity (CVR). 11 healthy males (age;  $28 \pm 7$  years; BMI;  $23 \pm 2$  kg/m<sup>2</sup>) underwent CVR testing prior to and following isovolumic hemodilution. The partial pressure of arterial CO<sub>2</sub> (PaCO<sub>2</sub>) was elevated to +3, +6, and +9mmHg above baseline in 5-min stages during which gCBF was assessed (duplex ultrasound). Arterial and superior internal jugular vein blood gases and intravascular blood pressure measurements were taken at each stage. CVR was determined as the slope of the relationship between PaCO<sub>2</sub> and gCBF. The CO<sub>2</sub> washout was estimated by multiplying calculated total jugular venous CO<sub>2</sub> content by gCBF. Hemodilution was conducted by removal and replacement of ~20% of blood volume with an equal volume of 5% human serum albumin (Alburex® 5%). Hemodilution reduced both hematocrit ( $P<0.001$ ) and hemoglobin concentration ( $P<0.001$ ) by ~18% each, resulting in a reduced arterial oxygen content ( $18.9 \pm 1.0$  vs  $15.0 \pm 0.8$  mL/dL  $P<0.001$ ) and elevated basal gCBF (+18%;  $P=0.002$ ). This increased gCBF preserved cerebral oxygen delivery ( $P=0.49$ ). Moreover, the increase in gCBF also elevated CO<sub>2</sub> washout (+11%;  $P=0.01$ ) perhaps underpinning the conservation of CVR ( $P=0.23$ ) following hemodilution. Thus, in the setting of acute anemia in the absence of pathology, cerebral vascular responses preserve cerebral oxygen delivery, and in doing so, maintain central acid base balance, even in the face of subsequent hypercapnic challenges. Further investigation is needed into the differential factors contributing to changes in CVR seen in chronic anemic pathologies.

## ABSTRACTS

In Order of Presentation

Phuong Ha, G Oostlander-Enns, M Kennefick, M Debenham, B Dalton

### **CHARACTERIZATION OF VESTIBULAR-EVOKED RESPONSES IN THE TRICEPS BRACHII DURING ARM-SUPPORTED BALANCE**

The purpose was to characterize the vestibular-evoked balance response by altering head-on-feet postures in a proximal upper limb muscle compared to that of a lower limb muscle model. Seventeen participants (female:  $n=7$ ,  $22\pm 2$  years; male:  $n=10$ ,  $28\pm 6$  years) were exposed to binaural, bipolar stochastic (0–25Hz; root mean square = 1mA) electrical vestibular stimulation (EVS) while holding an earth-fixed handle with the right hand and blindfolded. Participants performed 100-s trials of three different head yaw postures: facing over the left and right shoulder, as well as anatomical. The relationship between the EVS signal and electromyography (EMG) of the right medial gastrocnemius (MG) and triceps brachii (TB) were derived using the medium-latency peak amplitude of the cumulant density function. When rotating the head from facing left to right, the EVS-EMG medium-latency peak amplitude for the MG (left:  $-0.035\pm 0.019$ ; right:  $0.018\pm 0.019$ ) and TB (left:  $-0.052\pm 0.036$ ; right:  $0.012\pm 0.031$ ) reversed polarity ( $p<0.05$ ). With the head in an anatomical posture, there were no differences detected for the EVS-EMG medium-latency peak amplitude for the MG ( $-0.031\pm 0.014$ ) and TB ( $-0.057\pm 0.029$ ) compared with facing leftward ( $p>0.05$ ), but polarities were opposite for both muscles compared with the rightward head posture ( $p<0.05$ ). Here, we determined that vestibular-evoked balance responses of the TB are head-dependent. Thus, during arm-supported balance control, vestibular-driven signals provide relevant cues of head position to generate appropriate vestibular-evoked responses within the proximal, upper limb. These results may have implications for those requiring assistive technologies (e.g., cane) to maintain upright postural control.

Alanna Shwed, K Tang, F Hoekstra, L McPhail, N Thorogood, CR West, SCI Guiding Principles Panel, HL Gainforth

### **IDENTIFYING MEANINGFUL RESEARCH PARTNERSHIPS IN SPINAL CORD INJURY GRANT APPLICATIONS: PRELIMINARY FINDINGS**

People with spinal cord injury (SCI) are often subjected to tokenism in research partnerships. Identifying characteristics of research partnerships is important for 1) ensuring research findings are relevant, useful, and used; 2) combatting tokenism in science; and) advancing the science of partnership by investigating partnerships longitudinally and prospectively. However, research partnerships are complex and there are limited tools to support reviewers and partnership researchers to reliably and systematically identify proposed partnership processes and quality on grant applications. Therefore, to create a reliable tool that could be used by non-partnership experts to help identify meaningful SCI research partnership characteristics in grant applications. The initial coding manual was co-created with experts in the field of SCI research and research partnerships. All submitted Seed Grants to ICORD from 2014 and 2021 grant applications were coded by non-experts for their mission, their target research user, and if they had any research user partner(s) on the project. The grants that had a research user partner were then coded for the type of partner, the presence and steps of an engagement plan, shared decision-making, level of partnership engagement, and partner remuneration. A total of 38 grants were coded ( $n=12$  double coded), 12 were identified as having a research user partner. Coding reliability for the presence of shared decision-making and level of partnership engagement was fair to moderate and had a 60% agreement, 0.4 Cohen's Kappa, and 0.67 PABAK. All other codes were feasible with substantial or almost perfect and ranged between 72-100% agreement, 0.63-0.85 Cohen's Kappa, and 0.86-0.9 PABAK. Non-experts can code for partnership on grant applications; however, assessing quality is challenging and needs further expertise to confidently identify. This tool may be helpful for anyone who funds, studies, and/or reviews SCI research partnerships to help foster an increase in quantity and quality of meaningful research partnerships.

# ABSTRACTS

In Order of Presentation

Bryce Twible, L Ruggiero, C McNeil, B Dalton

## **THE EFFECT OF EXERCISE-INDUCED FATIGUE ON INTER-LIMB ASYMMETRIES IN ELITE YOUTH HOCKEY ATHLETES**

Inter-limb asymmetry (ILA) is defined as the phenomenon of reduced function, physical capacity, or strength of one limb in relation to the other. With links to physical development, injury risk, and athletic performance, ILA can negatively influence neuromuscular function. Exercise-induced fatigue is also known to impair neuromuscular function and potentially exacerbate ILA. Most prior research of fatigue and ILA used single-limb contractions, which may not be relevant to fatiguing activities outside of the lab. Further, existing studies focused solely on whether ILA is increased under a fatigued state, failing to investigate whether a proportional relationship exists between magnitude of fatigue and ILA. This study has two main objectives: 1) determine if ice hockey-specific exercise creates or exacerbates lower limb ILA, and 2) determine if a proportional relationship exists between the degree of neuromuscular fatigue and the extent of change to lower limb ILA. Forty athletes (13-18 years; 10 females) from the Okanagan Hockey Academy will perform three vertical countermovement jumps, as well as three maximal isometric hip adduction, hip abduction, and eccentric hamstring contractions before and after an on-ice training session. Peak force, peak power, concentric impulse, and eccentric impulse will be measured to quantify fatigue and lower limb ILA. Intensity of on-ice sessions will be assessed with a chest-strap heart rate monitor. It is hypothesized that ILA will increase following an acute bout of on-ice activity and that the extent of ILA change and degree of neuromuscular fatigue will exhibit a proportional relationship.

Liisa Wainman, M Ahmadian, G Foster, C West

## **ACUTE INTERMITTENT HYPOXIA IMPROVES ORTHOSTATIC TOLERANCE IN CHRONIC BUT NOT ACUTE SPINAL CORD INJURED RATS**

Introduction: Spinal cord injury (SCI) reduces orthostatic tolerance (OT) due to disrupted sympathetic input to the heart and vasculature following injury. Acute intermittent hypoxia (AIH; exposure to brief periods of low oxygen) improves control over motor systems in incomplete SCI. In able-bodied individuals, AIH increases blood pressure (BP) and improves OT. Cardio-autonomic responses to AIH after incomplete SCI are unknown. Purpose: This project investigated if AIH improves OT in rats following acute (2 weeks) and/or chronic (4 weeks) SCI. We believe AIH will only improve OT in chronically injured rats. Methods: 12 Wistar rats underwent T3 300 kdyn SCI. At 14 (n=6) or 28 (n=6) days post-SCI rats were ventilated and BP was assessed via femoral artery catheterization. Rats were subjected to lower body negative pressure (LBNP; recorded with manometer) to decrease mean arterial pressure (MAP) by 5 and 10 mmHg pre- and 90 minutes post-AIH. A mixed-design ANOVA was performed to examine the effects of time post-SCI (group) and AIH (treatment) on box pressure required to decrease MAP.

Results; There was a significant group\*treatment interaction for the -5 mmHg (p=0.011) and -10 mmHg LBNP stage (p=0.017). Post hoc comparisons demonstrate that in chronic SCI the box pressure required to drop MAP by -5 and -10 mmHg was increased by  $41 \pm 16\%$  (p=0.009) and  $46 \pm 22\%$  (p=0.079) versus pre-AIH, respectively, implying improved OT. Conclusions: Here, we demonstrate that AIH has the capacity to improve OT in a rodent model of SCI in a chronic, but not acute setting.



## ABSTRACTS

In Order of Presentation

Aldovino Rapini, J Little

### **EFFECTS OF EXOGENOUS KETONE SUPPLEMENTATION ON TNF- $\alpha$ IN PEOPLE LIVING WITH TYPE 2 DIABETES**

Objective: Chronic low-grade inflammation is implicated in the pathophysiology of type 2 diabetes (T2D), with the pro-inflammatory cytokine tumour necrosis factor-alpha (TNF- $\alpha$ ) being found in higher circulating concentrations in individuals with T2D compared to people without diabetes. Recent research has suggested that elevating blood ketone concentrations could have anti-inflammatory effects. The purpose of this study was to determine if acute consumption of oral ketone supplements could decrease the concentration of circulating TNF- $\alpha$  in people living with T2D. Methods: Participants (8 Male, 5 Female) with a mean age of  $65 \pm 5$  years (mean  $\pm$  standard deviation) who were diagnosed with T2D on average  $10 \pm 3$  years ago were recruited to participate in a randomized, double-blind, placebo-controlled, cross-over pilot study consisting of two in-person laboratory visits to test a ketone monoester supplement (0.3g/kg (R)-3-hydroxybutyl (R)-3-hydroxybutyrate, HVMN® Pure DeltaG™ Ketone Ester) versus taste-matched non-caloric placebo. TNF- $\alpha$  was quantitatively measured from venous blood samples at baseline, 90 minutes and 180 minutes post-ketone and placebo consumption. Results: Repeated measures ANOVA revealed no significant difference ( $P = 0.62$ ) in TNF- $\alpha$  concentrations in the ketone supplementation condition compared to placebo. Conclusion: Oral ketone supplementation did not significantly alter TNF- $\alpha$  concentrations 90 and 180 minutes following acute ketone ingestion. Future research should consider exploring earlier time points (~30-60 minutes post ketone supplement when blood ketone concentrations peak), directly measuring TNF- $\alpha$  in specific tissues (e.g., adipose) and/or longer-term (weeks to months) supplementation to determine if oral ketone supplementation impacts markers of chronic inflammation in people with T2D.

Ana Sanchez, E Giroux, J Bassett-Spiers, CB McBride, B Munro, SCI IKT Guiding Principles Partnership, HL Gainforth

### **USING ENVIRONMENTAL SCAN METHODS TO UNDERSTAND FACTORS THAT INFLUENCE RESEARCH PARTNERSHIPS WITH SPINAL CORD INJURY (SCI) COMMUNITY-BASED ORGANIZATIONS (CBOS)**

Background: Community-based organizations (CBOs) play a major role in representing and supporting the needs of equity-deserving communities. People with spinal cord injury (SCI) are supported through programs, services and resources delivered by CBOs. To strengthen their operations, some CBOs develop research partnerships with organizations, hospitals, and researchers. Since the purpose and goal of supporting people with spinal cord injury is different for every organization, research partnerships may be different across organizations. In order to develop useful and equitable partnerships with SCI CBOs, it is important to recognize and acknowledge their goals, responsibilities, interests and limits. Objective: Systematically develop a record of SCI CBOs that provide services within Canada and the United States. Once we have this list, we will aim to understand factors that influence research partnerships and use this information to support meaningful partnerships. Methods: The research will be conducted in partnership with the IKT Guiding Principles Partnership. A list with all SCI CBOs was created from recommendations from members of the partnership and systematic searches of organizational databases. The number of organizations was then refined by screening the list against inclusion and exclusion criteria. A meeting with the partnership will take place where decisions about the information being extracted from the websites will be discussed, along with the next steps. Anticipated results and discussion: Findings will produce an initial record of CBOs that provide services and support for people with SCI within Canada and the United States. With an understanding of CBO's goals, responsibilities and limits, researchers looking to reach out about forming partnerships will know factors to consider when establishing and maintaining meaningful research partnership.

# ABSTRACTS

In Order of Presentation



Mathew I. B. Debenham, CD Bruce, CJ McNeil, BH Dalton

## **THE INFLUENCE OF NORMOBARIC HYPOXIA ON ACHILLES TENDON REFLEX INHIBITION: A PROPOSAL**

Acute exposure to hypoxia impairs standing balance; yet the underlying factors negatively influencing postural control during hypoxia are unclear. Compared to normoxia, hypoxia disrupts proprioception, which may be a factor in increased sway. Golgi tendon organs (GTOs), located at the musculo-tendinous junction (MTJ), provide inhibitory signals to lower limb muscles which can be modified during a postural threat. However, it is unclear if GTO function is influenced by hypoxia, which could lead to the documented increases in sway at high altitude. The purpose here is to determine how hypoxia influences lower limb tendon-evoked inhibitory reflexes during standing. Participants will stand quietly on a force plate with their feet together and complete three blocks of musculo-tendinous stimulation (MTstim), consisting of two trials of 50 MTstims. Inhibitory reflexes to MTstims will be evaluated at baseline (BL; 0.21 fraction of inspired oxygen -  $F_{I}O_2$ ), and at ~2 (H2) and ~4 hours (H4) of normobaric hypoxia (0.11  $F_{I}O_2$ ) in a hypoxic chamber. The MTstim will be delivered to the left Achilles tendon at the MTJ and recorded with electromyography from the ipsilateral medial gastrocnemius. To ensure there is a systemic effect of the hypoxic stimulus, we will monitor oxyhemoglobin saturation with pulse oximetry. As proprioceptive function is reduced while standing during hypoxia, we expect that the tendon-evoked inhibitory reflex will also decrease, resulting in less inhibition on postural muscles compared to normoxia. The reduction in inhibition compared to normoxia may provide insight into why sway is increased when individuals are exposed to hypoxia.

Kyra G Braaten, ME Jung

## **THE ROLE OF FAMILY SUPPORT IN PREVENTING TYPE 2 DIABETES IN RURAL BRITISH COLUMBIA**

The southern interior of British Columbia experiences higher rates of prediabetes and type 2 diabetes than the rest of the province (Locke et al., 2021). Locating, accessing, and being supported in making behaviour changes in line with type 2 diabetes prevention guidelines are barriers for residents in this rural area. A feasible form of support that may be available to rural populations is family members, as most self-management activities occur at home and within the family network. Family involvement has been shown to influence adherence to diet and exercise; two health behaviors critical for preventing type 2 diabetes. The aim of this project is to understand how family involvement can facilitate or discourage diet and exercise behaviours among individuals with prediabetes. Small Steps for Big Changes (SSBC) is a diabetes prevention program in which individuals with prediabetes are empowered to make and adhere to changes in their diet and exercise. SSBC participants in Oliver, BC and their family members will be recruited to take part in semi-structured interviews to explore perceived supportive and unsupportive family behaviours related to diet and exercise adherence. The interview guide will be developed using the theoretical domains framework and interviews will be conducted separately to analyze individual and dyadic perspectives. The results of this study will help to inform if there is a need to involve family members in the SSBC program. Improving the quality of family support could increase adherence to diet and exercise and result in better diabetes prevention practices in rural areas.

## ABSTRACTS

In Order of Presentation

Malone, Q., McNeil, C. Passmore, S., Glazebrook, C., Dalton, B.

### **DOES THE PRESENCE OF A VISUAL TARGET RANGE BEFORE AND DURING MOVEMENT CAUSE A VIOLATION OF FITTS' LAW?**

During a pointing task, Fitts' Law predicts that a target which is farther away and smaller than another takes longer to reach. However, if potential targets are individually outlined before and during movement, the farthest target is reached faster than Fitts' Law predicts (i.e., the Law is violated). One hypothesis alleges that a gestalt (an object made of discrete parts) is created in the performers' minds from the outlined targets, and, since the edges of a gestalt are processed faster than the middle, movements to the farthest target require less time than expected. The present study objective is to determine if Fitts' Law is violated when the range in which a target can appear is outlined prior to and during its presentation, emulating a gestalt. Twenty participants (18-35 years) will start with their right index finger on the left side of a laptop screen and the target range outlined on the right. A target will appear within this range, to which participants will point 'as quickly and as accurately as possible'. Across 180 trials, movements will be measured with an accelerometer placed on the right index fingertip. Preliminary data from 11 participants provide evidence that more time was needed to reach the middle and far targets than the nearest ( $p=0.002$ ), but the time required to reach the middle and far targets was not different. Thus, a Fitts' Law violation occurred when participants were presented with an outline around the potential target range, lending support to the gestalt hypothesis.

Sarah Lawrason, KA Martin Ginis

### **ASSESSING THE EFFECTS OF A PHYSICAL ACTIVITY MHEALTH INTERVENTION AMONG INDIVIDUALS WITH SPINAL CORD INJURY: A RANDOMIZED CONTROLLED TRIAL**

Theory-based interventions that use integrated knowledge translation (Graham et al., 2006) to promote quality physical activity (PA) participation are needed for individuals with spinal cord injury (SCI [Ma et al., 2020]). SCI Step Together, an mHealth program, was developed in partnership with Curatio Inc. and end-users to improve the quantity and quality of PA among persons with SCI (Lawrason et al., under review). Guided by self-determination theory (Ryan & Deci, 2000), the program allows individuals to participate in modules about PA (e.g., goal setting), connect with peers and a health coach, and track PA. The purpose of this study was to test the effects of the SCI Step Together program on the self-determination theory variables, PA, and quality of PA. An 8-week pilot randomized controlled trial was conducted among 21 participants ( $n=11$  intervention). Participants responded to questionnaires at baseline, mid-, and post-intervention. Results were analyzed using linear mixed effects models. The intervention group had greater fulfillment of basic psychological needs (interaction effect,  $p=0.05$ ) and knowledge (interaction effect,  $p=0.05$ ) compared to the control group. Both groups had decreased levels of social influences over time (time effect,  $p=0.01$ ), but the control group scored lower at 8-weeks than baseline ( $p=0.03$ ). Both groups increased self-monitoring over time (time effect,  $p<0.01$ ) but the intervention group did more self-monitoring at 4-weeks than at baseline ( $p=0.04$ ). There were no significant effects for any other outcomes (motivation, determinants of PA, action control, PA participation, quality of PA experiences). Despite no changes in the quantity or quality of PA, this study demonstrated that a mHealth program can improve individuals' basic psychological needs and knowledge to complete PA and may mitigate losses in social influences for PA over time. This intervention may inform future mHealth programs for persons with SCI.



## ABSTRACTS

In Order of Presentation

### Gustavo A. Vizcardo-Galindo, CA Howe, RL Hoiland, HH Carter, PN Ainslie, JC Tremblay **IMPACT OF OXYGEN SUPPLEMENTATION ON BRACHIAL ARTERY HEMODYNAMICS AND VASCULAR FUNCTION DURING ASCENT TO 5050M**

High altitude trekking alters upper limb hemodynamics and reduces brachial artery vascular function in lowlanders. However, whether these changes are reversible with the correction of hypoxia is unknown. We investigated the impact of 15 minutes of oxygen supplementation ( $O_2$ ) on brachial artery hemodynamics, reactive hyperemia (microvascular function) and flow-mediated dilation (FMD; endothelial function). Healthy male participants (aged 21-42 years) were examined prior to and with  $O_2$  at 3440m (day 4 at high altitude;  $n=7$ ), 4371m (day 7;  $n=7$ ), and 5050m (day 10;  $n=12$ ) using Duplex ultrasound. At 3440m,  $O_2$  decreased brachial artery diameter ( $-5\pm5\%$ ;  $P=0.04$ ), baseline blood flow ( $-44\pm15\%$ ;  $P<0.001$ ), oxygen delivery ( $-39\pm16$   $P<0.001$ ) and peak reactive hyperemia ( $-8\pm8\%$ ;  $P=0.02$ ). Although at 3440m  $O_2$  elevated FMD ( $P=0.04$ ), this was attributed to the reduction in baseline diameter (allometrically-scaled FMD,  $P=0.145$ ). Only antegrade shear stress was reduced by  $O_2$  at 4371m ( $P=0.026$ ). However, at 5050m, a reduction in brachial artery blood flow ( $-17\pm22\%$ ;  $P=0.03$ ), but not oxygen delivery, diameter, reactive hyperemia or FMD occurred with  $O_2$ . Collectively, these findings suggest that  $O_2$  causes vasoconstriction in the upper limb along the arterial tree (conduit and resistance arteries), limiting oxygen delivery and reactive hyperemia during early trekking at high altitude. With prolonged, more severe high-altitude exposure,  $O_2$  reduces blood flow in the upper limb without compromising oxygen delivery, reactive hyperemia or FMD. Therefore, supplemental oxygen appears to have differential impacts on vascular function that are modulated by the duration and severity of high-altitude exposure.

Kaela D Cranston, JAP Sim, ME Jung

### **“EVERY [CLIENT] DESERVES A PLACE TO FEEL SAFE”: CANADIAN KINESIOLOGY STUDENTS’ AND FITNESS FACILITY STAFFS’ OPINIONS ON A BRIEF CULTURAL SAFETY AND INCLUSIVITY ONLINE MODULE**

Training current and future health and fitness workers in cultural safety and inclusivity is critical because of the pervasive implicit biases and systemic discrimination in healthcare. A cultural safety and inclusivity module was developed to include into an online training for diabetes prevention program coaches. This module includes an overview of cultural safety, self-reflection, and power imbalances. To determine the acceptability of this module, Kinesiology university students and fitness facility staff across Canada were recruited to watch the module and provide feedback. Participants ( $n=26$ ) were first asked about their attitude toward equity, diversity, and inclusion (EDI) training for their current/future job, and any prior EDI training. Participants then viewed the 20-minute module and were asked to open-endedly report on: their perceptions of their key learning outcomes, whether the module would change their client interactions, and whether they would recommend this module to peers/colleagues. Before watching the module, 19 participants said they had received some EDI training. Participants reported that they perceived the key lessons from the module included understanding the importance of empowering clients, learning how to make interactions more culturally safe for clients, and that self-reflection is important. After watching the module, 25/26 participants strongly agreed or agreed that this module should be mandated for people in their field, and 25 participants said that this module would change the way they interact with clients. Brief online EDI training for current and future health and fitness workers may be a viable option to meaningfully improve client care in the health and fitness industries.

# ABSTRACTS

In Order of Presentation

Juliana M Rancier, MIB Debenham, CD Bruce, CJ McNeil, BH Dalton

## **THE EFFECT OF NORMOBARIC HYPOXIA ON THE SURAL NERVE CUTANEOUS REFLEX DURING STANDING BALANCE**

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Hypoxia impairs standing balance, but the underlying factors remain unclear. One important contributor for balance control is cutaneous information, which can be characterized by evoking a reflex via electrical stimulation of a purely cutaneous nerve (i.e., sural) and sampling the subsequent motor activity with electromyography of a given muscle. The purpose of the present study is to determine how normobaric hypoxia influences the sural nerve cutaneous reflex during quiet standing balance. Participants will stand on a force plate with medial malleoli touching while subjected to 2 trials of 50 sural nerve stimulations (200Hz train presented randomly every 3-6 s) at baseline (BL; normoxia), and at 2 (H1) and 4 (H2) hours of normobaric hypoxia (~0.11 fraction of inspired oxygen in a hypoxic chamber). The cutaneous reflex will be evoked using a bar electrode in line with the sural nerve, posterior to the left lateral malleolus. Surface EMG will be sampled from the left medial gastrocnemius. The sural nerve cutaneous reflex will be characterized by calculating the area of the initial positive and negative peaks of the response. We expect the area of the cutaneous reflex will be less at H1 and H2 compared to BL, which may indicate a hypoxia-related disruption in the ability of peripheral cutaneous inputs to modulate ongoing motoneuron pool activity. The reduction in the sural nerve cutaneous reflex may provide evidence, at least in part, for a cutaneous origin for standing balance disturbances in hypoxia.

Blanca Gala, M MacPherson, ME Jung

## **SELF- REFLECTIONS OF PHYSICAL ACTIVITY BEHAVIOUR: EXPLORING REAL-WORLD CONTEXTS**

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Type 2 diabetes (T2D) affects millions of individuals worldwide. Intensive lifestyle interventions targeting diet and physical activity (PA) represent the most powerful path to reducing and delaying T2D incidence. Small Steps for Big Changes (SSBC) is an evidence-based lifestyle program delivered through brief counseling sessions at a local fitness facility at no cost to participants. Its main purpose is to help people aged 18 and older, living with prediabetes, learn how to make sustainable and lasting dietary and PA habits to prevent their risk of developing T2D. Behaviour change interventions require an understanding of the current and desired behaviour, including its determinants. Commonly, retrospective data from interviews and focus groups are interpreted, coded, and then analyzed within specific frameworks such as the Theoretical Domains Framework (TDF). Few studies use real-time momentary assessment tools to assess people's PA practices. Obtainment of "in-the-moment" self-reflections may provide unbiased, accurate and honest information about people's experiences when engaging in PA. Data not reported while under the direct supervision from researchers may offer the opportunity to collect information from real-world environments, where the specific behaviour happens, enabling participants to reflect on actual circumstances, and the study of the behaviour through diverse scenarios. These represent the characteristics of Environment Momentary Assessment (EMA) methodologies. For these reasons, and to have a better understanding of participants' PA-related reflections, the present thesis project seeks to examine real-time, EMA-reported barriers and facilitators to PA from SSBC past participants and categorize them within the TDF.

## ABSTRACTS

In Order of Presentation



Cori Calkins, S Kraeutner, J Jakobi

### **THE EFFECT OF MOTOR IMAGERY TRAINING ON COMMON SYNAPTIC INPUT TO MOTOR NEURONS AND FORCE STEADINESS IN OLDER ADULTS**

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Motor imagery training, described as the mental rehearsal of a motor task with no concurrent motor output, increases neural drive, and this may decrease oscillations in common synaptic input (CSI) and improve force steadiness (FS). Given that age-related decreases in FS are associated with increased oscillations of CSI, the influence of MIT should produce meaningful improvement of steady movements in older adults who experience substantial declines in force control with age; yet this is unknown. This study aims to investigate the effects of MIT on CSI and FS in older adults during isometric elbow flexion contractions. We hypothesized that MIT would lead to decreased CSI and improve FS. Further, the observed benefit will be greater in females who experience exacerbated age-related decline in force control relative to males. Participants (N = 40, aged 65-85 years old, half female) will be randomly assigned to an MIT or control group. Participants will perform isometric elbow flexion contractions at 5% maximal voluntary contraction pre/post MIT (MIT group) or no training (control). High density surface electromyography will be used to record motor units of the biceps brachii and estimate CSI. This work will show that MIT is an effective modality to decrease oscillations in CSI and enhance force control.

Laura Kuipers, F Hoekstra, T Hoekstra, SCI Exercise Counselling Panel

### **EXERCISE COUNSELLING FOR ADULTS WITH SPINAL CORD INJURY IN CANADA AND THE NETHERLANDS: AN INTERNATIONAL SURVEY STUDY**

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Background: Counselling is a promising approach to improve exercise participation in adults with spinal cord injury (SCI). Recently, an international panel co-created the first theory- and evidence-based best practices for exercise counselling for adults with SCI. The best practices are tested in Canada and the Netherlands. To support the implementation of the best practices, training modules are needed that will teach counsellors these best practices. To ensure the training modules are relevant and useful for end-users, it is important to identify counsellors' knowledge, skills, barriers, and confidence levels towards SCI-specific exercise counselling. Aims: This study aims to identify and compare counsellors' knowledge, skills, barriers and confidence related to providing SCI-specific exercise counselling in Canada and the Netherlands. Methods: This study uses a cross-sectional study design. An online survey is being conducted in Canada and the Netherlands. Respondents can be included if they work or volunteer as exercise/lifestyle counsellor, occupational therapist, recreation therapist, psychomotor therapist, physiotherapist, kinesiologist, rehabilitation assistant, social worker, fitness trainer or coach, SCI peer mentor or SCI caregiver and are planning to provide exercise counselling in the next 12 months. Counsellors' knowledge, skills, barriers and confidence levels are being measured using open- and multiple-choice questions. Anticipated results & discussion: We expect differences in knowledge, skills, barriers and confidence between counsellors working in Canada and the Netherlands and those working in different counselling settings (e.g., clinical or community setting). These insights will inform the development of training modules tailored to the needs of counsellors and their local context.



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