UNIVERSITY OF SASKATCHEWAN
College of Kinesiology
KINESIOLOGY.USASK.CA

# RESEARCH *Showcase*

## 2025

ACKNOWLEDGING RESEARCH AND LEARNING IN THE
COLLEGE OF **KINESIOLOGY** AT THE UNIVERSITY OF SASKATCHEWAN

March 28th and April 4th


# TABLE OF CONTENTS

# AGENDA

## MARCH 28

| | | |
|---|---|---|
| ***12:00 - 1:00 PM*** | Graduate Student Poster Session | Outside PAC 232 |
| ***1:30 - 3:20 PM*** | Honours Presentations | PAC 232 |
| ***3:20 - 3:35 PM*** | Honours Research Mixer | PAC 232 |

## APRIL 4

| | | |
|---|---|---|
| ***10:00 - 11:00 AM*** | Graduate Student Poster Session | Outside PAC 232 |
| ***11:00 - 11:05 AM*** | Welcome and Opening Remarks<br>***Dean Dr. Dani Brittain*** | PAC 234 |
| ***11:05 - 11:45 AM*** | KIN Faculty RSAW Excellence Award Presentation<br>***Dr. Heather Foulds*** | PAC 234 |
| ***12:00 - 1:00 PM*** | Graduate Student Oral Presentations | PAC 234 |
| ***1:30 - 3:50 PM*** | Honours Presentations | PAC 232 |
| ***3:50 - 4:05 PM*** | Honours Research Mixer | PAC 232 |

# Research Talk

## The Red River Jig

***"A spoke in the wheel" of wholistic health"***

**Friday, April 4, 2025 11:00 am - 11:45 am**
**(Followed by CKRS Graduate Students Oral Presentations)**
**PAC 234**

Dr. Heather Foulds is a Métis Associate Professor in the College of Kinesiology at University of Saskatchewan and received the first College of Kinesiology Faculty RSAW Excellence Award, which aims to annually recognize and celebrate outstanding research, scholarly achievements, and community-based impact

**Dr. Heather Foulds and her nominator, Dr. Leah Ferguson. (photo credit Cory Baumgardner)**

# DR. FOULDS WINS AWARD FOR RESEARCH, SCHOLARLY, AND ARTISTIC WORKS (RSAW)

**By Alyssa Wiebe | Kinesiology Communications**

This year's award recipient of the College of Kinesiology Faculty RSAW Excellence Award is Dr. Heather Foulds. Dr. Foulds holds the prestigious Heart and Stroke/CIHR Research Chair, focusing on the health and well-being of Métis People. Her research initiative is notable for its focus on health determinants specific to the Métis community, with particular attention to the significance of cultural activities, social connectedness, and support networks.

"Dr. Foulds has consistently highlighted the need for more Métis-specific health research in her work. For instance, she has emphasized the importance of cultural connectedness in the health of Métis women and she specifically addresses the health impacts of Métis dancing," said colleague, nominator, and Associate Professor, Dr. Leah Ferguson.

Dr. Foulds' efforts consistently promote the integration of health considerations specific to the Métis community within the wider context of Indigenous health research, emphasizing the distinct cultural and social factors that influence the Métis population. She has shown an exceptional capacity to obtain funding from various sources, including grants from CIHR, SSHRC, and SHRF.

**"I pursue the work I do to support the communities I partner with. The support of the communities and my peers through this award is a meaningful indicator that I am on the right path."**

Dr. Heather Foulds

Her achievements don't stop there as she has an outstanding record of publications. She has written and collaborated on a significant number of peer-reviewed journal articles, book chapters, and conference presentations, showcasing her expertise and leadership in the field of research. Her extensive publications focus on issues pertaining to the health and physical activity of Indigenous Peoples.

"Her research is significant, innovative, and impactful, addressing critical health issues within Métis and other Indigenous communities through culturally relevant and community-engaged approaches," said Dr. Leah Ferguson. "As someone who frequently has the privilege of collaborating with Dr. Foulds, I never pass up the opportunity to work alongside someone of her exceptional research calibre, her inspiring spirit, and her unwavering commitment to community."

# POSTER PRESENTATIONS

## 1. FOSTERING TEACHER WELLNESS TO SUPPORT MOVEMENT INTEGRATION IN THE CLASSROOM

**Presenter:** Kristina Sobolewski

**College of Kinesiology Affiliation:** PhD Candidate

**Collaborators/Co-Contributors:** Alexandra Stoddart, Lee Schaefer, Louise Humbert, & Marta Erlandson

**Introduction**: Less than 40% of Canadian children and youth are meeting Canada's recommended physical activity (PA) guidelines. To combat this, researchers and educators have developed movement integration (MI) opportunities (short burst of PA) as a strategy to incorporate PA into classrooms while reducing sedentary behaviour. However, teachers often encounter intrapersonal barriers that hinder their MI implementation in the classroom. Additionally, elevated levels of occupational stress and burnout among teachers negatively impact their health and wellbeing, limiting opportunities to prioritize their own PA. Research indicates that teachers who value and engage in PA are more likely to implement MI opportunities in their classroom (Webster et al., 2015). Therefore, this research aims to determine whether improving teachers' own PA, health, and wellbeing prior to a job-embedded MI intervention results in a greater impact on student PA and wellbeing.

**Methods**: This project comprises of three phases; however, this presentation will focus exclusively on phase one. Utilizing a mixed-methods design, teachers (N = 6) from one school division in Saskatoon participated in an 10-week behaviour change intervention featuring weekly 1-hour sessions guided by self-efficacy theory (Bandura, 1977) and incorporating movement. Teachers completed pre- and post-survey measures focusing on teacher subjective wellbeing, general health, classroom demands, school-based PA promotion and competence, and self-efficacy for PA. Teachers also participated in a focus group interview post-intervention to share their experiences.

**Results**: While there were no significant differences, percent-of-change increases were noted in specific health and wellness outcomes among low-active teachers. Four themes were generated from the focus group discussion: (a) realities of teacher wellbeing, (b) valuation vs. prioritization of PA, (c) journeying through the challenges, and (d) supporting teachers holistically.

**Significance**: School divisions should consider embedding health and wellness opportunities for teachers during the school day as teachers valued the intervention and felt a sense of change in their PA behaviours. Additionally, enhancing teacher health and wellness has the potential to positively influence student health and PA behaviours in addition to teachers' approaches to PA promotion in the classroom.

## 2. DIFFERENCES IN PHYSICAL ACTIVITY AND SEDENTARY BEHAVIOUR ON WEEKDAYS AND WEEKENDS: A SEX-MATCHED COMPARISON BETWEEN CHILDREN WITH CONGENITAL HEART DISEASE AND HEALTHY PEERS

**Presenter:** Matthew Chapelski

**College of Kinesiology Affiliation:** PhD Candidate

**Collaborators/Co-Contributors:** Natalie E. Houser, M. Louise Humbert, Dana S. Lahti, Kristi D. Wright, Charissa Pockett, Corey R. Tomczak, Marta C. Erlandson

Previous research is conflicted if children with congenital heart disease (CHD) engage in less or equal amount of physical activity (PA) compared to heathy peers (HP). Therefore, our study compared the PA and sedentary behaviour of children with CHD and HP on weekdays and weekends. Thirty-two children (8 female), 8-14 years of age with CHD were recruited from the pediatric cardiology unit at the Royal University Hospital, along with 139 (64 female) HP through Saskatchewan schools. Accelerometers were worn for seven consecutive days to measure sedentary time, light PA, moderate PA, vigorous PA, and moderate-to-vigorous PA using Evenson et al. (2008) cut points. Groups were split by sex and differences were evaluated using a MANCOVA while adjusting for age, with significance set at $p<0.05$. Male HP spent more time sedentary than males with CHD on weekdays ($p=.026$) and weekends ($p=.005$). Males with CHD spent more time engaged in light PA on weekdays ($p<.000$) and weekends ($p<.000$). For females, HP spent more time engaged in vigorous PA than females with CHD on weekdays ($p=.037$) and weekends ($p=.028$). Females with CHD spent less time sedentary ($p=.026$) and participated in more light PA ($p=.001$) on weekends than HP. Our findings suggest children with CHD are less sedentary and engage in more light PA than HP.

# 3. DEVELOPING WOMEN ATHLETES' SELF-COMPASSION TO THRIVE IN SPORT

**Presenter:** Karissa L. Johnson

**College of Kinesiology Affiliation:** PhD Candidate

**Collaborators/Co-Contributors:** Leah J. Ferguson, Margo E. K. Adam, Kent C. Kowalski, Amber D. Mosewich, Benjamin J. I. Schellenberg, & Kate E. Storey

Despite the many benefits of sport participation, the demanding and evaluative nature of competitive sport exposes women athletes to challenges that can result in maladaptive emotions, thoughts, and behaviours. However, self-compassion can be used by women athletes to manage sport-related challenges and predict elements of thriving, encompassing both well-being and performance. The purpose of this multi-phase research program is to enhance women athletes' thriving in sport through an athlete-tailored and user-identified self-compassion intervention. Through two research phases we qualitatively explored 19 competitive women athletes' (Mage = 22.6 years, SD = 5.4) preferences for and understandings of self-compassion, which will be used to inform intervention development. In Phase 1, we identified athletes' preferences for learning and practicing self-compassion, including (a) having interactive professional-led group sessions, (b) having sport-integrated (and pre-season) programming, (c) setting self-compassion goals, (d) managing self-talk, (e) compassionately reflecting on performance, and (f) having access to support people and a variety of self-compassion-based resources. In Phase 2, athletes' language describing self-compassion was captured in three themes: "Show Up" (support myself), "Regroup" (honestly check in with myself to reset), and "Trust" (trust the process and myself). Subsequent research phases will include (a) exploring coaches' capacity to support a self-compassion program for women athletes, and (b) assessing the feasibility of a sport-integrated athlete-tailored self-compassion program. This research provides valuable insights for researchers, practitioners, and sport personnel, highlighting the importance of tailoring programs to better serve women athletes' unique experiences and ultimately support their thriving in sport.

**Acknowledgements**: Funded by the Social Sciences and Humanities Research Council of Canada (SSHRC) Sport Participation Research Initiative

# 4. 'BUT HAVING SOMEONE, KIND OF, WALK YOU THROUGH WHAT TO DO…': EXPLORING WOMEN ATHLETES' PREFERENCES FOR LEARNING AND PRACTICING SELF-COMPASSION

**Presenter:** Karissa L. Johnson

**College of Kinesiology Affiliation:** PhD Candidate

**Collaborators/Co-Contributors:** Margo E. K. Adam, Kent C. Kowalski, Amber D. Mosewich, Nathaniel D. Osgood, Benjamin J. I. Schellenberg, Kate E. Storey, and Leah J. Ferguson

**Objectives**: Self-compassion is a positive way of relating to oneself (Neff, 2003) and is related to both athlete well-being and athletic performance (Adam et al., 2021; Killham et al., 2018). Therefore, self-compassion may support women athletes' thriving in sport (i.e., high overall well-being and athletic performance; Brown et al., 2017). Previous researchers have tailored self-compassion programs to the competitive sport experience. However, these programs have not considered women athletes' preferences for learning and practicing self-compassion. Therefore, their feasibility may be limited. With a hope of improving feasibility of future self-compassion programs to support women athletes' thriving in sport, the purpose of this study was to explore competitive women athletes' preferences for learning and practicing self-compassion.

**Methods**: Guided by a qualitative descriptive (Sandelowski, 2000) strategy of inquiry, data were generated through two phases of focus groups. A total of 19 women athletes (16-34 years of age) from various sports participated in Phase 1 focus groups, discussing preferences for learning and practicing self-compassion. Phase 1 findings were presented as an infographic to participants in Phase 2 focus groups, where 11 women athletes returned to reflect on the findings. Both phases were analyzed using reflexive thematic analysis (Braun & Clarke, 2019).

**Results**: The women athletes identified two preferences for learning self-compassion, namely through (1) multiple interactive professional-led group sessions and (2) sport-integrated progressive pre-season programming. Women athletes' four preferences for practicing self-compassion included (1) setting self-compassion goals before sport, (2) managing self-talk during sport, (3) compassionately reflecting on performance after sport, and (4) having access to support people. Lastly, women athletes expressed a need for a variety of accessible self-compassion-based resources throughout the process of learning and practicing self-compassion.

**Conclusion**: Future research may implement these findings when developing self-compassion programs for women athletes, to determine if self-compassion can support their thriving in sport.

## 5. EXPLORING DETERMINANTS OF CARDIOVASCULAR HEALTH IN MÉTIS WOMEN: THE ROLE OF ADVERSE CHILDHOOD AND DISCRIMINATION EXPERIENCES, SOCIAL SUPPORT, AND PHYSICAL FITNESS

**Presenter:** Shara Johnson

**College of Kinesiology Affiliation:** PhD Candidate

**Collaborators/Co-Contributors:** S. Moore, G. Selinger, J. LaFleur, M. Fatima, H.J.A. Foulds

**Background:** Métis women in Canada experience greater cardiovascular (CV) diseases, compared to non-Indigenous women. However, determinants of CV health for Métis women remain unclear.

**Objective:** This study explored differences in adverse childhood and discrimination experiences, social support, and physical fitness levels between Métis women with high and low arterial stiffness.

**Methods:** Thirty-six Métis women (35 ± 13 years) completed questionnaires on social support and adverse childhood and discrimination experiences, and completed physical fitness tests. Arterial stiffness measures of pulse wave velocity (PWV) (central, carotid-to-femoral (cPWV); upper peripheral, carotid-to-finger (upPWV); lower peripheral, femoral-to-toe (lpPWV) were determined using finger photoplethysmography and infrared photoelectric sensors. T-tests compared measures between high and low PWV groups split at the mean.

**Results:** Women with lower cPWV (3.82 ± 2.44 vs. 1.20, p=0.01) and upPWV (3.78 ± 2.54 vs. 1.64 ± 2.17, p=0.03) reported more adverse childhood experiences than women with higher cPWV and upPWV. Women with higher upPWV reported greater total social support (43.29 ± 4.43 vs. 39.96 ± 3.20, p=0.02) and social support perceptions (12.14 ± 1.57 vs. 10.65 ± 1.76, p=0.03) compared to women with lower upPWV. Women with lower lpPWV had greater grip strength (62± 11 vs. 52 ± 11 p=0.03) and longer 6-minute walk distances (582 ± 92 vs. 486 ± 83, p=0.01) than women with higher lpPWV. There were no differences for tandem balance and discrimination experiences with PWV.

**Conclusions:** Adverse childhood experiences, social support and physical fitness may be determinants of arterial stiffness in Métis women, though more understanding of social determinants is needed.

## 6. DETECTING CHANGES IN NEUROMUSCULAR FUNCTION AFTER LEG IMMOBILIZATION: RELIABILITY OF STRENGTH AND CONTRACTILE PROPERTIES OF THE KNEE EXTENSORS AND PLANTAR FLEXORS

**Presenter:** Ian Kurniawan

**College of Kinesiology Affiliation:** MSc Student

**Collaborators/Co-Contributors:** Maryam Masoomikhanghah, Jeremy Pynn, Emily McWalter, Joel Lanovaz, Jon Farthing

**Background:** Immobilization causes a rapid loss in muscle strength and size. While many have studied these effects in the knee extensors (KE) through a knee brace model, no study has also immobilized the ankle to concurrently compare the effects on the upper and lower leg. The purpose of this study was two-fold: 1) to assess and compare the reliability of neuromuscular measures in both the upper and lower legs, and 2) to determine whether these measures are sensitive enough to detect change in muscle strength and size following disuse.

**Methods:** Ten participants (5 females, 24 ± 4 years) completed two reliability sessions involving twitch contractile properties, and isometric and dynamic strength tests in both the KE and plantar flexor (PF) muscles. Reliability was determined using ICC based on poor (<0.5), moderate (0.5-0.75), good (0.75-0.90), and excellent (>0.9). Six participants (4 females, 21 ± 2 years) completed 14 days of leg immobilization using a knee-brace and ankle boot on the left leg. The same battery of measures was completed pre and post disuse, with the addition of MRI scans to quantify atrophy.

**Results:** KE reliability ranged from moderate to excellent, and PF reliability ranged from poor to good. The best reliability was shown for KE isometric strength (ICC=.958). In the immobilized leg, averaged across all contraction types, PF and KE strength decreased by 14.5% ($p=.001, \eta^2_p=.921$ ), and 18.1% ($p=.003, \eta^2_p=.916$) respectively, but remained unchanged in the non-immobilized PF ($p=.077, \eta^2_p=.496$) and KE ($p=.525, \eta^2_p=.085$). KE twitch contractile properties were impaired for both sides (time main effects: $p<.05, \eta^2_p=.582\text{-}.665$), where peak twitch-force decreased by 13.3% and 7.0%, half-relaxation time increased by 15.2% and 8.5%, and twitch rate-of-torque-development decreased by 4.2% and 12.1% for the left and right sides respectfully. Immobilized knee extensor muscle volume decreased by 5.4% ($p=.003, \eta^2_p=.856$).

**Conclusion:** Reliability was overall better for KE than PF, but it depended on the measures. Upper and lower leg strength decreased similarly after immobilization. Impaired twitch contractile properties on both legs after the intervention suggests a decrease in overall physical activity. To our knowledge, this study is novel by directly comparing changes in neuromuscular function of the upper and lower leg after unilateral immobilization.

# ORAL PRESENTATIONS

## 1. COMPARISON OF BONE AND MUSCLE DEVELOPMENT IN CHILDREN WITH TYPE 1 DIABETES AND THEIR TYPICALLY DEVELOPING PEERS: A 1-YEAR FOLLOW-UP WITH ADVANCED IMAGING

**Presenter:** Ali Rezai

**College of Kinesiology Affiliation:** PhD Student

**Collaborators/Co-Contributors:** Munier Nour, James Johnston, Saija Kontulainen

Altered bone and muscle development may contribute to the elevated fracture risk in children and adolescents with Type 1 Diabetes (T1D). However, prospective, advanced imaging data comparing bone and muscle changes is unavailable. Therefore, our objective was to assess annual changes in bone and muscle characteristics in children and adolescents with T1D compared to their typically developing peers (TDP).

We obtained bone and muscle properties, measured at baseline and 1-year follow-up using high-resolution peripheral quantitative computed tomography (HR-pQCT) and peripheral quantitative computed tomography (pQCT) scans from the Saskatchewan Bone Strength Development Study database. We included data from 20 participants with T1D (mean age 12.3, SD 2.7 years) and 32 TDP (mean age 10.7, SD 1.7 years). We compared follow-up bone and muscle properties, adjusted for baseline value, maturity offset, height, and body mass, using ANCOVA.

Annual changes in bone microarchitecture, estimated bone strength, and muscle density differed between T1D and TDP groups. At the distal radius, the T1D group had a lower increase in trabecular thickness (-3.8 µm, 95% confidence interval -7.4 to -0.2) and separation (-27.4 µm, -52.6 to -2.2), while the increase in trabecular number (0.1 /mm, 0 to 0.2) was greater in the T1D group. At the distal tibia, the T1D group had a lower increase in trabecular thickness (-3.7 µm, -7.2 to -0.2) and stiffness (-29.9 kN/mm, -53.5 to -6.3). Regarding muscle properties, the T1D group had a greater increase in muscle density at the forearm (75.0 mg/cm$^3$, 0.7 to 149.3).

Findings indicated differences in bone microarchitecture and muscle density development in children and youth with T1D compared to TDP. Lower increases in trabecular thickness at the distal radius and tibia, as well as less gain in estimated bone strength (stiffness) at the distal tibia, are concerning. However, the increase in trabecular number, less trabecular separation in the distal radius, and gain in forearm muscle density can be seen as favorable development. There is a need for prospective monitoring of bone and muscle development along with fracture incidence to better understand and prevent bone fragility development in children and adolescents with T1D.

# ORAL PRESENTATIONS

## 2. INDIGENOUS VOICES: EXPLORING PATHWAYS OF INDIGENOUS POST-SECONDARY STUDENT-ATHLETES

**Presenter:** Megan Tomyn

**College of Kinesiology Affiliation:** MSc Student

**Collaborators/Co-Contributors:** Lee Schaefer

**Introduction**: Saskatchewan has one of the largest Indigenous populations in Canada, comprising 17% of the province (Statistics Canada, 2022). However, Indigenous student-athletes account for only 3% (13 out of 420) of the University of Saskatchewan's athletic population (N. Orr, personal communication, October 2023). This significant disparity raises an important question: Why do Indigenous student-athletes remain underrepresented in post-secondary sport? Existing literature points to disparities in access to sport, physical activity, and education for Indigenous communities, which are deeply rooted in the enduring impacts of colonization. However, while these disparities are well-documented, there is comparatively little known about the unique experiences of Indigenous athletes in this context, and their perspectives remain underrepresented in the existing body of literature.

**Methods**: To explore this issue, we conducted a narrative inquiry to better understand the sporting and educational pathways of Indigenous student-athletes at the University of Saskatchewan. Narrative inquiry, with a focus on storytelling and temporality, provided a way for participants to share their unique experiences across the past, present, and future, while recognizing that these are shaped by complex socio-cultural contexts (Caine et al., 2020). Data collection involves three in-depth conversations with each participant. The first conversation examined key childhood and youth experiences in sport, physical activity, and education. The second conversation explored how these early experiences influenced their journey to post-secondary sport. The final conversation involved follow-up questions and a discussion of their current realities as Indigenous student-athletes. Each conversation is audio-recorded, transcribed, and analyzed using Clandinin's (2013) three-dimensional narrative inquiry framework, considering temporality, place, and sociality.

**Results**: Findings highlight the importance of strong support networks, inner drive, access to infrastructure, quality education, and high-level training in fostering the success of Indigenous student-athletes. Significance: These insights offer valuable guidance for improving support systems and shaping future initiatives aimed at increasing Indigenous representation and success in post-secondary sport.

# ORAL PRESENTATIONS

## 3. IMPLEMENTING A PATIENT-ORIENTED POLE WALKING INTERVENTION IN RETIREMENT HOMES: PRELIMINARY FINDINGS OF A PILOT CLUSTER-RANDOMIZED CONTROLLED TRIAL

**Presenter:** Mohsen Keramati

**College of Kinesiology Affiliation:** PhD Candidate

**Collaborators/Co-Contributors:** Saija Kontulainen

**Objective**: To examine the preliminary efficacy and safety of a pole walking (PW) intervention on physical function and other risk factors for falls and fractures among retirement home residents.

**Design**: Pilot cluster-randomized controlled trial implementing a patient-oriented PW intervention.

**Setting**: Retirement homes in Saskatoon, Canada.

**Participants**: We recruited 43 residents from 10 retirement homes (mean age 82.1 years; 70% female; intervention n=25; control n=18; median cluster size 4.5) during 2023-24.

**Intervention**: We randomized the retirement homes (allocation ratio 1:1) into a parallel-group PW intervention or a waitlist control group. The intervention was offered 3 times/week for 12 weeks. Supervised group sessions (20-60 min) included posture and balance warm-up, PW, muscle strengthening, and stretching exercises tailored to participants.

**Outcome measures:** We measured functional balance/mobility (timed "up & go"), lower-body strength (30-s chair stand), and quality of life (36-item short form survey) as primary outcomes as well as functional capacity (6-min walk), upper-body strength (grip strength), physical activity and sedentary time (accelerometers), fear of falling (falls efficacy scale), and safety (recorded adverse events) as secondary outcomes at baseline and follow-up. We used multiple imputations for missing data and performed intention-to-treat analyses using 2-level linear mixed-models adjusted for baseline values and with cluster ID as the grouping variable to examine between-group differences at follow-up.

**Results**: The PW group performed better at the 6-min walk (mean adjusted difference at follow-up 30.4 m; 95% CI: 0.4-60.5; p=0.047) and grip strength tests (5.4 kg; 1.2-9.6; p=0.018). We recorded 3 intervention-related (all non-serious: 2 falls, 1 musculoskeletal injury) and 4 non-intervention-related adverse events (3 non-serious musculoskeletal injuries, 1 serious headache) in the PW group and 4 events (2 falls, 1 dizziness, 1 poor vision) among controls.

**Conclusion**: Preliminary results indicate the efficacy of PW intervention on functional capacity and upper-body strength among retirement home residents, with no intervention-related serious adverse events.

**Trial registration**: NCT05388227

# ORAL PRESENTATIONS

## 4. WHEN HEARTS RACE AND PRESSURES RISE: ALTERED EXERCISE PRESSOR REFLEX WITH CARDIAC ABNORMALITIES AND AGING

**Presenter:** M. Rafique Khan

**College of Kinesiology Affiliation:** PhD Student

**Collaborators/Co-Contributors:** Adam M. S. Luchkanych, Thomas J. Jurrissen, Cameron J. Morse, Sarah Al-Mouaiad Al-Azem, Enoch Yang, T. Dylan Olver, Corey R. Tomczak

The exercise pressor reflex describes the autonomic response that stimulates the cardiovascular system to maintain perfusion of blood flow to working skeletal muscle. However, the exercise pressor reflex is exaggerated in patients with heart failure with reduced ejection fraction (HFrEF) whereas it is blunted in congenital heart disease (CHD). While HFrEF and CHD are clinically diverse, there may be phenotypic overlap that could provide a shared thread for observed pressor responses in these patient groups. Furthermore, the existing evidence on the effect of aging between healthy young (HY) and old (HO) appears to be conflicting. We hypothesized that the pressor response would be blunted with aging and the presence of cardiac conditions. A retrospective analysis of the immediate heart rate (electrocardiography) and mean arterial pressure (finger photoplethysmography) change from rest to during a short (3-5 sec) single bout of maximum voluntary isometric handgrip contraction was performed in HFrEF, CHD, HY, and HO (HFrEF; n=20 (6 F), 61±9 yrs; CHD, n=47 (21 F), 13±3 yrs; HY, n=40 (20 F), 13±3 yrs; HO, n=22 (10 F), 61±6 yrs). Data was analyzed by 2 × 2 ANOVA (health status; healthy and cardiac condition × age; young and old). Data were extracted as the average of three cardiac cycles at rest and a single cardiac cycle at peak systolic blood pressure during MVC. The data revealed heart rate increase from rest to MVC declined with age (8.6±8.1 Δ%, $p=0.0004$) and health status (8.0±4.8 Δ%, $p=0.0023$). Multiple comparisons revealed the increase in heart rate from rest to MVC was less in CHD (9.8±5.9 Δ%, $p=0.0049$), HO (11.2±9.4 Δ%, $p=0.0117$), and HFrEF (16.9±12.4 Δ%, $p<0.0001$) than HY. Furthermore, mean arterial pressure increase from rest to MVC declined with age ($p<0.0001$), but not health status ($p=0.1086$). During small skeletal muscle mass contraction at maximal intensity, the pressor response is impaired with aging and the presence of cardiac conditions. Together, these altered cardiovascular responses to exercise may be implicated in the reduced exercise capacity and tolerance known in these respective groups.

# HONOURS PRESENTATION SCHEDULE

## March 28th, 2025

| | | |
|---|---|---|
| ***1:30 - 1:35 PM*** | **OPENING REMARKS** | |
| ***1:35 - 1:46 PM*** | Ainsley Haas (Dr. Heather Foulds) | 6-8 mins |
| ***1:46 - 2:01 PM*** | Muqtasida Fatima (Dr. Heather Foulds) | 10-12 mins |
| ***2:01 - 2:16 PM*** | Kirstyn Robertson (Dr. Kent Kowalski) | 10-12 mins |
| ***2:16 - 2:24 PM*** | Sarah Al-Mouaiad Al-Azem (Dr. Corey Tomczak) | 10-12 mins |
| ***2:24 - 2:35 PM*** | **BREAK** | |
| ***2:35 - 2:50 PM*** | Sophia Abiara (Dr. Joel Lanovaz) | 10-12 mins |
| ***2:50 - 3:05 PM*** | Lauren Hinz (Dr. Kevin Spink) | 10-12 mins |
| ***3:05 - 3:20 PM*** | Ami Klinger (Dr. Kevin Spink) | 10-12 mins |
| ***3:20 - 3:35 PM*** | **HONOURS RESEARCH MIXER** | |

# HONOURS PRESENTATIONS

## DOES GENDER AFFECT THE RELATIONSHIP BETWEEN SOCIAL SUPPORT & PHYSICAL ACTIVITY?

**Presenter:** Aisley Haas

**Supervisor:** Dr. Heather Foulds

**Introduction:** There are many health benefits associated with physical activity yet almost half of Canadians do not meet recommended levels. Many factors can affect physical activity participation including social support. Social support (SS) is a resource supplied to an individual by their social network. There is a positive relationship between social support and physical activity participation. Research has found that the effects of this relationship vary by sex; however, little research examines gender differences.

**Methods:** This study investigates how gender affects the relationship between social support and physical activity among adults. A sample of 4,405 adults, aged 18+, completed an anonymous, online survey including the Social Support Index and International Physical activity Questionnaire.

**Results:** There was no difference in the relationships of perceived (p=0.92), friend (p=0.32), family (p=0.43), community (p=0.13), or total (p=0.14) SS and leisure time physical activity (LTPA) between gender identities. There was a significant relationship between perceived (R=0.11, p=0.02*), friend (R=0.09, p=0.02*), community (R=0.07, p=0.04*), and total (R=0.09, p=0.01*) SS and LTPA among men. There was also a significant relationship between perceived (R=0.07, p=0.001*), family (R=0.09, p=0.02*), community (R=0.11, p=0.004*), and total (R=0.13, p=0.001*) SS and LTPA among gender diverse individuals. There was only a significant relationship between perceived SS (R=0.08, p=0.02*) and LTPA among women.

**Conclusion:** Our results found that gender is not a moderator of relationships between SS and LTPA; however, perceived SS is important for physical activity participation.

# HONOURS PRESENTATIONS

## DIFFERENCE IN THE ARTERIAL STIFFNESS MEASURE BETWEEN MÉTIS ADULTS WITH HIGH OR LOW CONNECTION TO LAND

**Presenter:** Muqtasida Fatima

**Supervisor:** Dr. Heather Foulds

**Introduction:** Land connection has been identified as a significant component of Métis health in qualitative research. This study aims to explore how arterial stiffness measures differ between Métis adults with a high or low connection to land.

**Methods:** In partnership with Saskatoon Métis Local 126, participants completed a questionnaire about land connection. Central and peripheral pulse wave velocities were used to measure arterial stiffness and compared between individuals with high and low land connections. The first question surveyed whether they spend time on the land. The second question surveyed their accessibility of land outside major urban centres. The third question surveyed the wholistic wellness of land connection. The fourth question surveyed their ability to connect with the land anytime.

**Results:** The questionnaire was completed by 56 participants (35 females, 21 males) with a mean age of 34 ± 13. For each question, the central, upper and peripheral pulse wave velocities were similar between the high and low land connection. For the overall score, the central pulse wave velocity was similar for both land connection groups ($8.57 \pm 3.83$ m·s$^{-1}$ vs $8.86 \pm 4.57$ m·s$^{-1}$; $p = 0.42$). The upper peripheral pulse wave velocity was similar for both land connection groups ($20.44 \pm 10.39$ m·s$^{-1}$ vs $25.50 \pm 18.13$ m·s$^{-1}$; $p = 0.20$). The lower pulse wave velocity was similar for both land connection groups ($9.98 \pm 2.35$ m·s$^{-1}$ vs $10.24 \pm 1.52$ m·s$^{-1}$; $p = 0.37$).

**Conclusion**: This study found no significant association between land connection and arterial stiffness among Métis adults.

# HONOURS PRESENTATIONS

## EXPLORING THE SELF-COMPASSION INTERVENTION PREFERENCES OF ATHLETES WITH INTERSECTING AND UNFOLDING IDENTITIES

**Presenter:** Kirstyn Robertson

**Supervisor:** Dr. Kent Kowalski

Despite self-compassion interventions helping athletes cope with setbacks and enhance performance in sport, research suggests self-compassion interventions could be more efficacious if individualized. One way to tailor self-compassion interventions is by considering athletes' identities. Our study explored the role of athletes' evolving and intersecting identities in their reception to and preference for self-compassion interventions. Using a qualitative narrative strategy of inquiry, nine student-athletes (5 men, 4 women) from various sports were individually interviewed. Participants represented a range of identities (e.g., athletic, academic, ethnic, spiritual, and gender), with diverse intersections among them. By utilizing thematic narrative analysis, three key themes were generated: (a) Clear Identities, Unclear Intersections, (b) An Evident but Blurry Bridge Between Self-Compassion and Identity, and (c) Shifting Identities and Preferences. Across interviews, when asked to identify their identities, athletes shared stories about each one individually but struggled to explain how they intersected to shape their sport experiences. Athletes recognized their identity intersections likely influenced their preferences for self-compassion and that interventions should consider their identities; however, they were unsure how to tailor self-compassion practices to their intersecting identities. Additionally, athletes recognized their self-compassion preferences shifted over time, across circumstances, and as their identities unfolded. Together, results reveal a complex link between identity and self-compassion. However, it is clear that considering athletes' identity in the personalization of self-compassion interventions could enhance their adoption and effectiveness.

***Key Words:*** Self-compassion; intervention; identity; intersection; athletes

# HONOURS PRESENTATIONS

## ATTENUATION OF CARDIOVAGAL BAROREFLEX GAIN RESETTING DURING ISOMETRIC HANDGRIP EXERCISE IN PATIENTS WITH FONTAN CIRCULATION

**Presenter:** Sarah Al-Mouaiad Al-Azem

**Supervisor:** Dr. Corey Tomczak

**Co-Authors:** M. Rafique Khan, Adam M. S. Luchkanych, Thomas J. Jurrissen, Stephanie Fusnik, Marta Erlandson, Kristi D. Wright, Charissa Pockett, T. Dylan Olver, Corey R. Tomczak

Exercise intolerance is hallmark in patients with Fontan (FTN) circulation and may be attributed to low baroreflex sensitivity and thus, a low heart rate response for a given exercise intensity. Whether resetting of the cardiovagal baroreflex gain during exercise in FTN is attenuated remains unknown. Accordingly, we tested the hypothesis that the increase in heart rate from rest to exercise would be lower and cardiovagal baroreflex gain resetting attenuated in FTN. Twenty- three patients with FTN (F = 11, M = 12; 14(4) yrs; BMI = 20(6)) were age- and sex-matched to 20 healthy controls (CTL; F = 7, M = 13; 14(4) yrs; BMI = 20(4)) that performed 2-min of isometric handgrip (IHG) exercise at 30-40% maximal voluntary contraction after 2-min of rest. Heart rate (electrocardiogram) and blood pressure (finger cuff photoplethysmography) were measured throughout. Cardiovagal baroreflex gain was determined using the spontaneous sequence method at rest and during IHG exercise. Sequences of 3 or more successive increases or decreases in SBP and heart rate (R-R interval) using a lag of 0, 1, or 2 cardiac cycles when $r > 0.7$ were included. Comparisons were made using mixed-designs ANOVA or unpaired t-tests and the threshold for significance was set to $P < 0.05$. In FTN, 36(21) sequences/participant at rest and 35(12) sequences/participant during IHG exercise were analyzed. In CTL, 26(9) sequences/participant at rest and 39(13) sequences/participant during IHG exercise were analyzed. Resting heart rate (FTN = 76(13) vs CTL = 70(8) bpm, P = 0.2208) and SBP (FTN = 109(13) vs CTL = 106(14) mmHg, P = 0.7188) did not differ between groups. Despite similar delta SBP responses to IHG exercise (FTN = 5(6) vs. CTL = 8(8) mmHg, P = 0.2014), the delta heart rate was lower in FTN relative to CTL (3(5) vs 15(10) bpm, $P < 0.0001$). At rest, cardiovagal baroreflex gain was lower in FTN relative to CTL (14.0(9.8) vs 24.4(6.3) ms/mmHg, P = 0.0001). Further, the delta baroreflex gain was attenuated in FTN compared to CTL (-0.2±5 vs. -9±8 ms/mmHg, P = 0.0001). The cardiovagal baroreflex gain and heart rate responses were negatively correlated in FTN (r = -0.68, P = 0.0003). Attenuated resetting of the cardiovagal baroreflex gain during exercise contributes to a blunted exercise heart rate in FTN.

# HONOURS PRESENTATIONS

## EVALUATION OF A NOVEL PUSH TASK FOR SHOULDER FUNCTION ASSESSMENT IN BREAST CANCER SURVIVORS AFTER RECONSTRUCTIVE SURGERY

**Presenter:** Sophia Abiara

**Supervisor:** Dr. Joel Lanovaz

**Authors:** Sophia Abiara, Kenzie Friesen, Angelica Lang, Joel Lanovaz

On average, over 80 Canadian women are diagnosed with breast cancer every day. Treatment is often followed by reconstructive surgeries, which can lead to longer term musculoskeletal issues. Research has shown that survivors elicit unique upper body muscle activations and kinematics. Typically, ergonomics-related functional tasks are used in these studies, but lifting is often the only loaded task. A novel functional push task has been developed, and this study aims to evaluate this task in comparison to a standard overhead lift in breast cancer survivors. Ten women (Age: 35-68), who had previously undergone breast reconstruction surgery more than six months ago and experienced no shoulder pain, were analyzed from a larger dataset. Participants completed a Work-Related and Functional Tasks protocol, which included the standard overhead lift task and the novel horizontal push task from a seated position. Electromyography (EMG) data from the infraspinatus and pectoralis major muscles were recorded from both the dominant and non-dominant arms along with 3D kinematics of the humerus. Applied force from the push was recorded using a handheld dynamometer. EMG expressed as a percent of maximum voluntary contraction was calculated along with the co-contraction index (CCI) between the muscles. Humeral elevation and rotation were calculated. CCI, EMG and humeral rotation were compared between the lift and push at similar elevation levels using a repeated measures ANOVA with task and arm as factors. The relationships between the variables and load were explored with correlations. Humeral rotation was found to be different between the tasks, with more internal rotation in the push. CCI were similar between tasks, but absolute muscle activity for both muscles were significantly higher in the lift task. No between-arm (dominance) effects were observed. CCI, EMG and kinematics were not correlated with load in either the push or the lift tasks. This exploratory study found the addition of the loaded push task could be valuable as it resulted in different kinematic and muscle activation patterns in comparison to the lift. Future work will include other breast cancer survivors who do experience pain and comparisons between participants with different surgery types.

# HONOURS PRESENTATIONS

## EXAMINING THE EFFECTS OF TRENDING NORM MESSAGES ON UNIVERSITY STUDENTS' ON-CAMPUS ACTIVITY AND SITTING INTENTIONS AND BEHAVIOURS

**Presenter:** Lauren Hinz

**Supervisor:** Dr. Kevin Spink

**Introduction:** While more movement and less sitting behaviour is associated with important health outcomes (Stamatakis et al., 2019), university students are trending in the opposite direction. It has been reported that they often report low physical activity (PA) levels (Scarapicchia et al., 2015) and high levels of sitting behaviour (SB) (Castro et al., 2020). As noted previously (Anderson et al., 2024), this may not be surprising given the choice architecture of the school environment. However, as students spend considerable time on campus, examining how to increase movement in this environment becomes important. One approach to address this issue is the use of normative messages (Cialdini et al., 1990) in the form of trending norms (Mortensen et al, 2019). In a recent study (Anderson et al., 2024), it was reported that trending norm messages decreased on-campus SB, but did not increase PA. As university students report that decreasing SB may be easier to do than increasing PA (Pachu et al., 2020), adding a positive outcome expectation (POE) to normative messages may be a possible method to increase on- campus PA as well. Adding a POE to a normative message has been done previously to increase PA in university students during an examination period (Crozier & Spink, 2017).

**Purpose**. The purpose of this study was to examine whether a trending norm message augmented with a POE would change university students' movement intentions and behaviours while on-campus for both increasing PA and reducing SB.

**Methods**: University students (N = 103) completed two online surveys. In the first survey, participants completed demographics and self-reported on-campus PA and SB, were randomly assigned one of two messages (trending norms or attention control), then completed intentions to increase PA and reduce SB while on campus in the next week. One week later, self-reported on-campus PA and SB were re-assessed.

**Results:** Results from a MANCOVA revealed that messages significantly impacted intentions, $F(2, 96) = 6.32$, $p = .003$ with both PA ($p < .001$) and SB ($p < .005$) contributing. Those who received the trending norms message reported greater intentions to increase PA and reduce SB while on campus. In terms of behaviour, the messages only significantly impacted SB, $F(2,45) = 3.85$, $p < .029$, with those receiving the trending norms message reporting they stood up more to break up sitting time on campus ($p < .019$).

**Conclusion:** These findings provide further experimental support for exposure to trending norms decreasing university students' on-campus sitting behaviours. While trending norm messages increased intention to be active, they did not increase on-campus PA. This deserves future examination.

***Keywords***: physical activity, sitting behaviour, on-campus, university students, trending norms

# HONOURS PRESENTATIONS

## EXAMINING THE MODERATING EFFECT OF MIND-BODY BELIEFS ON THE RELATIONSHIP BETWEEN TRENDING NORM MESSAGES AND ON-CAMPUS PHYSICAL ACTIVITY AND SITTING BEHAVIOUR

**Presenter:** Ami Klinger

**Supervisor:** Dr. Kevin Spink

**Introduction:** Trending norm messages (Mortensen et al., 2019) have been shown to be effective in influencing on-campus activity behaviour (Anderson et al., 2024). While research examining normative messaging typically report positive relationships with health behaviours, less is known about potential moderators that may influence these relationships. One idea that has gained traction recently with respect to endorsing health behaviours concerns one's intuitive understanding of how the mind and body relate. One belief system that emerges is that the mind and body are separate entities that do not influence each other (Cartesian dualism). Others hold a belief system that the mind and body are connected (monism) (Burgmer & Forstmann, 2018). Research also is clear that these two mind-body belief systems play out differently with respect to health. Prior research has revealed that those who believe that the mind and body are separate (dualists) report decreased engagement and a less positive attitude toward health behaviours compared to mind-body monists (Burgmer & Forstmann, 2012). Further, it has been reported that those who believe that their mind and body are connected (monists) have an increased probability of engaging in both physical and mental health behaviours (Ku et al., 2025). Given the positive relationship between monist beliefs and health behaviours, it may be possible that monists would react more favourably toward trending norm messages that focus on health versus dualists.

**Purpose:** Based on evidence suggesting mind-body beliefs may influence engagement in health behaviours, the purpose of this study was to examine whether different personal understandings of how the mind and body relate would moderate the relationship between trending norm messages versus a control message on-campus physical activity (PA) and sitting behaviour (SB).

**Methods:** University students (N=89) completed surveys at two time points. For the first survey, participants completed demographics, on-campus PA and SB, a mind/body dualism measure (Burgmer & Forstmann, 2018) and then were randomly assigned to receive either a trending norm or attention control message. One week later, on-campus PA and SB were reassessed.

**Results:** Moderation was tested by examining the effects of the interaction between messages and mind-body mindset beliefs on both on-campus PA and SB. Using a median split, mindset beliefs were converted to a binary category - monists (n=19) or dualists (n=29). Results revealed a significant interaction between the messages and mind-body beliefs for both PA ($p < .024$) and SB ($p < .007$). Individuals with a stronger monist belief who received the trending norm message reported walking around while using their phone more often (PA) and intentionally standing up more often to interrupt SB compared to those who received the attention control message. However, differences between the trending norm and attention control message for both PA and SB were not significantly different for dualists.

**Conclusion:** These results provide preliminary evidence suggesting that mind-body beliefs may be a possible moderator of the relationship between trending norm messages and on-campus PA and SB.

***Keywords*:** mind-body beliefs, trending norm, physical activity, sitting behaviour, intuitive theories

# HONOURS PRESENTATION SCHEDULE

## April 4th, 2025

| | | |
|---|---|---|
| ***1:30 - 1:35 PM*** | **OPENING REMARKS** | |
| ***1:35 - 1:50 PM*** | Anya Jackson (Dr. Natalie Houser/Dr. Louise Humbert) | 10-12 mins |
| ***1:50 - 2:05 PM*** | Amy Meyer (Dr. Alison Oates) | 10-12 mins |
| ***2:05 - 2:20 PM*** | Nisarg Shiroya (Dr. Jon Farthing) | 10-12 mins |
| ***2:20 - 2:35 PM*** | Olu Adebayo (Dr. Natalie Houser) | 10-12 mins |
| ***2:35 - 2:43 PM*** | Spencer Dmytruk (Dr. Nancy Gyurcsik) | 3-5 mins |
| ***2:43 - 2:55 PM*** | **BREAK** | |
| ***2:55 – 3:10 PM*** | Abdullah Ramadan (Dr. Phil Chilibeck) | 10-12 mins |
| ***3:10 – 3:25 PM*** | Thomas Rusk (Dr. Louise Humbert) | 10-12 mins |
| ***3:25 – 3:40 PM*** | Shayan Ahmed (Dr. Phil Chilibeck) | 10-12 mins |
| ***3:40 – 3:51 PM*** | Rachel Kirk (Dr. Marta Erlandson) | 6- 8 mins |
| ***3:51 - 4:05 PM*** | **HONOURS RESEARCH MIXER** | |

# HONOURS PRESENTATIONS

## EXPLORING CHILDREN'S EXPERIENCES IN CIRCUS CLUB

**Presenter:** Anya Jackson

**Supervisors:** Dr. Natalie Houser and Dr. Louise Humbert

**Introduction:** As children spend the majority of their weekdays at school, it is important that there are a wide variety of movement opportunities that align with their broad interests. In an encouraging shift from sport-centered offerings that often dominate school physical activity programming, circus arts is an increasingly popular movement option in physical education and recess/afterschool contexts. Circus has been found to be an optimal way to develop physical literacy and the introduction of circus arts programs in schools has resulted in increased physical literacy outcomes for children and youth. Additionally, student voices are essential in shaping our understanding of relevant movement opportunities, ensuring that activities offered to them are engaging and reflective of their interests, furthering a deeper sense of ownership, confidence, and motivation in their physical literacy development.

**Purpose:** The purpose of this study was to understand the physical literacy experiences of elementary school children who participated in circus club.

**Methods:** Circus Club is a lunch-time program at an elementary school in Saskatoon, Saskatchewan. The program is run by a physical education specialist, and it strives to provide students from grades 3-8 a non-sport movement opportunity. An intrinsic case study method was used to gain an in-depth understanding of the participants' experiences in circus club. Three data collection tools were used: field notes on participant observation, semi-structured interviews, and the write, draw, show, and tell (WDST) method. Data analysis was done by using Braun and Clarke's six step reflexive thematic analysis.

**Results.** Semi-structured interviews were conducted with 10 students enrolled in grades 4-8, and four completed the optional WDST activity. Using Braun and Clarke's (2022) reflexive thematic analysis procedures, three themes were identified: (i) "I know I am getting better": Enhanced confidence and motivation through challenge, (ii) "Learning together" : Collaboration and social engagement opportunities, and (iii) "Just be creative": Empowerment through choice and creative freedom. This study's findings highlighted how physical challenge, collaboration, choice, and creative freedom enhanced the participants' confidence, motivation,
and social engagement.

**Conclusion:** Circus arts provided a unique opportunity for students to develop various aspects of physical literacy including confidence and competence, shown through positive challenge, as well as motivation, social connection, and creativity. The study also illuminated valuable insights into the participants' perspectives, highlighting the importance of their experiences in shaping their understanding and engagement with physical activity.

# HONOURS PRESENTATIONS

## THE REFINEMENT OF A PREVIOUSLY TESTED CONCUSSION PROTOCOL TO IMPROVE ITS CLINICAL UTILITY

**Presenter:** Amy Meyer

**Supervisor:** Dr. Alison Oates

**Background**: Concussions are a complex pathophysiological process that can affect balance control, emphasizing the importance of measuring balance during concussion rehabilitation. Our research team evaluated the feasibility of a balance assessment protocol comprised of 24 standing tasks (i.e., one/two legs, eyes open/closed, on/off foam, with/without a figure 8 head movement, with/without a reaction time task) with 15/24 tasks deemed feasible; however the reliability, clinical implementation, and clinical utility of those tasks is unknown. This research examined the reliability of those 15 tasks, gathered clinician insights, and evaluated the clinical utility to develop a refined balance assessment protocol for people undergoing concussion rehabilitation. We hypothesized that the clinical utility index (CUI) would increase after our refinements.

**Methods**: Participants completed the standing balance tasks while standing on force plates (VALD Force Decks) to measure Centre of Pressure (COP) movement. Reliability of the COP data for participants without a history of concussion who completed the tasks twice 2-20 days apart was examined using Intraclass correlation coefficients (ICCs) for normally distributed data and Lin's Concordance Coefficient (Rc) for non-normally distributed data ($\alpha = .05$). Tasks with ≥moderate reliability were compared between participants with and without a history of concussion using Independent T-tests ($\alpha = .05$). We shared results with clinicians to gather their clinical input and determine which tasks would be clinically useful. Clinical utility was calculated for the original and refined protocols.

**Results**: Six of the 15 feasible tasks had significant ($p < .05$), moderate-good reliability including quiet standing eyes closed, quiet standing single leg, quiet standing single leg eyes closed, figure 8 single leg, figure 8 on foam single leg, and a lower extremity reaction time test. The quiet standing eyes closed and quiet standing single leg tasks differentiated between groups with and without a history of concussion. Clinicians chose the quiet standing eyes closed, figure 8 single leg, and lower extremity reaction time tasks as tasks they could incorporate into their current concussion rehabilitation protocol. The CUI changed from 1 (original protocol) to 5 (refined protocol).

**Discussion**: Using the previously establish feasibility results, and calculated reliability results changed the number of tasks from 15 to three which increased the CUI by four points. The increased CUI supports a more clinically useful protocol than before. The feasibility and reliability results allowed clinicians insight into which tests are best to implement into their current protocol. The quiet standing eyes closed task serves as a simple baseline test, while the figure 8 single leg task incorporates vestibular activation, and the lower extremity reaction time task adds a cognitive challenge to balance. Future research will implement these three tasks in people undergoing concussion rehabilitation to determine if they are beneficial in detecting changes in balance and for clinical decision making.

# HONOURS PRESENTATIONS

## EXPLORING THE UTILITY OF RESISTANCE TRAINING FOR CONGENITAL MIRROR MOVEMENT DISORDER

**Presenter:** Nisarg Shiroya

**Collaborators**: Dr. Layla Gould and Dr. Gary Hunter, College of Medicine

**Supervisor:** Dr. Jon Farthing

**Introduction**: Congenital mirror movement (CMM) disorder is a very rare condition (<1 in a million) where voluntary limb movements trigger involuntary mirroring in the opposite limb. This study examined whether four weeks of unilateral resistance training, followed by 10 days of detraining, affects mirroring activity and cross-education effects (i.e., strength gain in the untrained opposite limb) in CMM.

**Methods**: Two right-handed participants reporting CMM completed four weeks of maximal unilateral isometric grip training of the left hand, three times per week using a grip trainer (Digiflex), followed by 10 days of detraining. Training sessions increased from two to five sets of eight maximal repetitions per session. Participants completed testing for grip strength and muscle activation at baseline, mid-training, post-training, and after detraining. Testing included three brief 3-second maximal voluntary contractions (MVC) and a 1-minute MVC contraction of each hand. MVC force (kg) was measured using Jamar and Biopac grip dynamometers, while simultaneous EMG recordings captured muscle activity from the flexor carpi radialis, extensor carpi radialis, and flexor digitorum superficialis of both arms.

**Results**: Due to the low sample size in this study (on account of the rare condition), only descriptive results are reported. After left-hand training, left grip strength increased in the first participant by 12% and remained 6% above baseline after detraining. Strength in the untrained right arm improved 17% and increased to 23% above baseline after detraining, indicative of cross-education. The second participant showed a modest increase of ~6% by the end of detraining and no cross-education. Both participants showed substantial mirroring force and EMG activity in the opposite limb during 1-minute MVC contractions of either hand. Mirroring force in the right hand during a 1-minute left MVC was ~20% MVC for both participants at baseline and decreased by almost half at the end of detraining. Mirroring force in the left hand during 1-minute right MVC was ~40% MVC and ~20% MVC for each participant, respectively, and decreased by almost half after detraining. EMG activation of the right hand during the left 1-minute MVC ranged from 67% to 82% MVC at baseline, with little change after training, and then increased after detraining. EMG activation of the left hand during the right 1-minute MVC was in the range of 80% MVC and tended to increase post-training, but reverted to baseline or lower after detraining.

**Conclusion**: Unilateral grip training reduced mirroring force and improved strength, with signs of cross-education. However, muscle activation responses varied, and detraining effects were inconsistent. Further research is needed to understand individual differences and long-term benefits for CMM.

**Acknowledgements**: A special thank you to the participants with CMM who dedicated a considerable amount of time to training and testing for this study and to my lab members.

# HONOURS PRESENTATIONS

## INFLUENCE OF PHYSICAL EDUCATION EXPERIENCES ON SCHOOL-AGED CHILDREN'S PERCEIVED PHYSICAL LITERACY DEVELOPMENT

**Presenter:** Adeoluwa Gideon Adebayo

**Supervisor:** Dr. Natalie Houser

**Introduction:** Physical literacy is the motivation, confidence, physical competence, knowledge and understanding to value and take responsibility for engagement in physical activities for life. Physical education (PE) offers a unique and structured opportunity for children to develop physical literacy by providing varied movement experiences within supportive and inclusive learning environments. Current literature underscores the importance of examining how physical literacy is perceived and fostered within educational contexts, particularly through varied pedagogical approaches.

**Purpose:** This study aimed to investigate the relationship between teacher and student perceptions of physical literacy within different PE environments, and how this experience might differ between them.

**Methods:** A cross-sectional design was utilized, with data collection including physical literacy self-assessment (PLAYself), teacher assessment of student physical literacy (PLAYcoach), and observational assessments using a comprehensive physical literacy checklist. Descriptive statistics, correlation analyses and Mann-Whitney U tests were conducted to explore differences and relationships among physical literacy measures. Significance was set a $p<0.05$.

**Results:** This study involved 228 students (114 males, 114 females) from grades 4 to 7 and their PE teachers (1 male, 1 female) from two schools. There was a significant positive correlation between student (PLAYself) and teacher (PLAYcoach) perspectives of physical literacy ($r =0.291$; $p < .001$). There was also a significant positive correlation between both perspectives of physical literacy and the PE environment (PLAYself & PE environment: $r = 0.754$, $p < 0.001$; PLAYcoach & PE environment: $r = 0.272$, $p < 0.001$). When examining the difference in traditional PE compared to circus in PE, we found that traditional PE students reported higher self-perceived physical literacy scores (Environment: $22.5 \pm 3.75$ vs. $21.0 \pm 3.27$; $p = 0.001$; Self-description: $36.9 \pm 5.88$ vs. $34.3 \pm 4.86$; $p < 0.001$), whereas teacher and observational assessments indicated significantly higher scores outcomes in circus arts PE classes (Teacher assessed PL: $67.2 \pm 20.54$ vs. $53.9 \pm 17.89$; $p < 0.001$; Observational scores: $21.8 \pm 0.95$ vs.$15.6 \pm 1.09$; $p < 0.001$).

**Conclusion:** The results of this study revealed important relationships between physical literacy perceptions and the PE environments facilitated. Observational and teacher reported data suggest that circus arts in PE provides a more physical literacy enriched environment compared to traditional PE, fostering greater creativity, inclusivity, and affective engagement, as well as a greater opportunity for teachers to understand the abilities of all students in non-sport contexts. However, these experiences have not yet translated fully into student self-perceptions of physical literacy, indicating a need for sustained implementation to bridge the gap between instructional design and student experience.

# HONOURS PRESENTATIONS

## UNDERSTANDING THE TIME DEMANDS OF INTEGRATED KNOWLEDGE TRANSLATION (IKT): LESSONS FROM CO-DEVELOPING THE MOVEMENT THAT MATTERS PROGRAM

**Presenter:** Spencer Dmytruk

**Supervisor:** Dr. Nancy Gyurcsik

**Introduction:** Chronic pain is a public health emergency, affecting one in five Canadian adults. Without adequate pain management strategies, chronic pain can have detrimental effects on physical function, quality of life, and mental health. Despite strong evidence supporting physical activity as an effective nonpharmacological pain management strategy, most individuals who experience chronic pain are inactive. Psychosocial factors, such as fear of movement, pain anxiety, and low pain acceptance, contribute to inactivity. The Active Living for Pain (ALP) research team applied integrated knowledge translation (iKT) to co-develop, with patient and community partners, an accessible and acceptable physical activity program for adults living with moderate to severe chronic pain. The 6-week Movement That Matters (MTM) program targets the building of individuals' knowledge, confidence, and skills needed to engage in and maintain long-term physical activity participation.

**Purpose:** The initial Honours research study purpose was to examine baseline and end-program correlations between psychosocial factors of fear avoidance, pain anxiety, pain intensity, pain acceptance, and total attendance across the 6-week MTM program, as well as changes in the psychosocial factors from baseline to end-program. However, an unexpectedly lengthy amount of time was needed by the ALP team and knowledge users of patient partners and certified physical activity instructors to co-develop all necessary program materials and finalize program logistics. Thus, the Honours research study purpose shifted to analyzing the time required to engage in an iterative iKT approach in the co-development of MTM program materials and program logistics.

**Methods:** The amount of time to co-develop and finalize MTM materials and logistics was recorded and analyzed. Examples of key materials included the program instructor manual and participant habit tracker. Logistic examples included the timeline to hire a certified physical activity instructor and the creation and testing of online surveys. The time needed for co-development, revisions, and feedback from researchers and knowledge users including patient partners and certified physical activity instructors, were documented to better understand the duration and iterative nature of an iKT design process.

**Results:** The iKT process of the co-development and finalization of the MTM materials ranged from 3 months (implementation guide) to 10 months (program overview guide and participant habit tracker). The time to finalize program logistics ranged from 6 weeks (securing of physical activity equipment) to 5 months (development and testing of online surveys, including participant screening, pre-program, end-program, and 1-month end-program surveys).

**Conclusion:** The iKT process was time intensive, requiring substantial coordination, collaboration, and iterative development between researchers and knowledge users. However, implementing iKT in program design has the potential to lead to programs that are more user-centered and effective in real-world settings. Researchers should be aware of the time required to meaningfully engage in iKT processes and account for this during program development.

# HONOURS PRESENTATIONS

## EFFECTS OF SHORT-TERM ASHWAGANDHA SUPPLEMENTATION ON RECOVERY FOLLOWING INTENSE EXERCISE

**Presenter:** Abdullah Ramadan

**Supervisor:** Dr. Phil Chilibeck

Ashwagandha, an herbal supplement commonly used for stress reduction and general well-being, has gained attention in sports science for its potential role in muscle recovery. This study examined the short-term effects of ashwagandha supplementation on muscle recovery by assessing muscle strength, soreness, and swelling over a 72-hour period following resistance exercise. Ten healthy adults (ages 18–35) participated in a randomized, double-blind, placebo-controlled study. Participants were assigned to either a 600 mg/day ashwagandha supplementation group or a placebo group for seven days before completing an acute resistance exercise protocol targeting the biceps. Muscle recovery was assessed using ultrasound (muscle thickness), a Biodex machine (torque), and subjective soreness ratings (Visual Analog Scale). Follow-up assessments occurred at 24-, 48-, and 72-hours post-exercise. Results showed a significant group × time interaction for muscle thickness ($p = 0.013$). In the ashwagandha group, muscle thickness returned to baseline within 24 hours, whereas the placebo group exhibited persistent swelling at 24-, 48-, and 72-hours post-exercise ($p < 0.05$). No significant interaction was found for torque recovery, though a time main effect ($p < 0.01$) indicated that strength declined post-exercise and recovered by 48 hours in both groups. Similarly, muscle soreness followed a typical time-dependent recovery pattern, peaking at 24 hours and declining at 48 and 72 hours ($p < 0.05$), with no significant difference between groups. These findings suggest that short-term ashwagandha supplementation may accelerate muscle swelling reduction but does not significantly impact strength recovery or muscle soreness compared to placebo. Due to the small sample size, further research is necessary to confirm these results and establish a definitive relationship between ashwagandha and muscle recovery.

# HONOURS PRESENTATIONS

## THE LAST GAME AND THE YEARS THAT FOLLOW: A CASE STUDY ON THE EXPERIENCES OF PARTICIPANTS IN A HIGH SCHOOL FOOTBALL PROGRAM

**Presenter:** Thomas Rusk

**Supervisor:** Dr. Louise Humbert

**Introduction:** High school sports are recognized for their numerous positive impacts, as evidenced by extensive research. Despite this, the unique experiences of individuals involved in specific sports, such as football, remain underexplored. This study aimed to address this gap by examining the perspectives of coaches and former student-athletes who participated in one Saskatchewan high school football program that was intentionally structured to foster character development.

**Methods**: This study employed an intrinsic case study design to explore the perspectives of former participants in the described high school football program. Using snowball sampling, two coaches and four former student-athletes were recruited. The coaches were actively involved in the program at the time of the study, each with a minimum of three years of experience. The former student-athletes had graduated between one and six years prior and had participated in the program for at least three years, including a minimum of two years on the senior team. Data was collected through semi-structured interviews and document analysis. All interviews were transcribed, and documents were reviewed, with key findings recorded in a research journal. Finally, reflexive thematic analysis was employed to identify and interpret themes within the data.

**Results**: Analysis of documents, as well as insights from coaches and former student-athletes, revealed three key themes. The first theme explores how high school football serves as a microcosm of life's emotional fluctuations, exposing athletes' raw character during extreme highs and lows. It examines how the prevailing win-focused framework contributes to these emotional fluctuations, which can serve as opportunities for character development, while also contrasting this framework with the ideals promoted by coaches and high school football regulatory bodies. The second theme explores the design of the program and the coaches' intent behind its structure, which forms the foundation of the program. Specifically, it investigates the elements coaches have incorporated into the framework, how they implement their approach, and the underlying motivations behind each structural decision. The third theme addresses the experiences this programs design and intent facilitated for both coaches and former student-athletes. Coaches, having observed multiple program iterations, identified both beneficial and problematic elements. Former student-athletes reflected on how the program shaped them, highlighting both positive and negative influences. In conclusion, the participants' insights offer a deeper understanding of their experiences in this unique football program. These perspectives provide valuable information to high school coaches seeking to develop student athletes' abilities and characteristics beyond the playing field.

# HONOURS PRESENTATIONS

## EFFECT OF POST-EXERCISE DRY CUPPING THERAPY ON MUSCLE RECOVERY

**Presenter:** Shayan Ahmed

**Supervisor:** Dr. Phil Chilibeck

**Introduction:** Dry cupping therapy has gained popularity in athletic settings as a recovery modality, yet empirical evidence supporting its effectiveness remains limited. The practice involves using suction to create negative pressure on the skin, which is theorized to promote blood flow and tissue recovery.

**Purpose:** To determine whether post-exercise dry cupping therapy improves recovery of muscle strength, reduces muscle soreness, and limits swelling compared to a sham control arm.

**Methods**: Ten resistance-trained adults participated in a randomized, within-subject, blinded trial. Participants performed a biceps-focused muscle-damaging exercise. One arm received dry cupping therapy post-exercise, while the opposite arm received a sham cupping treatment. Assessments were conducted at six time points: pre-exercise, post-exercise, post-cupping, and 24, 48, and 72 hours post-exercise. Outcomes included muscle strength (isometric torque via Biodex), muscle thickness (ultrasound), and soreness (Visual Analog Scale).

**Results:** There were no significant arm × time interactions for any outcome, indicating similar recovery patterns between cupped and control arms. Significant time main effects were observed for all outcomes ($p < 0.01$). Muscle strength decreased post-exercise and remained below baseline at 24, 48, and 72 hours ($p < 0.05$). Muscle thickness increased post-exercise and remained elevated at 24 and 48 hours before returning to baseline by 72 hours ($p < 0.05$). Muscle soreness increased post-exercise and remained elevated at all follow-up time points ($p < 0.05$).16

**Conclusion:** Dry cupping therapy applied after resistance exercise did not significantly improve recovery of strength, soreness, or swelling compared to control. These findings suggest that cupping may not provide additional recovery benefits beyond placebo.

# HONOURS PRESENTATIONS

## BONE HEALTH IN NEWCOMER CHILDREN COMPARED TO CANADIAN-BORN CHILDREN

**Presenter:** Rachel Kirk

**Supervisor:** Dr. Marta Erlandson

**Co-Authors:** Rachel Kirk, Matthew Chapelski, Marta Erlandson

**Introduction:** Bone health is crucial during childhood, as this period is essential for achieving optimal peak bone mass, which can reduce the risk of osteoporosis and fractures later in life. While research exists on the determinants of bone health, suggesting newcomer children may be at risk of impaired skeletal development, little is known of the bone health of newcomer children. The purpose of this study was to evaluate if there were differences in bone between newcomer and Canadian-born children.

**Methods:** Our cross-sectional study recruited forty-five children (12 newcomers and 33 Canadian-born) from 5 to 11 years of age. Bone health was assessed using high-resolution peripheral quantitative computed tomography (HR-pQCT) to measure total bone area (Tt.Ar), cortical area (Ct.Ar), trabecular area (Tb.Ar), total volumetric bone mineral density (Tt.vBMD), cortical density (Ct.vBMD), cortical thickness (Ct.Th), trabecular density (Tb.vBMD), trabecular thickness (Tb.Th), trabecular bone volume fraction (Tb.BV/TV), trabecular number (Tb.N), and
trabecular separation (Tb.Sp) at the distal radius and tibia. Anthropometric measures were recorded and physical activity (PA) was evaluated using the Childhood Physical Activity Questionnaire. Multivariate analysis of covariance (MANCOVA) was used to assess differences in HR-pQCT bone outcomes between groups while controlling for age, sex, height, weight, and PA. Statistical significance was set at $p<0.05$.

**Results**: Newcomer children had significantly greater Ct.Ar ($p=0.02$), Ct.vBMD ($p=0.02$), and Ct.Th ($p=0.01$) at the distal tibia compared to their Canadian-born peers. No significant differences were observed at the radius between groups ($p>0.05$).

**Conclusion**: Contrary to previous literature, this pilot study did not find that newcomer children had impaired bone health. Instead, newcomer children demonstrated greater values for cortical bone at the distal tibia. Future research should explore the impact of refugee status, parental education, acculturation, healthcare access, and diet with a larger and more ethnically diverse sample to better understand the bone development of newcomer children.

***Keywords***: Bone health, newcomer, children, HR-pQCT, PA, diet


# SPECIAL THANKS

**We would like to offer a heartfelt thank you to the planning committee for their dedication and hard work in organizing this year's research showcase. Their efforts created a valuable platform for students to share their work, connect, and inspire innovation. We truly appreciate your contributions!**

## CKRS COMMITTEE

**Karissa Johnson**

PhD Candiate

**Bailey Gitzel**

MSc Student

**Ian Kuriawan**

MSc Student

**Sarah Benson**

MSc Student

**Booklet design by Bailey Gitzel**


# SPONSORS

**The College of Kinesiology Research Showcase would not be possible without the support of our generous sponsors. We would like to thank our sponsors for helping showcase the interdisciplinary research taking place within the college.**

UNIVERSITY OF SASKATCHEWAN
College of Graduate and Postdoctoral Studies
GRAD.USASK.CA

UNIVERSITY OF SASKATCHEWAN
College of Kinesiology
KINESIOLOGY.USASK.CA