



UNIVERSITY OF SASKATCHEWAN

College of Kinesiology

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College of Kinesiology Research Showcase 2022 *From Ideas to Application*

A celebration of our research community including undergraduates, graduates, post-doctoral researchers, and faculty



CKRS

College of Kinesiology Research Showcase

March 28th – April 1st, 2022

Table of Contents

ACKNOWLEDGEMENTS.....	3
WEEK OVERVIEW	4
RESEARCH IN THE COLLEGE OF KINESIOLOGY	5
RESEARCH THEMES	5
GUIDING PRINCIPLES.....	5
STRATEGIC GOALS	5
MONDAY MARCH 28TH SCHEDULE.....	6
HONOURS PRESENTATIONS – ZOOM LINK	6
TUESDAY MARCH 29TH SCHEDULE.....	14
GRADUATE STUDENT PRESENTATIONS – ZOOM LINK	14
GRADUATE PRESENTATION ABSTRACTS	15
WEDNESDAY MARCH 30TH SCHEDULE	20
HONOURS PRESENTATIONS – ZOOM LINK	20
HONOURS PRESENTATION ABSTRACTS.....	21
THURSDAY MARCH 31ST SCHEDULE.....	29
GRADUATE STUDENT PRESENTATION – ZOOM LINK	29
GRADUATE PRESENTATION ABSTRACTS	30
FRIDAY APRIL 1ST SCHEDULE	37
PRESENTATIONS – ZOOM LINK	37

Acknowledgements

As we gather here today, we acknowledge we are on Treaty 6 Territory and the Homeland of the Métis. We pay our respect to the First Nations and Métis ancestors of this place and reaffirm our relationship with one another. The College of Kinesiology is committed to enhancing our relationship with Indigenous peoples, families, and communities to enrich our understanding of wholistic health. We are very grateful for the opportunity the College of Kinesiology provides for students to engage in Indigenous research and develop on our own personal reconciliation journey

Also, we'd like to thank the CKRS Planning Committee of KC Hall, Karly Anderson, Matthew Chapelski, Dr. Nancy Gyurcsik and Dr. Jon Farthing for their hard work in making this event possible.

Finally, we'd like to thank our wonderful presenters and their supervisors. Without their commitment to research and mentorship this event would not be possible.

Week Overview

Monday March 28: 1:30-4:00 PM PAC 232

- Undergraduate Honours Student Presentations

Tuesday March 29: 11:30 AM - 1:00 PM PAC 246

- Graduate Student Presentations

Wednesday March 30: 1:30-4:00 PM PAC 232

- Undergraduate Honours Student Presentations

Thursday March 31: 11:30 AM - 1:00 PM PAC 246

- Graduate Student Presentations

Friday April 1: 2:30-4:30 PM PAC 246

- Faculty and postdoctoral fellowship presentations
- CKGS Social to follow

Research in the College of Kinesiology

Research Themes

The College of Kinesiology conducts research on the role of physical activity, movement, and sport in:

- *Indigenous wellness* – To partner with Indigenous peoples, families, and communities to enhance wholistic health.
- *Healthy aging and management of chronic conditions* – To optimize physical and mental well-being in aging adults.
- *Child and youth health and development* – To enrich well-being, growth, and function in children and youth.
- *Human performance* – To elevate people's capabilities to thrive in various movement contexts.

Guiding Principles

The College of Kinesiology explores and is a leader in developing strategies for resolving local and world issues by:

- *Creating Impact* – Our research advances the field of kinesiology and improves people's lives.
- *Fostering Community* – We work shoulder-to-shoulder with Indigenous and other communities.
- *Promoting Collaboration* – We lead and foster interdisciplinary research partnerships.
- *Providing Mentorship* – We are committed to preparing the next generation of scholars and leaders in physical activity.
- *Sustaining Breadth* – Our research covers the spectrum from basic to applied science.

The College of Kinesiology Research Themes and Guiding Principles can be found [here](#).

Strategic Goals

Goal 1: Establishing research leadership

Goal 2: Inspiring research impact and increasing profile

Goal 3: Enhancing research support

To learn for about the Strategic Plan 2025, [click here](#).

Monday March 28th Schedule

Honours Presentations – [Zoom Link](#)

Time	Student	Supervisor
1:30	<i>Introduction to Research Showcase</i>	
1:45	Bill Duncan	Ferguson
2:00	Mustafa Shahbaz	Oates
2:15	Topaza Yu	Oates
2:30	Marin Schaab	Foulds
2:45	Yara Al Horoub	Foulds
3:00	Mason Beaulieu	Arnold
3:15	Mady Chartier	Erlandson

Honours Presentation Abstracts

Title: Indigenized Interventions to Address Rising Diabetes Rates Among Indigenous Women in Canada: A Scoping Review

Student: Bill Duncan

Supervisor: Dr. Leah Ferguson

Theme: Indigenous Health

Introduction: Indigenous Peoples worldwide are disproportionately affected by Type II diabetes (T2D). Some Indigenous Peoples have 40% of their population living with T2D. For instance, Indigenous women living in Saskatchewan have a four times greater risk of living with T2D than their non-Indigenous counterparts. Interventions are widely used to address T2D rates among various populations, including Indigenous Peoples. There is accumulating evidence that interventions are more ethical and effective when based in appropriate culture.

Purpose: The purpose of this scoping review is twofold. First, to determine if cultural intervention practices positively impact biomarkers/risk factors of T2D among Indigenous women in Canada. Second, if there are positive changes, identify which aspects of those interventions account for the change.

Methods: The primary investigator (PI) utilized five stages, detailed by Arksey and O'Malley (2005), to conduct this scoping review; identifying the research question, identifying relevant studies, study selection, charting the data and, collating, summarizing, and reporting the results. Once the research question was identified, search strategies were created for two databases to identify relevant sources. Those strategies produced 235 results across two databases. After three independent reviewers applied the inclusion and exclusion criteria, six articles were included in the review. Those six articles were then reviewed by the (PI) to reveal themes within them.

Results: The PI identified six reoccurring themes across the articles; social support, traditional foods, time/building trust, access, learning/understanding, and holistic approaches. Each of these themes had either a positive impact on T2D biomarkers/risk factors or provided a barrier for the participants' healthcare.

Conclusions: Interventions that are rooted in Indigenous frameworks are ethical and effective at positively impacting biomarkers/risk factors of T2D for Indigenous women in Canada. The themes generated from this scoping review reflect some of the cultural components among effective T2D interventions for Indigenous women in Canada. Appropriately integrating Indigenous culture into T2D interventions is meaningful for Indigenous participants and should be the basis of future interventions.

Title: Examination of how Long-COVID Affects Balance Control and Mobility

Student: Mustafa Shahbaz

Supervisor: Dr. Alison Oates

Theme: Healthy Aging and Management of Chronic Conditions, Human Performance

Introduction: Balance and mobility are necessary to sustain independent living. Maintaining balance is an important component in fall prevention and improving quality of life. Poor mobility increases the likelihood of disability, dependent-care, and mortality. Research has found that Long-COVID-19 can impact neurologic function which may also affect balance control; however, there is limited information about how Long-COVID impacts balance, mobility, and falls.

Purpose: To examine how Long-COVID affects balance control, mobility, and falls in individuals with Long-COVID.

Methods: An online survey using SurveyMonkey collected information about how Long-COVID affects balance control and mobility. The survey was created in collaboration with people that had Long-COVID to gain an insight on the experiences that are unique to individuals living with Long-COVID. Eligibility included having Long-COVID, 18 years of age or older, and living in Canada. The survey included five sections: eligibility, demographics, acute-COVID experiences, Long-COVID experiences, and the impact of Long-COVID on balance, mobility, and falls. Not every participant had a 100% completion rate. As such, data were analysed using frequency of responses for individual questions.

Results: Forty respondents started the survey and thirty-seven respondents that were deemed eligible continued with the survey. Standing balance was worsened in 61.29% (19/31) of respondents and 64.51% (20/31) of respondents experienced a worsened walking balance. Within their home, 60% (18/30) of respondents reported worsened mobility and 74.19% (23/31) of respondents had a worsened mobility within their communities. Since having Long-COVID, 20% (6/30) of respondents had started using a mobility aid. During their time with Long-COVID 35.48% (11/31) of respondents reported they had fallen and 70.97% (22/31) of respondents experienced a near fall. There were 28.12% (9/32) respondents that had Postural Orthostatic Tachycardia Syndrome (POTS) associated with their Long-COVID.

Conclusion: The data suggests that Long-COVID does impair balance control and mobility. Furthermore, the data also suggest that there is a connection between Long-COVID and the number of falls and near-falls experienced by individuals with Long-COVID. Future research can examine the relationship between Long-COVID symptoms and their impacts towards balance, mobility, and falls.

Acknowledgements: Dr. Oates, Long-COVID research team, Susan Bolton, Sunny Bui, Jackson Lordall, Dr. Lanovaz

Title: Assessing the Current State of Sex- and Gender-Based Analysis (SGBA) in Standing Balance Research for the Older Adult Population through a Scoping Review

Student: Topaza Yu

Supervisor: Dr. Alison Oates

Theme: Healthy Aging and Management of Chronic Conditions

Introduction: Balance is a vital aspect of everyday life to perform activities. Currently, the impact of sex or gender through Sex and Gender Based Analysis (SGBA) in standing balance research in older adults is not thoroughly understood. Integrating SGBA is important for creating inclusive and applicable research.

Purpose: This research assessed the current state of SGBA in standing balance research with older adults.

Methods: A scoping review was used to examine peer-reviewed journal articles from the year 2020 that studied standing balance in older adults. Search strategies and inclusion and exclusion criteria were created with support from a librarian. Two separate inclusion and exclusion criteria were developed for the abstract and then full-text screening to further focus results. Each study was evaluated by at least two researchers, with a third researcher to resolve conflicts. Data were extracted from articles that included older adults. Descriptive statistics were used to summarize the findings.

Results: A total of 1550 articles underwent abstract and title screening, 413 full-text screening, and 45 articles were selected for data extraction. Sex was referenced in the title and/or abstract in 11% ($n=5$) of the articles, while gender was referenced in 18% ($n=8$). Seven percent ($n=3$) reported on how sex data were collected, and 2% ($n=1$) reported on how gender data were collected. Sex and/or gender was considered in the limitations section of 18% ($n=8$) articles. Future discretions related to sex and/or gender were included in 9% ($n=4$) of the articles. Seven percent ($n=3$) of the articles used no sex and/or gender terms, and 51% ($n=23$) used sex and/or gender terms consistently throughout.

Conclusion: A moderate amount of articles examining standing balance in older adults in this review included SGBA, and a low amount of articles used sex and gender terminology consistently. Future research should include how sex and gender data were obtained, analyze sex and gender differences, and use consistent sex and gender terminology consistently.

Title: A Comparison of Experienced Red River Jiggers' $VO_2\text{max}$ with their Step-Counts while Performing the Red River Jig

Student: Marin Schaab

Supervisor: Dr. Heather Foulds

Theme: Indigenous Health

Introduction. Maximal oxygen consumption ($VO_2\text{max}$), a measure of cardiorespiratory fitness, is currently not feasible to measure independently. Counting steps is an accessible measure that can be conducted individually. The Red River Jig Métis cultural dance alternates ten seconds of double-step with ten seconds of fancy steps (dancer's choice), including weight transferring steps (full steps) and non-weight transferring movements (non-steps) (i.e., taps and shuffles). This structure with some freedom, may be a feasible activity to estimate $VO_2\text{max}$.

Purpose. The objective of this study was to evaluate the relationship between $VO_2\text{max}$, and step counts while Red River Jigging, and to estimate $VO_2\text{max}$ from steps counts during Red River Jigging.

Methods. Four experienced Red River Jiggers (30-43 years, 2 female) completed a Bruce treadmill $VO_2\text{max}$ test and survey questions. Ten minutes of Red River Jigging wearing Xsens motion capture sensors were recorded 2-4 weeks later. Steps and non-step movements in Xsens videos were counted. Pearson's correlations and linear regression analysis estimated $VO_2\text{max}$ from step counts.

Results. $VO_2\text{max}$ was associated with moderate to vigorous physical activity ($R = -0.951$, $p = 0.049$), minute one non-steps ($R = -0.962$, $p = 0.04$), and minute one total movements ($R = -0.971$, $p = 0.03$). Two linear regression models predicting $VO_2\text{max}$ were identified: $VO_2\text{max} = 63.809 - 0.149 \times \text{minute one non-steps}$, $p = 0.04$ and $VO_2\text{max} = 69.213 - 0.115 \times \text{minute one total movements}$, $p = 0.03$.

Conclusion. Among experienced Red River Jiggers, $VO_2\text{max}$ can be estimated from the movements of the first minute of Red River Jigging.

Title: What sex and gender specific roles does cultural connectedness play in Sedentary Behaviour of Indigenous peoples in Saskatchewan?

Student: Yara Al Horoub

Supervisor: Dr. Heather Foulds

Theme: Indigenous Wellness

Introduction: Sedentary behaviour (SB) is any waking activity that uses very little energy. Decreasing SB, including screen time, may reduce the risk of many chronic diseases. Indigenous Peoples currently experience elevated risks for chronic diseases. Identifying Indigenous-specific SB determinants may support Indigenous-specific health-related interventions. Currently, SB determinants specific to Indigenous males and females are unknown.

Purpose: The purpose of this study is to evaluate cultural connectedness among Indigenous males and females with high and low SB.

Methods: Indigenous students, staff, and faculty (N=150, 121 female, 29 males) completed an online survey, including the Cultural Connectedness Scale (CCS), Multigroup Ethnic Identity Measure (MEIM), and SB questions from the Canadian Community Health survey. Independent sample t-tests compared cultural connectedness scores between high and low SB and screen time, specific to males and females of each Indigenous identity.

Results: Métis females reporting greater SB reported greater CCS traditions (19.5 ± 6.45 vs. 14.0 ± 6.32 , $p = 0.03$). First Nations females reporting greater screen time reported lower CCS spirituality (6.06 ± 2.32 vs. 7.15 ± 2.19 , $p = 0.049$). Indigenous females reporting greater SB reported greater Overall CCS (89.6 ± 19.8 vs. 82.3 ± 18.6 , $p = 0.048$). Indigenous females reporting greater screen time reported lower CCS traditions, CCS spirituality, and overall CCS, while Indigenous males reporting greater screen time reported lower CCS traditions (4.15 ± 2.27 , 6.67 ± 2.08 $p = 0.04$).

Conclusion: Cultural connectedness is greater among Indigenous females reporting greater sedentary behaviour and lower screen time. Further research including more male participants.

Title: Assessment of a Workplace Physical Activity Program

Student: Mason Beaulieu

Supervisor: Professor Arnold

Theme: Healthy Aging and Management of Chronic Conditions

Introduction: Physical inactivity is a large issue in Canadian adults. Obesity and other preventable chronic diseases have been linked to physical inactivity. The majority of Canadian adults spend large amount of their time at a workplace. As such, the workplace offers an opportunity to target Canadian adults and change their lifestyle behaviour toward being more physically active through workplace based physical activity programs. There has been rigorous evidence to support the health benefits of physical activity and limited evidence that physical activity may be beneficial to employers due to decreased sick time, absenteeism and occupational stress.

Purpose: The purpose of this project was to assess a workplace physical activity program in hopes to receive data on the usage and benefits or challenges experienced by users of the program. The workplace physical activity program that will be studied in this project is the Fitness Benefit and Flexible Spending program apart of the Administrative and Supervisory Personnel Association (ASPA) union on the University of Saskatchewan campus.

Methods: A one-time online survey consisting of 33 questions was made available to all ASPA employees through the University of Saskatchewan' PAWS page.

Results: Forty-eight participants completed the survey. The results showed that while awareness of both benefits is high within ASPA employees, the usage of the Flexible Spending Program is much higher. When participants were asked what improvements they would like to see in the Fitness Benefit the most common response related in increasing programing such as fitness class that fit with the workday schedule of ASPA employees. Out of the ASPA members that used the Fitness Benefit before the pandemic 50% of users had additional memberships/access to other fitness facilities, programs, or equipment that were close to or at home. All users of the Fitness Benefit found it to beneficial to their physical health and 85% of users found the Fitness Benefit to improve non-physical aspects of their life. The most reported barrier by nonusers of the Fitness Benefit was lack of time.

Conclusion: The results showed that a taxable benefit may not be an effective way to incentivize employee uptake of a workplace-based physical activity program and that having flexibility within the program may enhance participation. Exercising near or at the workplace can be seen as convenient, but some surveyed employees prefer to be physically active away from the place of work such as at home or a fitness facility close to home. Lastly, it is important that workplace based physical activity programs conform to the schedule of employees.

Acknowledgements: I would like to thank all faculty and staff of the College of Kinesiology at the University of Saskatchewan in supporting my studies within my undergraduate degree. I would also like to send a special thank you to my friends and family who have supported my academic journey. Lastly, I would like to thank Dr. Gyurcsik and my supervisor for this project Associate Professor Bart Arnold.

Title: Physical Literacy in Children with Congenital Heart Disease

Student: Madigan Chartier

Supervisor: Dr. Marta Erlandson

Theme: Child and Youth Health and Development

Introduction. There is a notable population of children living with congenital heart disease (CHD). Children with CHD have been found to have low levels of physical activity and increased sedentary behaviour. Children with CHD are able to participate and meet daily physical activity guidelines in the same manner as their healthy peers. However, external factors such as perceived confidence, and knowledge of physical literacy, may be impacting children with CHD keeping them from performing motor skills and meeting the physical activity guidelines.

Purpose. To examine the physical literacy (including self-perception and parent perception) of children (aged 7-14) with CHD compared to a healthy control group, to understand the differences of physical activity comprehension and portrayal

Methods. Six participants, 7-14 years of age, with CHD were recruited and compared to a healthy comparison group (n=680). The battery of PLAY tools was used to examine physical literacy. PLAYfun was used to assess 18 different fundamental movement skills and PLAYself was used to assess the child's perception for their physical literacy. The PLAYparent was given to assess parental perception of their child's physical literacy. Children with CHD were compared to sex-matched controls using one sample t-tests.

Results. Children with CHD were found to have lower levels of physical literacy (PLAYfun) compared to controls. Specifically, females with CHD had lower overall physical literacy ($p=.040$), while males had lower locomotor motor competence ($p=.025$). There were no differences in participants self-confidence (PLAYself) between the CHD and control groups ($p>0.05$). However, parent's of males with CHD reported their children to have lower physical literacy ($p<0.001$) while there was no difference in the parental perception for girls with CHD.

Conclusion. Though children with CHD (both female and male) had lower physical literacy compared to the control group, self-confidence was similar between the two groups. The parents of girls with CHD perceived their children had similar physical literacy to the control group while the parents of males with CHD perceived their children had significantly lower physical literacy.

Acknowledgements: I would like to thank the CHAMPS participants and research team for their time and contributions.

Tuesday March 29th Schedule

Graduate Student Presentations – [Zoom Link](#)

Time	Name	Degree	Supervisor
11:30	<i>Introduction to Session</i>		
11:40	Kristina Sobolewski	PhD.	Dr. Marta Erlandson
11:55	Yuwen Zheng	PhD.	Dr. Saija Kontulainen
12:10	Karly Anderson	MSc.	Dr. Kevin Spink
12:25	Jackson Lordall	PhD.	Drs. Alison Oates & Joel Lanovaz
12:40	Justin Pifko	MSc.	Dr. Joel Lanovaz

Graduate Presentation Abstracts

Title: The Effect of Job- Embedded Professional Development on Supporting Teachers to Implement Movement Integration.

Authors: Kristina M. Sobolewski, Larissa T. Lobo, Alexandra L. Stoddart, and Serene Kerpan.

Research Theme: Child and Youth Growth and Development

Introduction: Physical activity is associated with many health and behaviour benefits that positively impact children and youth, yet many physical activity initiatives in schools vary in duration, intensity, and frequency. Movement integration (MI) is a tool that can increase physical activity levels while improving learning outcomes and behaviour in children and youth; however is not well utilized by teachers.

Purpose: The purpose of this study was to examine a job-embedded professional development intervention on addressing teachers' barriers to MI in the classroom.

Methods: An embedded-mixed methods design consisting of individual interviews was used to capture MI experiences, followed by an implementation science model containing six procedures that guided intervention development. The duration of the intervention was three, 15-minute MI sessions over 3 weeks for 12 teacher participants in the Durham Catholic District School division. Interviews were completed pre-intervention with all teacher participants and questionnaires were delivered pre-and post-intervention (1 month later) to assess MI frequency as well as confidence and competence with implementing MI.

Results: Three themes were derived from the interview data including barriers (time constraints, challenging spaces, limited confidence and competence, relying on other sources, student chaos), envisioned MI strategies (new resources and strategies), and reasons for job-embedded professional development (another perspective, teacher learning). Intervention data indicated a significant increase in teachers' self-reported MI use from pre-to post-intervention ($Z = -2.138$, $p = .0165$, $r = .6$), improved confidence in delivering MI ($p = .048$), and a strong positive correlation ($r = .627$, $p = .018$) between confidence and competence.

Conclusion: Job-embedded professional development appears to be a feasible and effective strategy for addressing teachers' MI barriers and supporting MI implementation in the classroom.

Title: Low bone mass and trabecular bone deficits in children and adolescents with type 1 diabetes: A systematic review and meta-analysis

Authors: Yuwen Zheng, Mahdi Rostami Haji Abadi, Zahra Ghafouri, Suelen Meira Goes, J.D. Johnston, Munier Nour, Saija Kontulainen

Research Theme: Child and Youth Growth and Development

Introduction: It is unclear if bone mass, structure and strength differ between children with type 1 diabetes (T1D) and typically developing children (TDC).

Purpose: We aim to synthesize evidence via a meta-analysis of studies comparing bone mass, density, structure and strength outcomes between children with T1D and TDC.

Methods: We searched MEDLINE, Embase, CINAHL, Web of Science, Scopus, Cochrane Library databases (inception to 16/09/2021). Eligible studies included comparisons of bone outcomes between children with T1D and TDC (mean age \leq 18yrs). We extracted studies reporting bone mineral content (BMC), areal density (aBMD), trabecular and cortical content, density, area, micro-architecture, and strength estimates. We used random-effects model to assess the between-group standardized mean differences (SMD) of bone outcomes from the meta-analysis. We assessed the role of sex, age, body size, disease duration, and HbA1c on bone differences using meta-regression.

Results: We included 46 studies (2555 children with T1D, 3049 TDC). Children with T1D had deficits in: total body and lumbar spine BMC and aBMD (SMD:-0.2 to -0.3); femoral neck aBMD (-0.2); distal radius and tibia trabecular density (-0.5 and -0.3, respectively) and bone volume fraction (-0.3 and -0.4); and distal tibia trabecular thickness (-0.4). Age was associated larger total body BMC and aBMD deficits (Beta coefficient:-0.1). Longer disease duration was associated with larger total body aBMD deficit (-0.1).

Conclusion: Children with T1D have low bone mass and deficits in trabecular structure. Bone deficits may contribute to increased fracture risk and require attention in diabetes research and care to optimize bone development in children with T1D.

Title: The Influence of Salient Others: An Application of Trending Norms on the Lifestyle Activities of Retired Adults

Authors: Anderson, K.J., Spink, K.S.

Research Theme: Healthy Aging and Management of Chronic Conditions

Introduction: Older adults in Canada are the fastest growing population in the country (Statistics Canada, 2021). Although Canadians are living longer, these added years are often accompanied by declines in physical and mental capacities (PHAC, 2020). Such declines will account for \$93 billion in additional health care costs over the next ten years and will continue to negatively impact individual older adults (Gibbard, 2018). Thus, it is imperative that cost-effective and efficient health interventions be developed for this ageing population. Increasing physical activity and decreasing sedentarism are the most important steps older Canadians can take toward improving health (CSEP, 2021). Given that humans are social beings (Baumeister & Leary, 1995) and social engagement is critical to older adults' health and wellbeing (Luo et al., 2020), a focus on social norms might prove fruitful (Cialdini et al., 1990).

Purpose: Underpinned by focus theory (Cialdini et al., 1990), the purpose of this exploratory study is to examine the effects of trending norm messages (i.e., a minority norm that is currently increasing; Mortensen et al., 2019) on both older adults' physical activity (i.e., walking) and sedentary behaviours (i.e., sitting).

Methods: Using an experimental design, 186 retired adults will be recruited and randomly assigned to receive one of three messages: trending norm with outcome expectations (OE), trending norm no OE, or attention control. Based on one of the tenets of focus theory, OE is included in one of the messages as a method to enhance message saliency. Participants will complete pre- and post-message surveys to assess both walking and sitting behaviours. A MANOVA will be used to examine the effects of the message conditions on reported walking and sitting behaviours.

Title: Exploring the frequency of sex- and gender-based analysis and consistency of sex and gender terminology use in standing balance research for people with Parkinson's Disease: A scoping review for the year 2020.

Authors: Lordall, Jackson¹; Bui, Sunny¹; Koupantsis, Alexa¹; Yu, Topaza¹; Bolton, Susan²; Lanovaz, Joel L¹; Prosser-Loose, Erin J³; Morrison, Todd G⁴; Oates, Alison R¹.

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³College of Medicine, University of Saskatchewan

⁴Department of Psychology and Health Studies, College of Arts and Science, University of Saskatchewan

Research Theme: Healthy Aging and Management of Chronic Conditions

Introduction: Postural instability informs clinical decision making for persons with PD (pwPD)¹. While sex and gender can impact the onset and progression of PD, women with PD might be more prone to developing postural instability². Sex- and gender-based (SGB) analysis (SGBA) integrates SGB concepts into research design and analysis and can produce more accurate and replicable research findings which could better inform research and clinical practice³. Sex-based terms include male and female, while gender-based terms include man and woman⁴. Infrequent SGBA and inconsistent term use (e.g., gender-based terms to describe sex) limits understanding of how SGB concepts impact behaviour³.

Purpose: This scoping review explored the frequency of SGBA and consistency of SGB term use in recent standing balance research involving pwPD.

Methods: Searches were conducted in seven databases (Medline, PubMed, Embase, APA PsycInfo, SPORTDiscus, Web of Science, and Scopus) for peer-reviewed articles published in 2020. Titles and abstracts ($n=2427$) and full texts ($n=877$) were screened and data were extracted by two reviewers with a third resolving conflicts. Inclusion criteria were: a) standing balance was a dependent variable measured by a biomechanical construct for pwPD⁵; and, b) articles were available in English. Data were extracted to examine the frequency of SGBA and consistency of SGB term use.

Results: Twenty-five articles were included: four (16%) conducted a statistical analysis using sex and/or gender as a factor, 12 (48%) used terms consistently, 11 (44%) used terms inconsistently, and two (8%) articles used no SGB terminology. Among inconsistencies, five (45%) reported gender with male and female as groups and two articles (18%) reported sex with man and woman as groups. No articles (0%) included how SGB data were collected or more than two SGB groupings.

Conclusion: Increased SGBA inclusion and consistent term use is needed to understand SGB influences on standing balance for PwPD.

References: 1. Goetz et al. *Mov Disord.* 2008; 23(15). 2. Georgiev et al. *Acta Neurol. Scand.* 2017; 136(6). 3. Lee. *BMB Reports.* 2018; 51(4). 4. CIHR. <https://cihr-irsc.gc.ca/e/50836.html>. 2019. 5. Arora et al. *J Spinal Cord Med.* 2020; 43(1).

Title: Relationships of upper extremity strength and biomechanics during controlled descents in healthy older males and females

Authors: Justin Pifko, Cathy Arnold, Jon P Farthing, Joel Lanovaz

Research Theme: Healthy aging and management of chronic conditions

Introduction: Fall-related injury is an important health concern for older adults. Previous studies have also found sex-related differences in fall-related injury profiles; however, there remains a lack of information directly comparing sex-based forward fall-related arrest dynamics and their relationships with upper body muscle strength in older adults.

Purpose: To investigate relationships between upper body strength and controlled forward descent (CFD) performance in males and females aged over 65 years.

Methods: We recorded body mass index (BMI) and traditional (handgrip, shoulder abduction, shoulder flexion, elbow extension) and novel (push-off-test (POT), custom isokinetic dynamometry concentric (CON) and eccentric (ECC) arm extension) muscle strength measurements. Participants also used a novel rig apparatus to complete CFDs angled at 30° from vertical. CFDs resemble the downward portion of a push-up with the pace controlled by a metronome. Kinematics and kinetics were recorded using an eight-camera motion capture system (VICON, $f_s=200\text{Hz}$) and bilateral force platforms (OR6-7, AMTI, $f_s=2000\text{Hz}$), respectively. Normalized maximum wrist (wMOM), elbow (eMOM), and shoulder (sMOM) moments were CFD outcomes.

Results: Seventy-four participants (38 female) were recruited. Two participants were excluded for incomplete CFD data. Age was significantly different between sexes (Male: $73.1\pm 8.0\text{years}$, Female: $69.2\pm 6.3\text{years}$, $p=0.023$) while BMI was similar (Male: $29.0\pm 3.5\text{kg/m}^2$, Female: $28.0\pm 5.9\text{kg/m}^2$, $p=0.114$). Males were consistently stronger than females (all measures $p<0.001$). MANCOVA tests controlling for trial duration revealed that males displayed larger wMOM, eMOM, and sMOM ($p<0.05$) during CFDs. Significant Pearson correlations between strength and CFD outcomes included male wMOM-POT ($r=0.402$, $p=0.018$), female wMOM-BMI ($r=-0.559$, $p<0.001$), male eMOM-POT ($r=0.393$, $p=0.021$), male eMOM-CON ($r=0.393$, $p=0.021$), male eMOM-ECC ($r=0.359$, $p=0.037$), female eMOM-BMI ($r=-0.473$, $p=0.003$), and female sMOM-POT ($r=-0.355$, $p=0.029$).

Conclusion: Older males had greater upper body muscle strength and used greater upper extremity joint moments than the older females in CFDs. Strength-biomechanics relationships were clear for males but unclear for females, possibly indicating more reliance on technique.

Wednesday March 30th Schedule

Honours Presentations – [Zoom Link](#)

Time	Student	Supervisor
1:30	Kenzie Duke	Humbert
1:45	Ashley Fee	Humbert
2:00	Ibrahim Al-Mouaiad Al-Azem	Tomczak
2:15	Brianna Andrews	Farthing
2:30	Hussein Eldassouki	London
2:45	Terrell Drever	Lanovaz
3:00	Osman Badawi	Chilibeck
3:15	Taylor Leonhardt	Chilibeck

Honours Presentation Abstracts

Title: The Experience of Teachers and Administrators in a Multi-Sector Physical Literacy Intervention

Student: McKenzie Duke

Supervisor: Dr. Louise Humbert

Theme: Child and Youth Growth and Development

Introduction: Physical literacy is defined as the “motivation, confidence, physical competence, knowledge and understanding to value and take responsibility and engagement in physical activities for life” (International Physical Literacy Association, 2021). Children who meet the minimum level of physical competence have a higher chance of meeting the physical activity and sedentary behaviour guidelines (Belanger, et al. 2018). Multi sector interventions (school, community, and home) show promise for increasing physical activity, however little is known about their effectiveness on developing physical literacy.

Purpose: The purpose of this study is to understand the experiences of teachers and administrators involved in a multi sector physical literacy intervention.

Methods: Semi-structured Interviews were completed with teachers and administrators from two elementary schools involved in a multi sector physical literacy project. All interviews were transcribed verbatim and analyzed using Creswell’s (2013) six steps in thematic analysis.

Results: Three themes were identified. The first theme discussed positive outcomes that occurred because of the intervention. These outcomes included changes in physical education such as teachers being more mindful of what they are teaching. The second theme reported challenges to getting students physically active and developing physical literacy and included challenges such as teacher knowledge and understanding. Theme three outlined strategies to address these challenges.

Conclusion: Teachers and administrators noted several positive changes to the physical activity levels of the students and to the content and organization of physical education classes. Teachers and administrators reported a lack of understanding of what physical literacy is and how to develop physical literacy in their students. Challenges to develop students’ physical literacy were noted by teachers and administrators, these included a lack of education in university for teachers, and next to no continuing professional development of how to teach physical education.

Acknowledgments: Thank you Dr. Humbert and Dr. Farthing, and the University of Saskatchewan Physical Literacy Team, for their work on the main study

Title: Then and Now: Exploring the Past and Present Physical Education and Physical Activity Experiences of Female University Students

Student: Ashley Fee

Supervisor: Dr. Louise Humbert

Theme: Child and Youth Growth and Development

Introduction. There are many health benefits derived from physical activity including risk for disease, obesity, improving mental health, and overall increasing quality of life (CDC, 2021; Kohl & Cook, 2013). Although there are numerous health benefits, only 39% of youth and 16% of adults are meeting the movement guidelines in Canada (ParticipACTION, 2019; ParticipACTION 2020). High school physical education classes provide optimal opportunities for young people to be active daily and learn how to be active for the rest of their lives (Saskatchewan Ministry of Education, 2009). In Saskatchewan, high school students are required to take physical education in grades one to nine and one additional physical education course in grades ten through twelve. Despite physical education's aim to positively influence physical activity across the lifespan, physical activity levels remain low and a decrease in activity levels occurs when high school students make the transition to university (Allender et al., 2008; Bray & Born, 2004; Keating et al., 2005). To date there has been limited research investigating the reasons why this drop in physical activity occurs and the role physical education may play in preventing this decline.

Purpose. This study investigated the role that experiences in physical education may have played in the physical activity patterns of first and second year female post secondary students. The aim was to find out if these students felt as though their physical education experiences impacted their physical activity habits during the transition to university.

Methods. A mixed methods design was used in this study. A survey was distributed to first and second year female College of Education students, enrolled in a required Kinesiology course. Questions posed asked participants about their experiences in physical education, their activity levels, and the role that participating in physical education classes may have played in their transition to university. Qualitative data was organized, coded by hand, and analyzed for themes following the steps outlined by Kowalski et al. (2018). Quantitative data such as activity levels and some survey questions were organized by the SurveyMonkey software.

Results. Three themes were identified from the analysis of the data. "Experiencing the Curriculum", "The Environment in Physical Education" and, "Life After High School." Results indicated that experiences in physical education played a role in physical activity behaviours in university.

Conclusion. The perceived quality of each of the participant's physical education affected their confidence and ability to participate in physical activity after high school. It is apparent that not all participants were taught all aspects of the physical education curriculum. The environment of their physical education class was an important factor in their enjoyment and further involvement.

Acknowledgements: Dr. Louise Humbert, Dr. Jon Farthing, Participants

Title: Impact of Chronic Electronic Cigarette Usage on Cardiovascular Blood Pressure Regulation

Student: Ibrahim Al-Mouaiad Al-Azem

Supervisor: Dr. Corey Tomczak

Theme: Healthy Aging and Management of Chronic Conditions

Introduction: Electronic cigarette (e-cigarette) use has been rapidly adopted by young adults since being introduced to the market. *Nicotine* is a biologically active substance found in such devices and is a potent sympathomimetic drug. Acutely, nicotine travels through the bloodstream and binds to nicotinic acetylcholine receptors leading to a release of catecholamines through a cascading mechanism. This results in an increase in heart rate, contractility, and blood pressure. However, chronically inhaled vaporized nicotine effects upon cardiovascular health in this population remains incompletely understood.

Purpose: We aimed to understand hemodynamic regulation and baroreceptor sensitivity in chronic young adult e-cigarette users. We hypothesized that chronic young adult e-cigarette users will have an impaired ability to regulate heart rate and blood pressure during an orthostatic challenge.

Methods: 9 e-cigarette users (21.9 ± 0.9 years) and 9 controls (21.6 ± 1.0 years) underwent an orthostatic challenge. Participants laid supine on the tilt table and were instrumented with a finometer (blood pressure) and 3-lead ECG (heart rate). Participants remained supine for 5 minutes before being raised to a 60 degree head up tilt (HUT) for 5 minutes and were then returned to level. This was repeated with one hand being immersed in a cold-water bath for the transition to head up. The cold pressor was applied 1 minute before orthostatic change and remained on for 1 minute after (2 mins total for each change).

Results: Visually, the data demonstrates that e-cigarette users have attenuated changes in heart rate and blood pressure when undergoing an orthostatic challenge. Mean arterial pressure (MAP) is preserved during HUT in the e-cigarette group compared to controls. Total peripheral resistance (TPR) is greater in the e-cigarette group and might explain the preserved MAP in this group during HUT. Results of the cold pressor test remains to be elucidated. Data collection and analysis is on-going. T-tests will be performed to compare groups and significance will be accepted at $p < 0.05$.

Conclusion: The data demonstrates that chronic young adult e-cigarette users exhibit an impaired hemodynamic variability.

Acknowledgements: Dr. T. Dylan Olver (VBMS), Natasha Boyes, Adam Luchkanych, Rafique Khan

Title: Functional and Neuromuscular Asymmetries in Athletes

Student: Brianna Andrews

Supervisor: Dr. Jon Farthing

Theme: Human Performance

Introduction: Sport training generates interlimb asymmetry in strength, power, morphology, and functional parameters. Meaningful force and power asymmetries are often classified within 10-15%, and heightened asymmetry (>10%) is associated with injury risk. Undetermined are the underlying neuromuscular mechanisms and the relationships between asymmetries in strength, power, morphology, function, and subsequent injury in competitive athletes.

Purpose: To gain mechanistic insight into the origins of athlete asymmetries using functional and neuromuscular tests, and to examine the relationships between neuromuscular and functional asymmetries and subsequent injury.

Methods: Thirteen varsity track-and-field athletes (7 female) completed functional tests (Functional Movement Screen (FMS); Y-Balance Test (YBT)) and had both lower limbs measured for knee extensors muscle thickness (MT) (β -mode ultrasound), isometric maximal voluntary contractions (MVC) of the knee extensors (isokinetic dynamometer), vastus lateralis muscle activation (EMG), voluntary activation (twitch interpolation), and rate of torque development (resting evoked contractions) via femoral nerve stimulation. Participants then completed an online bi-weekly current injury questionnaire. Asymmetries were quantified as a percent: $(\text{max score} - \text{min score} / \text{max score}) \times 100$, and as an absolute side-to-side difference, and were compared against zero (one sample t-tests) and correlated with neuromuscular and functional outcomes.

Results: Analysis of group means revealed no differences between limbs for any variable ($p > 0.05$). However, neuromuscular and functional absolute and percent asymmetries were significantly different than zero ($p < 0.005$; adjusted for multiple comparisons). Neuromuscular and functional percent asymmetries ranged from 11.5-31.8% and 2.8-4.4%, respectively. Positive correlations emerged between MVC and EMG percent asymmetries ($R = 0.680$, $p < 0.05$), MVC and EMG absolute asymmetries ($R = 0.717$, $p < 0.01$), and MT and both resting max torque and EMG absolute asymmetries ($R = 0.675$; $R = 0.602$, $p < 0.05$). FMS total score was negatively correlated with MVC and EMG percent and absolute asymmetries ($R = -0.693$, $p < 0.01$; $R = -0.715$, $p < 0.01$; $R = -0.924$, $p < 0.01$; $R = -0.652$, $p < 0.05$). A positive correlation occurred between YBT composite score and MT absolute asymmetries ($R = 0.563$, $p < 0.05$).

Conclusion: Meaningful asymmetries emerged only after computing individual asymmetry scores. Asymmetries were correlated across several neuromuscular measures. Larger neuromuscular asymmetries were associated with lower functional outcomes. These data may guide future research into the mechanistic origins of asymmetry and related injury risk. Analyses of relationships between asymmetries and subsequent injuries is ongoing.

Acknowledgements: Amr AlMarsi, Parker Scott, Meagan Wong, Jason Reindl, Bart Arnold, Dr. Joel Lanovaz

Title: Student Well-Being on the University of Saskatchewan Campus: Exploring Perceptions Using the Okanagan Charter Framework

Student: Hussein Eldassouki

Supervisor: Dr. Chad London

Theme: Human Performance

Introduction: Well-being is defined as the optimal state of health of individuals and groups (WHO, 2006). In an effort to maintain and improve student well-being, the University of Saskatchewan signed on to the Okanagan charter of 2015, which is an international charter on health-promoting universities created to maintain well-being on campus in all aspects (Okanagan Charter, 2015)

Purpose: To explore how students perceive their well-being in relation to the commitments made regarding well-being and the Okanagan Charter at one Canadian university over the last 3-4 years.

Methods: The participants were four students from two colleges, all of whom attended USask since 2018. The study consisted of semi-structured one-on-one dialogue style interviews. Data was interpreted using the Creswell (2014) thematic analysis method, which involves building up from particular to general themes and further interpreting these meanings (Cresswell, 2014).

Results: This study was an exploratory one which allowed for the discovery of many emerging themes such as physical & social environment in relation to well-being, academics, issues with supports and impactful aspects of well-being. Data shows that the university does abide by the commitments of maintaining a healthy environment and aligning with the wellness strategy but there is room for improvement. The data also indicates that there is a slight difference in the way students in different colleges experience well-being. Data also shows that some students may have improved their well-being post-pandemic compared to pre-pandemic levels.

Conclusion: While no definitive conclusions can be made, it is determined that the university can do better at helping students maintain a certain level of well-being and helping them become more aware of their well-being overall. Further, there may be a unique relationship between the college a student is enrolled in and their level of awareness toward their mental health.

Acknowledgements: Special thanks to my supervisor, Dr. Chad London, for his support and guidance throughout this process and to all the participants who have made this research possible.

Title: Examining the effect of hand position and strength on joint mechanics during explosive push ups

Student: Terrell Drever

Supervisor: Dr. Joel Lanovaz

Theme: Human Performance

Introduction: The explosive push-up (EPU) is a commonly used training and measurement exercise whose biomechanics are not fully explored. Hand placement can be used to vary push-up difficulty. The effect of hand width on joint torques has been examined in standard push-ups but not EPUs. It is also unknown how EPU peak torques relate to maximal strength. The purpose of this study was to examine how alterations in EPU hand width change joint biomechanics and to compare EPU torque values to standard strength measures.

Methods: Ten young healthy adult men (mean age = 23.9 years) performed three EPU repetitions at three hand positions: 50%, 100% and 150% of biacromial width (narrow width, NW; standard width, SW; wide width, WW). Kinematic data were collected using a motion capture system and ground reaction forces were recorded at the participant's hands. For each width, the repetition with the maximal vertical impulse was selected. Inverse dynamics were used to calculate peak net joint torques for wrist flexion, elbow extension and shoulder flexion, adduction, and horizontal adduction. On a separate day, isometric, concentric, and eccentric strength was measured with an isokinetic dynamometer for shoulder flexion, elbow extension, and horizontal shoulder adduction for both arms. EPU torque data were expressed as percentage of maximal isokinetic torque. EPU torques were analyzed using separate 3 x 2 (hand width x arm) repeated measures ANOVAs. Pearson bivariate correlations were used to examine the relationship between EPU and isokinetic torque.

Results: Peak EPU shoulder flexion torques were significantly greater in the NW and SW condition compared to the WW condition. Peak elbow and shoulder adduction moments significantly increased as hand width decreased, while shoulder horizontal adduction moments had the opposite response. No arm effects were detected. Only isokinetic shoulder flexion torque showed consistent significant correlations to the corresponding EPU torque.

Conclusion: Hand placements alter EPU muscular demands, with NW having generally greater torque requirements but WW needing greater horizontal shoulder adduction torques. This information may be useful for targeted muscle training/assessment. Interestingly, isokinetic strength measures were not strongly associated to most maximal joint torques indicating a complex relationship with EPU demands.

Title: Effects of Strength Training on Golf Ball Hitting Distance

Student: Osman Badawi

Supervisor: Dr. Phil Chilibeck

Theme: Human Performance

Introduction: Historically, golf is viewed as a gentle game that does not require high levels of physiological conditioning (Smith, 2010). However, the execution of a golf swing requires high levels of skeletal and muscle involvement. Large amounts of stress are imposed on both systems to achieve maximal results (Smith, 2010). The literature shows that both strength and flexibility training has led to increases in a golfer's ability to hit the golf ball greater distances. However, at present little to no studies have investigated which form of training leads to more significant improvements in ones' ability to hit the golf ball further.

Purpose: To determine whether strength training or flexibility training will lead to more significant improvements in experienced golfers' ability to hit a golf ball further.

Methods: Participants were four healthy males over the age of 18 who golf at a minimum playing frequency of 1 time per week during the golf season. Participants were tested for flexibility, strength, and golf ball hitting distance prior to partaking in a training program. They were then split into either a Strength Training or Flexibility Training group in which they engaged in a 5-week training program. Upon completion of the training programs, participants were tested once again for flexibility, strength, and golf ball hitting distance, and comparisons between pre- and post-training values were completed.

Results: Baseline data measuring strength, flexibility, and hitting distances with a golf iron (7-iron) and the driver has been collected. Reporting of results is pending the conduction of a final data collection session measuring the same parameters measured at baseline.

Conclusion: A conclusion will be made upon the collection of post-training data.

Acknowledgments: I would like to express my special thanks of gratitude to my supervisor Dr. Phil Chilibeck for his continued guidance and support in completing my project.

Title: Nutrition Knowledge and Dietary Adequacy in Powerlifters

Student: Taylor P. M. Leonhardt

Supervisor: Dr. Phil Chilibeck

Theme: Human Performance

Introduction: Higher nutrition knowledge may predict better dietary behaviours, however, studies of this relationship in athletes are equivocal. Athletes competing in weight categories often restrict food intake as they approach competition, which may be detrimental to health and performance.

Purpose: To assess the effect of nutrition knowledge, sex, and time (i.e. off-season versus pre-competition) on dietary intake in powerlifters.

Methods: 23 powerlifters (10 females, 13 males; mean age 30.7 ± 11.2 y) completed one online survey to assess nutrition knowledge and two online surveys to assess dietary intake from off-season and pre-competition.

Results:

Nutrition knowledge: Athletes with higher nutrition knowledge consumed more calories from fruits and nuts, more fruit servings, and less vitamin B2 and B3 across all timepoints ($p < 0.05$). Seventy-three percent of athletes with high nutrition knowledge were at or above the recommended dietary allowance for vitamin D and fibre, which was greater than the proportion of athletes with lower nutrition knowledge (50%) ($p < 0.05$). Males with higher nutrition knowledge consumed less alcohol than males with lower nutrition knowledge ($p < 0.05$). Females with higher nutrition knowledge consumed less sugar than females with lower nutrition knowledge ($p < 0.05$).

Changes from off-season to pre-competition: Intake of alcohol and carbohydrate decreased and calories from meat increased from offseason to pre-competition ($p < 0.05$). Males increased their vitamin B2, B3, B6, and B12, whereas females decreased their vitamins B2, B12, and sugar consumption approaching competition ($p < 0.05$). Males tended to increase water consumption whereas females tended to decrease water consumption approaching competition (sex x time, $p < 0.05$). There was no difference between groups with higher versus lower nutrition knowledge for dietary changes approaching competition.

Conclusion: Nutrition knowledge, sex, and time affect dietary intake of powerlifters. A higher nutrition knowledge predicts a higher intake of many foods and nutrients important for maintenance of health and performance. Female powerlifters should pay close attention to intake of B-vitamins and water before competitions when many are trying to cut weight.

Acknowledgements: Dr. Gordon Zello (College of Pharmacy and Nutrition)

Thursday March 31st Schedule

Graduate Student Presentation – [Zoom Link](#)

Time	Name	Degree	Supervisor
11:30	<i>Introduction to Session</i>		
11:35	Tobias Hyrich-Krueger	MSc.	Dr. Adam Baxter-Jones
11:46	Aaron Hidalgo-Mazzei	MSc.	Dr. Adam Baxter-Jones
11:57	Melissa Leonzio	MSc.	Dr. Marta Erlandson
12:08	Nisha Mainra	MSc.	Dr. Heather Foulds
12:19	Sunny Bui	PhD.	Dr. Alison Oates
12:30	Doug Renshaw	PhD.	Dr. Jon Farthing
12:41	Parker Scott	MSc.	Dr. Jon Farthing

Graduate Presentation Abstracts

Title: Long Term Effects of Sport (De)selection in Adolescence on Sport Participation

Authors: T. Hyrich-Krueger, A. Hidalgo-Mazzei, S. Beaulieu, M. Leonzio, M. Erlandson, and A. Baxter-Jones

Research Theme: Child and Youth Growth and Development

Introduction: Physical activity is known to have health benefits at all ages across the lifespan. Involvement in sports teams is one such physical activity. Sport initiation and sustained participation are influenced by many physical and psychosocial factors. A one potentially important determinant of sustained participation is selection into age-banded teams. Deselection from a sports team can often have a negative effect on both continuation within a sport and overall physical activity levels. However, it is unclear whether deselection causes an athlete to continue at the competitive level or to drop down to recreational sport

Purpose: The aim of the study was to identify the consequences of (de)selection on short term participation

Methods: The Saskatchewan Sports Participation Study's (SSPS) recruited 895 participants, aged 10-17 years, from 6 sports (basketball, baseball, football, hockey, soccer, volleyball). Data collected includes measures of anthropometry, maturity status, reasons for sports participation, perceptions of physical conditioning, competence, coach's attitudes, and parental involvement.

Results: It was found that 84% of athletes who were deselected continued to play that sport at the competitive level 36 months later. Only 10% of athletes choose to continue that sport at the recreational level

Conclusion: These findings suggest that deselection from a sports team tryout during adolescence does not affect the level of competition an athlete chooses to continue with 36 months post tryout. Although these results do not support the hypothesis that deselection in adolescences influences participation in the sport after 36-month, further research is needed over a longer time to analyze the true effects of deselection more accurately on sports participation.

Title: Does Sports Training During Adolescence Effect Lung Function Development?

Authors: A. Hidalgo-Mazzei, T. Hyrich-Krueger, S. Beaulieu, M. Leonzio, M. Erlandson, and A.D.G. Baxter-Jones

Research Theme: Child and youth health and development

Introduction: Low physical activity levels during adolescence have health implications. Previous studies suggest that too much exercise, intensive training, can negatively affect a child's growth and development. Research has shown that adult athletes have larger pulmonary function values than height-, age-, and sex-matched peers. Young swimmers undergoing intensive training have been shown to have larger lung volumes than age- and sex-matched peers. To what extent these differences are a consequence of training or natural endowment is still under debate.

Purpose: This study aimed to examine the pulmonary function and respiratory muscle strength development, in both sexes, from four sports.

Methods: Participants were from the UK Training of Young Athletes (TOYA) study. The study used a mixed-longitudinal cohort design (5 age cohorts, 8-16 years) and ran from 1987-to 1990. Participants recruited were involved in intensive training and had or predicted to have success at national and international levels. Four hundred fifty-three recruited participants from four sports (gymnastics, swimming, soccer, tennis) were compared to a group of non-athletic controls. Body height and mass, lung function (Forced Vital Capacity (FVC), Forced Expired Volume in 1 second (FEV1), and peak expiratory flow (PEF) were measured annually for three years. ANOVA was used for group comparisons and alpha set at 0.05

Results: Male swimmers, soccer and tennis players were taller and heavier ($p < 0.05$) than male gymnasts and controls. A pattern replicated in females ($p < 0.05$). All sports (both sexes) had higher FVC than controls ($p < 0.05$), and swimmers had the highest values. The pattern repeats for FEV1 and PEF ($p < 0.05$)

Conclusion: Although swimmers had the highest lung volumes, they were not the tallest or heaviest. This suggests that swimmers could have greater and stronger lungs due to training. Although, a genetic predisposition is also possible.

Title: Body fat measurement in adolescences: comparison of skinfold equations with DXA

Authors: M. Leonzio, S. Beaulieu, A. Hidalgo-Mazzei, T. Hyrich-Krueger, A.D.G. Baxter-Jones, and M.C. Erlandson

Research Theme: Child and Youth Growth and Development

Introduction: There are numerous methods to assess percentage body fat (PBF) in children and adolescents including underwater weighing and dual-energy X-ray absorptiometry (DXA). However, these laboratory methods are not suitable for field studies. Skinfold thickness is often used as a field method. Several equations exist to predict PBF from skinfolds, most are age and sex dependent. Adolescence is a critical period of growth when there is great variation in maturity status, which influences fat accrual. However, very few equations control for maturity when predicting PBF.

Purpose: The purpose of the present study was to compare commonly used equations and align them by a measure of maturation, namely years from peak height velocity (PHV).

Methods: Participants were drawn from the University of Saskatchewan's Pediatric Bone Mineral Accrual Study (PBMAS; 1991-2017). Serial measures of anthropometry (height, weight, skinfolds, etc.) and DXA scans were collected. PHV was estimated by fitting cubic splines to height velocity data. A biological age was calculated as age at test-age minus age at PHV. Two equations of body composition were used Slaughter et al (S) and Lean et al (L) to predict PBF from skinfold assessments. PBF was also obtained from a DXA scan. Data were aligned by biological age groupings and differences between equation estimates calculated.

Results: In males it was found that prior to PHV there was good agreement in PBF between the S equations and DXA scans ($p>0.05$); however, after PHV percentage body fat was systematically underestimated ($p<0.05$), a similar pattern was observed in females. Equation L underestimated percentage fat mass from -5 years from PHV ($p<0.05$) with the difference increasing with increasing biological age, in both males and females

Conclusion: These results illustrate skinfold equations systematically underestimate PBF and the differences are biological age equations also need to be maturity dependent.

Title: The Effect of Family Support on Physical Activity among Indigenous Peoples in Saskatchewan

Authors: Nisha Mainra, Avery Ironside, Varinder Brar, Heather Foulds

Research Theme: Indigenous Health and wellbeing

Introduction: Family support is a crucial aspect of Indigenous ways of life, influencing culture, knowledge, and physical activity (PA). Family support of and involvement in PA may increase PA participation for Indigenous Peoples. Purpose: To compare PA of Indigenous Peoples with and without family support of PA.

Methods: Indigenous adults (N=123, 30±11yrs, 93 females) completed the Godin Shephard Leisure Exercise Questionnaire (GSLEQ) and Family Influences on Physical Activity questionnaire. Independent one-tailed t-tests compared moderate PA per week (MPA), vigorous PA per week (VPA), weekly exercise frequency (WEF) and GSLEQ scores between family supports of PA.

Results: Indigenous and First Nations participants with family/friend encouragement of PA reported greater VPA, WEF, and GLTEQ scores. Cree/Nehiyawak participants with family/friend encouragement of PA reported greater VPA (117.6 ± 117.2 min/week vs. 42.4 ± 94.1 min/week, p=0.01). Indigenous, First Nations and Cree/Nehiyawak participants with family/friend involvement in PA reported greater WEF and GSLEQ scores. Métis participants with family/friend involvement in PA reported greater VPA. Indigenous, First Nations and Cree/Nehiyawak participants with active family/friends reported greater VPA. Indigenous, First Nations and Cree/Nehiyawak participants with family who watch them engage in PA reported greater VPA and GLTEQ scores. Cree/Nehiyawak participants with family who watch them engage in PA also reported greater WEF. Métis participants who's family watch them engage in PA report greater VPA. Métis participants with PA mentors reported greater GLTEQ scores (51.8 ± 27.0 vs 37.2 ± 20.8, p=0.04).

Conclusion: Métis, Cree/Nehiyawak, First Nations, and Indigenous participants with family/friend support of PA report greater PA.

Title: Scoping Review on Sex and Gender in Walking Research among People with Parkinson's Disease

Authors: Bui, Sunny (MSc)¹; Lordall, Jackson¹; Petite, Jasmine¹; Yu, Topaza¹; Bolton, Susan (MLIS)¹; Lanovaz, Joel L (PhD)¹; Prosser-Loose, Erin J (PhD)²; Morrison, Todd G (PhD)³; Oates, Alison R (PhD)¹.

¹ College of Kinesiology, University of Saskatchewan

² College of Medicine, University of Saskatchewan

³ Department of Psychology and Health Studies, College of Arts and Science, University of Saskatchewan

Research Theme: Healthy Ageing and Management of Chronic Diseases

Introduction: Symptoms of Parkinson's Disease (PD) can negatively impact walking balance and activities of daily living (ADL). Walking balance for people with PD (pwPD) is important because it supports ADL and functional independence.¹ Research on walking balance and pwPD are well understood^{3,4}; however, the specific impact and differences between sex (i.e., females have higher cadence)⁵ and gender (i.e., women walk more to do errands)⁶ are less understood.

Sex- and gender-based analyses (SGBA) seeks to understand the influence of sex and gender on health. Proper use of sex- (i.e., male, female) and gender (e.g., men, women) terms are important to understand whether outcomes are attributed to biological or sociological differences. Inconsistent use of these terms results in improper interpretations.

Purpose: Determine the frequency of SGBA and use of these terms in walking balance research among pwPD.

Methods: Six online databases were searched. Inclusion criteria were pwPD, walking outcomes (i.e., kinetic, kinematic, neurological), and publications in 2020. Articles using clinical walking balance assessments only or participants <18 years were excluded. Two reviewers screened title and abstract (n=1799), full texts (n=58) and completed data extraction (n=38) independently. A third reviewer resolved conflicts. Frequency of SGBA, use of terms, and if these concepts were factored into the statistical analyses were collected.

Results: Eight articles (21%) included sex and/or gender in the statistical analysis. No articles (0%) conducted a SGBA. Sixteen articles (42%) used sex and gender terms consistently whereas fifteen articles (39%) used the terms interchangeably. Six articles (16%) did not use sex and gender terms to describe participants.

Conclusion: There is a lack of SGBA in current walking research among pwPD. These terms are often used interchangeably or not at all. It is important to distinguish sex and gender differences appropriately and correctly to determine best practices for research and clinical practice for pwPD

Title: Physiological mirror activity during sustained and discrete unilateral handgrip contractions

Authors: Doug W. Renshaw^{1,2}, M.Ed., Jason M. DeFreitas², PhD., Jonathan P. Farthing, PhD.¹

¹College of Kinesiology, University of Saskatchewan, Saskatoon, Saskatchewan

²Applied Neuromuscular Physiology Laboratory, Oklahoma State University, Stillwater, Oklahoma, USA

Research Theme: Human performance

Introduction: Physiological Mirror Activity (pMA) describes the involuntary muscle activity in the contralateral homologous muscle during unilateral movements. The magnitude of pMA is positively correlated with the functional requirements of the task including voluntary force production as well as central and peripheral fatigue. Although the mechanisms are poorly understood, pMA has been posited as a logical impetus for inter-limb transfer effects (e.g., cross-education of strength or skill).

Purpose: The purpose of this study was to compare the pMA in two conditions that hypothetically induce different amounts of activity in the resting limb.

Methods: 18 young, healthy participants (7 females) had handgrip force and EMG recorded from bilateral wrist flexor and extensor muscles during three handgrip maximal voluntary contractions (MVC)/hand. This was followed by 1) a 1-minute sustained maximal handgrip contraction; and 2) four sets of five repetitions of discrete handgrip contractions (3 second contractions with 2 min rest between sets; 1-minute total contraction time) with each hand. pMA was normalized to EMG during MVC and data was extracted from each condition at matched time epochs for comparisons.

Results: Repeated measures ANOVA revealed a significant interaction between Condition and Time, $F(1.6, 27.3)=7.555$, $p<.01$, $\eta^2=0.308$; whereby pMA increased significantly during sustained contractions [4.7 ± 3.3 (%MVC at time 1), 19.1 ± 22.8 (%MVC at time 5)]; whereas it remained stable during repeated discrete contractions [6.8 ± 7.3 (%MVC at time 1), 6.9 ± 6.0 (%MVC at time 5)].

Conclusion: While there was no appreciable difference in pMA in the discrete condition, there was a near four-fold increase of the pMA as the sustained condition persisted. Understanding strategies for increasing pMA offers insight into mechanisms of cross-education and could be clinically useful to inform interventions incorporating unilateral training paradigms as a counter-measure to atrophy and strength loss (e.g. during immobilization, or post-injury).

Title: Validity and reliability of a novel alternative to force plate technology for position specific isometric strength tests and their relationship to dynamic performance in collegiate athletes

Authors: Parker Scott, Joel Lipinski, Dr. Joel Lanovaz, Dr. Kenzie Friesen, Dr. Jon Farthing

Research Theme: Human Performance

Introduction: The strength and conditioning field is constantly evolving due to technological advances in human performance research. However, the technology required to obtain reliable metrics can be expensive, non-portable, and often involves time-consuming set-up, or laboratory settings. Therefore, strength and conditioning coaches cannot easily obtain the metrics promoted in research studies to assess athletes and guide exercise prescription.

Purpose: The primary goal of this research is to determine the test-retest reliability and criterion validity of a new portable and low-cost single-axial load device called the “Force Finder”. A secondary goal is to use this new, portable technology to assess force-time characteristics of various bilateral and unilateral isometric movements including Isometric Mid Thigh Pull (IMTP), and Isometric Squat (ISqT) and relate these to performance metrics, such as peak sprinting velocity. A novel, sport-specific contribution of this work, is the assessment of force-time characteristics during unilateral IMTP and ISqT, as prior research has been largely limited to the bilateral movements.

Methods: A minimum of 50 varsity athletes will be recruited from the University of Saskatchewan to participate in two identical testing sessions (Test 1 | Test 2) separated by one week. Each session will include a series of five isometric strength tests (bilateral and unilateral IMTP, ISqT) designed to yield force-time characteristics at specific joint angles, which will be compared to dynamic performance (40m sprint). Anticipated findings: Measures of peak force derived from force plate technology and the novel “Force Finder” device will be highly correlated and reliable. Unilateral ISqT will have a higher correlation to sprinting velocity than unilateral IMTP.

Conclusion: This work will enable Sport Scientists, Strength and Conditioning Coaches and Rehabilitation Professionals to better assess neuromuscular capabilities of athletes and clients to better guide the prescription of training protocols, rehabilitation, and sports programming.

Friday April 1st Schedule

Presentations – [Zoom Link](#)

Time	Name	Position
2:30	<i>Introduction to Session</i>	
2:40	Dr. Alison Oates	Faculty Member
3:00	Dr. Heather Foulds	Faculty Member
3:20	KC Hall	PhD. Candidate
3:40	Shara Johnson	PhD. Candidate
3:55	Dr. Margo Adam	Postdoctoral Fellow
4:10	Dr. Kenzie Friesen	Postdoctoral Fellow

Title: Knowledge translation: A Framework and its use for balance research

Presenters: Pawan Kumar, Alison Oates

Research examining balance aims to understand how we control and how to improve balance. Sharing research results with knowledge users is essential to move from knowledge creation to application to reduce the impact of balance impairment for individuals and society. This presentation will use the Knowledge-to-Action Framework to highlight a variety of knowledge translation activities designed to share research results with relevant communities as well as present research that evaluates the use of research knowledge in practice.

Balance impairment was identified as a challenge for people with incomplete spinal cord injury (pwiSCI). A SHRF-funded project then examined balance control to enhance understanding of how balance is affected in pwiSCI. For researchers, a blog-post shared highlights in a technical and concise manner for an international audience (<https://ispgr.org/walking-safely-after-spinal-cord-injury-reactive-balance-matters/>). For clinicians and individuals with iSCI, one-page summaries and presentations were developed with knowledge users to tailor and adapt the messages appropriately. An article in a provincial magazine about spinal cord injury (Parascope) was also created to share with a broader, provincial audience (<https://scisask.ca/wp-content/uploads/2018/05/parascope-spring2018-web.pdf>).

People with MS (pwMS) also experience considerable balance impairments driven by sensory and motor impairments. The identified problems driven by a lack of balance in pwMS led to research examining standing and walking balance in pwMS. Results were shared with clinicians and researchers at a local MS Research Day as well as on a podcast with “Researchers Under the Scope” supported by the College of Medicine (Episode 28: <https://medicine.usask.ca/research/researchers-in-action.php#Podcast>).

Finally, it is essential to move research examining balance in older adults to fall prevention applications. Studies that aim to evaluate application and identify challenges to implementation will be presented including the application of evidence-based best practices across Canada in community-based exercise programs and the identification of balance impairments by clinicians.

Title: “It’s very different walking in two worlds as a Metis person”: The Métis Identity Duality as a Determinant of Health and Wellbeing

Presenter: Heather Foulds

Métis Peoples, a distinct Indigenous Nation with a homeland in Western Canada, experience health inequalities through ongoing colonization. While these health disparities are evident, limited understanding of Métis-specific health experiences are available. This series of studies aim to identify and understand Métis-specific determinants of health and physical activity.

A quantitative survey of 41 Métis adults at the University of Saskatchewan evaluated cultural connectedness: Cultural Connectedness Scale and Multigroup Ethnic Identity Measure, physical activity: Godin Shephard Leisure Exercise Questionnaire, and sedentary behaviour: Canadian Community Health Survey questions. Qualitative conversational interviews and photovoice exercise among 20 Métis adults collected stories and discussions around experiences of identity, culture and social support in relation to health and wellbeing.

Métis adults reporting lower physical activity reported greater cultural traditions and spirituality. Métis adults reporting 5 or more hours of continuous sitting report greater identity and spirituality scores, particularly among those who have not relocated from home communities. Métis adults identified two main identity themes influencing health and wellness: (1) The Métis Person: “I have a lot to learn about myself and my culture, where I come from”, including culture as self-discovery, tracing family history/lineage and actively “being” Métis; and (2) Balancing the Métis Duality: “on the phone I have my white voice”, including reconciling “non-Indigenous” appearances and colourism discrimination, feeling isolated due to having dual cultural backgrounds, and identity politics.

Métis Peoples’ unique experience of health and wellbeing is inherently tied to identity while connections to culture are dissonant with identity dualities.

Title: Organization and implementation of an annual LGBTQ statewide lobby day.

Authors: Kelly Corrine Hall

Research Theme: Healthy Aging

Advocacy is an important component of health education as it is a vehicle to improve health equity through social justice movements. The purpose of this session is to present the process and results of a statewide lobby day designed to address health disparities in a marginalized population. The main components of this lobby day included; (1) distinct training for lobby day leaders and participants, (2) decreasing barriers to lobby day attendance, (3) incentives for participation, and (4) leveraging community organizational capacity and resources to strengthen the program. LGBTQ lobby day leaders were identified and participated in a 3-hour training to discuss their role and responsibilities, as well as receive guidance for leading a lobby team through the state capitol. Components of the leader training included how to navigate the state capitol, how to create an inclusive space for all identities, policies and procedures to request a legislature off the state floor, and conflict resolution skills. The participant trainings focused on increasing personal efficacy in telling their own story in an appealing way to legislatures through the Social Cognitive Theory constructs of observational learning and facilitation/behavioral capability. Other components of the training included issue briefing on the policies, implications of policy change, and message framing tips to provide a strong rationale for policy change. Efforts were strengthened through collaboration with sexual and reproductive health coalitions, including the states leading coalitions for healthcare reform, and faith-based community organizations. These collaborations were instrumental in demonstrating the breadth of policy implications to legislatures and participants. The lobby day resulted in over 300 participants, with representation from all state counties and districts. Organizers, leaders, and participant feedback indicate strengths of the program include providing a safe and inclusive environment for marginalized individuals to engage in the legislative process, increasing participant self-efficacy regarding policy, and a demonstrated capacity for sustainability.

Title: A Scoping Review of Indigenous-Specific Physical Activity Measures Developed with and/or for Indigenous Peoples in Canada, Australia, and New Zealand

Authors: Shara R. Johnson, Philip D. Chilibeck, Heather J. A. Foulds

Research Theme: Indigenous Wellness

Introduction: Indigenous Peoples face disproportionately higher health challenges including risk of chronic diseases, compared to non-Indigenous persons. Physical Activity (PA) is one of the most modifiable behaviours to combat chronic diseases, however historical factors including colonization and ongoing socioeconomic inequities have impacted Indigenous Peoples' PA. Enhancing PA participation, monitoring, and reliably reflecting PA levels require using accurate and culturally appropriate assessment methods. Furthermore, addressing the complex health inequities faced by Indigenous Peoples requires approaches that move from focusing on individuals to community levels.

Purpose: This scoping review examined Indigenous-specific PA measures developed with and/or for Indigenous Peoples in Canada, Australia, and New Zealand.

Methods: A systematic search was conducted in Web of Science, Medline, University of Saskatchewan Indigenous Portal, and ProQuest Dissertations and Theses Global databases. Twenty-nine (n=29) articles were identified, and data extracted for narrative synthesis. The articles were examined for Indigenous-specific PA measures used and how the studies utilized Community Based Participatory Research principles to engage communities (Israel et al., 2003).

Results: This review found that the number of studies using Indigenous-specific PA measures have been increasing over time with wide variations in measures and designs. Adapting questionnaires to traditional Indigenous activities such as cultural dances and ceremonies and food gathering activities were the most frequent adjustments done to make the measures Indigenous-specific. This review also highlighted practical ways researchers can engage Indigenous communities however, more needs to be done to facilitate community collaboration in all phases of research and develop long-term sustainable initiatives.

Conclusion: Using appropriate and valid means for assessing PA and collaborating with Indigenous communities will help with the implementation of culturally relevant health promotion initiatives and enhance PA participation.

Title: Introducing the Saskatoon Try-Sport League – a Multi-Sport Experience in the Wake of Single-Sport Stardom

Presenter: Kenzie Friesen

With trends of early professionalization in youth sport, the high cost of participation, and the vast time demand for single sport involvement, it has become increasingly difficult for youth to participate in organized sport, and especially challenging for families to dedicate both time and finances for children to participate in multiple sports. Multi-sport involvement and “sport sampling” has been shown to improve physical function, athletic movement, emotional well-being, social cohesion, and decrease injury risk. Despite the numerous benefits of multi-sport involvement, it is becoming less and less common.

Funding from the Canadian Tire Jumpstart Program allowed for the creation of the Try-Sport league, a multi-sports league in Saskatoon that allowed children from core communities the opportunity to sample three sports at no cost. During this league, athletes competed on one team, and within one league, while playing three different sports including flag football, soccer, and kickball. The league was formed to promote multi-sport involvement and remove the barriers of sports participation including the high cost of organized sport, and the scheduling constraints of hectic practice/game schedules.

With the help of 8 volunteers and numerous local supports, over 50 kids participated in the Try-Sport league completely free of cost and with free access to all equipment necessary for participation. The league was an outstanding success as indicated by a post-season follow-up survey. Nineteen parents completed the survey on behalf of their child via an online survey platform. Results indicated that 47% of Try-Sport kids participated in organized sport for the first time and 72% of Try-Sport kids would not have participated in sport outside of the Try-Sport league during the summer of 2021. The Try-Sport league was able to remove barriers to sport and as such, improve the accessibility and opportunity for kids to sample new sports.

Survey results indicated that the two main barriers to multi-sport involvement included financial reasons and scheduling constraints. Due to the success and excitement of participants and their families, a grant has one again been submitted to host the league again during the 2022 summer. All survey participants (n = 19) indicated they were likely or highly likely to participate in the Try-Sport League again next year and so we hope to continue expanding the league to promote multi-sport sampling and healthy sport involvement. While there are known benefits of multi-sport sampling, there needs to continue to be more programs designed to allow for such diverse athletic involvement.