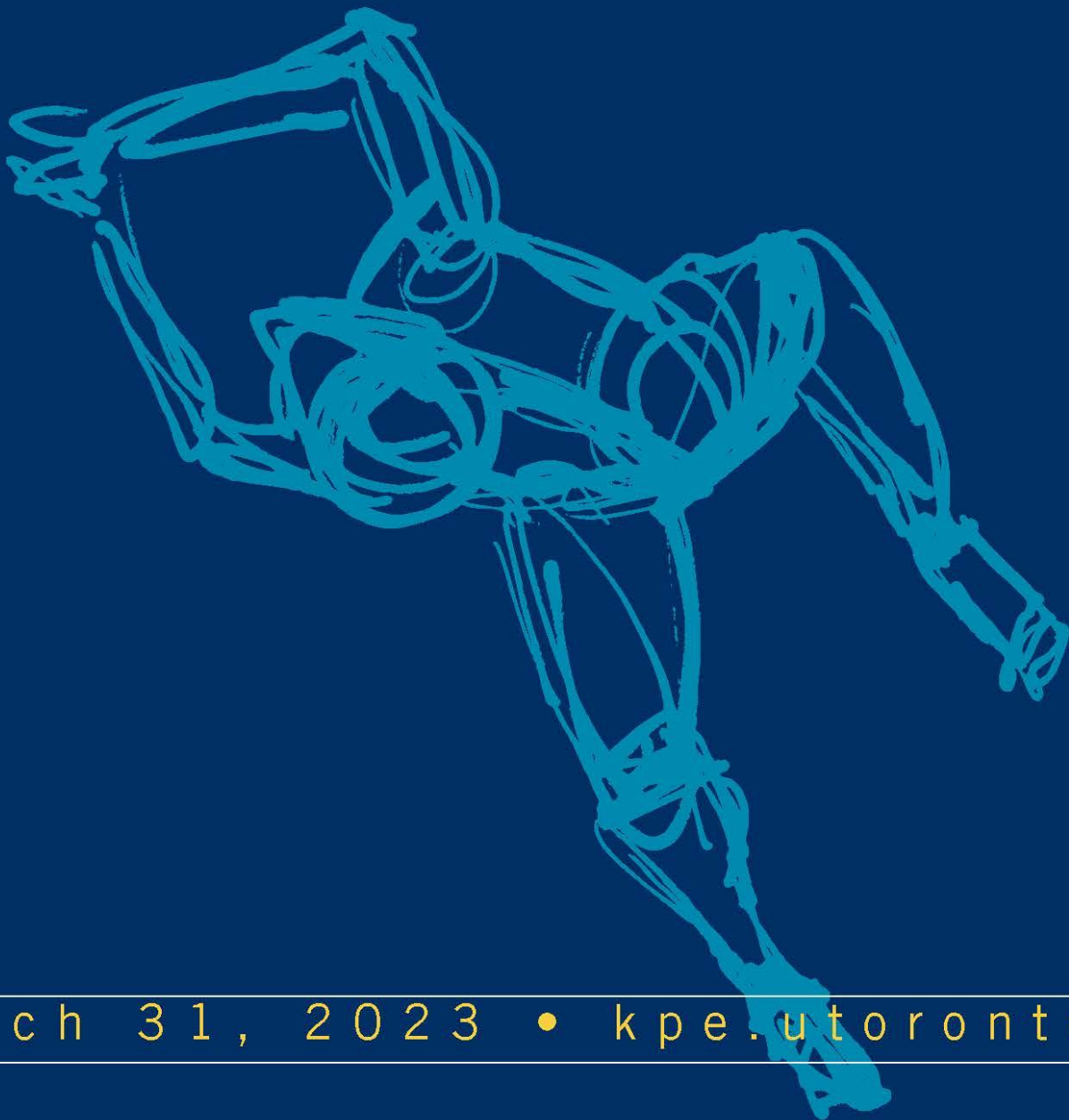




UNIVERSITY OF TORONTO
FACULTY OF KINESIOLOGY & PHYSICAL EDUCATION

THE 23rd ANNUAL BERTHA ROSENSTADT
**NATIONAL UNDERGRADUATE
RESEARCH CONFERENCE**

KINESIOLOGY AND PHYSICAL EDUCATION



March 31, 2023 • kpe.utoronto.ca

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WELCOME TO THE 23RD ANNUAL BERTHA ROSENSTADT NATIONAL UNDERGRADUATE RESEARCH CONFERENCE

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SCHEDULE AT A GLANCE

Time	Item	Location – Topic
8:15-8:45 a.m.	Registration & Refreshments	2 nd Floor Benson Lobby & Lounge
8:45-9:00 a.m.	Welcome	Gretchen Kerr, Ph.D., Dean, Faculty of Kinesiology and Physical Education (hybrid) BN 307 <ul style="list-style-type: none"> • Zoom link: https://utoronto.zoom.us/j/88677424808 • Passcode: 480354
9:00-9:15 a.m.	BREAK	2 nd Floor Benson Lounge
9:15-10:45 a.m.	Breakout Sessions I	<p>Session 1A: Behavioural Studies and Physical Activity (hybrid) BN 307</p> <ul style="list-style-type: none"> • Zoom link: https://utoronto.zoom.us/j/88677424808 • Passcode: 480354 <p>Session 1B: Biophysical Studies and Exercise Interventions (in-person) WS 2007</p> <p>Session 1C: Cardiovascular Physiology and Exercise Science (in-person) BN 304</p> <p>Session 1D: Skeletal Muscle and Physical Activity (in-person) BN 302</p>
10:45-10:55 a.m.	BREAK	2 nd Floor Benson Lounge
10:55-12:25 p.m.	Breakout Sessions II	<p>Session 2A: Cardiovascular and Muscle Physiology (hybrid) BN 307</p> <ul style="list-style-type: none"> • Zoom link: https://utoronto.zoom.us/j/88677424808 • Passcode: 480354 <p>Session 2B: Biomechanics and Exercise Interventions (in-person) WS 2007</p> <p>Session 2C: Skeletal Muscle and Physical Activity (in-person) BN 304</p> <p>Session 2D: Sport Psychology and Physical Activity Intervention (in-person) BN 302</p>
12:25-1:10 p.m.	LUNCH	2 nd Floor Benson Lounge
1:10-2:25 p.m.	Breakout Sessions III	<p>Session 3A: Cardiovascular and Muscle Physiology (in-person) BN 307</p> <p>Session 3B: Injury Rehabilitation and Exercise Interventions (in-person) WS 2007</p> <p>Session 3C: Neurophysiology and Sensorimotor Learning (in-person) BN 304</p> <p>Session 3D: Physical Cultural Studies (hybrid) BN 302</p> <ul style="list-style-type: none"> • Zoom link: https://utoronto.zoom.us/j/88677424808 • Passcode: 480354
2:25-2:35 p.m.	BREAK	2 nd Floor Benson Lounge
2:35-3:50 p.m.	Breakout Sessions IV	<p>Session 4A: Cardiovascular and Muscle Physiology (in-person) BN 307</p> <p>Session 4B: Exercise and Mental Health (in-person) WS 2007</p> <p>Session 4C: Neurophysiology and Sensorimotor Learning (in-person) BN 304</p> <p>Session 4D: Sport Psychology and Physical Activity Intervention (in-person) BN 302</p>
3:50-4:00 p.m.	BREAK	2 nd Floor Benson Lounge

4:00-4:40 p.m.	Keynote: Dr. Kaleigh Pennock	<i>“Risk and responsibility in sport: Embracing interconnected perspectives in Kinesiology (hybrid) BN307</i> <ul style="list-style-type: none"> • Zoom link: https://utoronto.zoom.us/j/88677424808 • Passcode: 480354
4:40-5:00 p.m.	Award Presentation and Closing Remarks	Prof. Catherine Amara, Director of Undergraduate Studies, Faculty of Kinesiology and Physical Education, U of T (hybrid) BN307 <ul style="list-style-type: none"> • Zoom link: https://utoronto.zoom.us/j/88677424808 • Passcode: 480354

HYBRID SESSION LINKS

One zoom link and passcode for Welcome, Closing, Keynote Speaker and Hybrid Session 1A, 2A and 3D:

- Zoom link: <https://utoronto.zoom.us/j/88677424808>
- Passcode: 480354

BLOCK PRESENTATION ROOM ASSIGNMENTS

Sessions	Room #
Welcome/ Keynote / Closing Remarks	Benson 307 (BN307)
Lunch & Breaks	Benson Student Lounge
Session A	Benson 307 (BN307)
Session B	Warren Stevens (WS2007)
Session C	Benson 304 (BN304)
Session D	Benson 302 (BN302)

ABOUT THE KEYNOTE SPEAKER



Dr. Kaleigh Pennock is a postdoctoral researcher at Western University. Broadly, her research examines how constructions of risk and responsibility shape experiences in sport. Kaleigh completed her PhD at the University of Toronto, where her dissertation focused on sport-related concussion under-reporting by adolescent athletes. At Western, her research examines the interrelated roles of various actors in youth sport concussion awareness and removal, and collective strategies for knowledge mobilization to improve concussion management. In addition to her research at Western, Kaleigh is the lab coordinator for the Indigeneity, Diaspora, Equity, and Anti-Racism in Sport (IDEAS) Research Lab at the University of Toronto. Through her work with Fast and Female, Kaleigh helps advance opportunities for girls in sport and physical activity.

Risk and responsibility in sport: Embracing interconnected perspectives in Kinesiology. This talk will explore key concepts related to risk and responsibility and the implications of these processes for athletes' experiences in sport. We will explore how athletes and others interpret and contextualize physical, social, and psychological harm in sport. We will also delve into the shared responsibility of sport-involved parties in negotiating and managing risk within interpersonal (teammate, coach, parent) and community sport organization (club) contexts. Drawing from research findings and current social issues in sport, this presentation will highlight the ways in which a transdisciplinary approach to risk and responsibility can inform our understanding of athlete safety, well-being and engagement in sport

PRESENTATION INSTRUCTIONS

Each session will have 5 presentations and will be facilitated by two moderators. Each presenter is allocated 15 minutes, which includes a verbal presentation (approx. 10 minutes), questions and answers, and time for transition between presenters.

In-Person Sessions:

- The majority of the sessions will be hosted and presented in-person.
- Please intend to stay during the full session to limit the distractions for presenters and to support your fellow colleagues and co-presenters.
- Each session will be facilitated by a moderator who will welcome all the attendees, provide session housekeeping details, introduce the speakers, and facilitate questions.
- As this is an in-person conference, live in-person presentations will not be available virtually. Only the virtual sessions, Welcoming & Closing Remarks and the Keynote Speaker will be accessible remotely.

Hybrid Sessions:

- Please use the links and passwords provided in the Conference Programme to join the sessions.
- Only the virtual sessions, Welcoming & Closing Remarks and the Keynote Speaker will be accessible remotely.

- Each session will be facilitated by a moderator who will welcome all the attendees, provide session housekeeping details, introduce the speakers, and facilitate questions.
- Virtual presenters are expected to present live synchronously over zoom.
- Virtual presenters will be made as co-hosts and will share their screens during their allotted presentation time. After you present (approx. 10 minutes), stop sharing your screen, and the moderator will facilitate the Q&A portion (approx. 5 minutes). If possible, presenters are encouraged to have their cameras while they are presenting and while answering questions.

ORDER OF THE DAY

Registration and Refreshments: 8:15 a.m. – 8:45 a.m. (2nd Floor Benson Lobby & Lounge)

Welcome: 8:45 a.m. – 9:00 a.m. (Benson 307)

Break #1: 9:00 a.m. – 9:15 a.m. (2nd Floor Benson Lounge)

Session I: 9:15 a.m. – 10:45 a.m.

Session 1A (BN307) Behavioural Studies and Physical Activity (Hybrid)	
9:15 a.m.	<p><i>Perspectives on Return to Work after an Occupational Injury: Health Care Workers' Views of Potential Predictors</i> *Online By: Mohamed Alzahrán Faculty Advisor: Dr. Melissa Wiman Laurentian University</p>
9:30 a.m.	<p><i>Investigating the impact of high-intensity interval training on deficits in mood and changes in inflammation after acute sleep restriction.</i> By: Anjali M. Bedi Co-Authors: Connor Gibala and Dr. Jennifer J. Heisz Faculty Advisor: Dr. Jennifer J. Heisz McMaster University</p>
9:45 a.m.	<p><i>Exploring Barriers to Physical Activity Participation Post-COVID-19 Restriction Removal Among Female Undergraduate Students</i> By: Madeline Fabiano Co-Authors: Elizabeth Wall Faculty Advisor: Dr. Erin Pearson Lakehead University</p>

10:00 a.m.	<p><i>Social Identity and Mindfulness of Mental Health in University Students</i> By: Maliha Khan Faculty Advisor: Dr. Jennifer Heisz McMaster University</p>
10:15 a.m.	<p><i>Redefining Exercise Identity in People Living With and Beyond Cancer: A Qualitative Exploration of Exercise Behaviour within Early Survivorship</i> By: Jada Roach Co-Authors: Allyson Tabaczynski MSc, PhD(c)e, William Goodman, PhD(c) Faculty Advisor: Dr. Linda Trinh University of Toronto</p>
10:30 a.m.	<p><i>Demographic and Clinical Correlates of Daily Step Counts among Prostate Cancer Survivors</i> By: Sasha Arbid Co-Authors: Lauren Voss, Alexis Whitehorn Faculty Advisor: Dr. Linda Trinh University of Toronto</p>

Session 1B (WS2007) Biophysical Studies and Exercise Interventions

9:15 a.m.	<p><i>The Effects of Ankle Taping on the Mean Sway Velocity, 95% Ellipse Area, and Path Length of the GRF of Simulated Drop Landings in Female Competitive Gymnasts</i> By: Hayley Swift Faculty Advisor: Dr. Paolo Sanzo Lakehead University</p>
9:30 a.m.	<p><i>Arm Technique Comparison during a Figure Skating Jump</i> By: Natalie Schwarz Co-Authors: P Renaud, L Holman, ARB Phillips Faculty Advisor: Dr. Shawn M Robbins & Dr. Celena Scheede-Bergdahl McGill University</p>
9:45 a.m.	<p><i>Early Specialization and Biomechanical Considerations: Hip Kinematics in Ice Hockey Goaltenders</i> By: Courtney Hlady Co-Authors: Margaret Harrington Faculty Advisor: Dr. Timothy Burkhart University of Toronto</p>
10:00 a.m.	<p><i>Quadriceps muscle size and echogenicity correlate with physical function in Idiopathic Pulmonary Fibrosis</i> By: Jamie Bell Co-Authors: Sahar Nourouzpour, Ryan Koh, Dinesh Kumbhare, Jenna Gillen, Dmitry Rozenberg, Daniel West Faculty Advisor: Dr. Daniel West & Dr. Jenna Gillen University of Toronto</p>

10:15 a.m.	<p><i>Outcomes of Surgical vs. Non-Surgical Treatments for Femoral-Acetabular Impingement Syndrome (FAIS) in Female Athletes</i></p> <p>By: Stefania DiLeo Co-Authors: Margaret Harrington Faculty Advisor: Dr. Timothy Burkhart University of Toronto</p>
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Session 1C (BN304) Cardiovascular Physiology and Exercise Science

9:15 a.m.	<p><i>Using Ultrasonography to Non-Invasively Assess Site-Specific Body Composition in Healthy Pregnant Persons Compared to Age, BMI, and Exercise-Matched Controls</i></p> <p>By: Dina Attia Co-Authors: Brinda Prapaharan Faculty Advisor: Dr. Kirsten Bell McMaster University</p>
9:30 a.m.	<p><i>Sex differences in cognitive function following an acute bout of high intensity aerobic exercise</i></p> <p>By: Jared So Faculty Advisor: Dr. Jeremy Walsh McMaster University</p>
9:45 a.m.	<p><i>Examining the Association Between TNF-α Levels and Physical Activity in Children with Inflammatory Bowel Disease</i></p> <p>By: Shivanthi Kandappa Co-Authors: Samantha Morin, Madelyn Byra, Dr. Robert Issenman, Dr. Mary Zachos, Dr. Mary Sherlock, Dr. Nikhil Pai, Emily Brackenridge, Dr. Brian W. Timmons, Dr. Joyce Obeid Faculty Advisor: Dr. Joyce Obeid McMaster University</p>
10:00 a.m.	<p><i>The impact of high-intensity and moderate intensity arm cycling ergometry on recovery: A preliminary analysis.</i></p> <p>By: Arya Raha Co-Authors: Sydney Valentino Faculty Advisor: Dr. Maureen MacDonald McMaster University</p>
10:15 a.m.	<p><i>Sex-differences in cerebral blood flow during a transition to standing, in older adults with cognitive impairment</i></p> <p>By: Zahra Ali Co-Authors: Jaspreet Bhangu</p>

10:30 a.m.	<p>Faculty Advisor: Laura K. Fitzgibbon-Collins McMaster University</p> <p><i>Exploring Whether MDM2 SNP309 is a Genomic Determinant of Cardiorespiratory Fitness</i> By: Ghazal Haddadi Co-Authors: Brian Lam, Loren Yavelberg, Veronica Jamnik, Emilie Roudier Faculty Advisor: Dr. Emilie Roudier York University</p>
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Session 1D (BN302) Skeletal Muscle and Physical Activity

9:15 a.m.	<p><i>Muscle protein synthesis in response to the ingestion of plant-based protein blends in young men and women</i> By: Nelani Paramanatharajah Co-Authors: Nelani Paramanatharajah, Brad S. Currier, Changhyun Lim, Tom Janssen, Stuart M. Phillips Faculty Advisor: Dr. Stuart M. Phillips McMaster University</p>
9:30 a.m.	<p><i>The effect of exercise on the human skeletal muscle phosphoproteome</i> By: Antony Yang Co-Authors: Liam Deneve, Wenyuan Zhu, Aaron Thomas, Troy Hornberger, Stuart Phillips Faculty Advisor: Dr. Stuart Phillips McMaster University</p>
9:45 a.m.	<p><i>Characterizing heart rate responses and postprandial glucose during bodyweight exercise and walking in women with or at-risk for type 2 diabetes</i> By: Alexandra Dojutrek Co-Authors: Alexa Govette, Rebecca Christensen, Elia Rishis, Stephanie Small, Olivia Lee, Sasha High, Sarah Neil-Sztramko, Catherine M Sabiston, Jenna B Gillen, Amy A Kirkham Faculty Advisor: Dr. Amy Kirkham and Dr. Jenna Gillen University of Toronto</p>
10:00 a.m.	<p><i>Impact of dairy and dairy alternative beverages on whole-body protein balance after exercise in active adolescents</i> By: Yikai Liu Co-Authors: Nicki Pourhashemi, Hugo Fung, Daniel Moore Faculty Advisor: Dr. Daniel Moore University of Toronto</p>
10:15 a.m.	<p><i>Effects of menstrual cycle phase on carbohydrate metabolism following an oral glucose tolerance test in females</i> By: Eric Antonen Co-Authors: Alexa Govette, Madeline Pettit, Anessa Koussioris, Dinesh Kumbhare, Daniel R. Moore</p>

10:30 a.m.	<p>Faculty Advisor: Dr. Jenna Gillen, Dr. Daniel West University of Toronto</p> <p><i>Validation of a noninvasive amino acid 'breath test' to detect increased anabolic sensitivity in females on oral contraceptives</i> By: Daniya Idrissova Co-Authors: Nicki Pourhashemi, Hugo Jern Wai Fung, Jonathan Aguilera, Daniel West, Daniel Moore Faculty Advisor: Dr. Daniel Moore University of Toronto</p>
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Break #2: 10:45 a.m. – 10:55 a.m. (2nd Floor Benson Lounge)

Session II: 10:55 a.m. – 12:25 p.m.

Session 2A (BN307) Cardiovascular and Muscle Physiology (Hybrid)	
10:55 a.m.	<p><i>Evaluating the Effect of Environmental Heat on the Autophagic Response to High-Intensity Aerobic Exercise in Peripheral Blood Mononuclear Cells from Healthy Young Women*Online</i> By: Archana Weerasooriya Co-Authors: Nicholas Goulet, James J. McCormick, Morgan K. McManus, Kelli E. King, Pascal Imbeault, Glen P. Kenny Faculty Advisor: Dr. Pascal Imbeault University of Ottawa</p>
11:10 a.m.	<p><i>Targeting vascular and skeletal muscle health to improve quality of life in males and females with type 1 diabetes: Trial protocol development and refinement</i> By: Gurleen Kaur Bagri Co-Authors: Gurleen K Bagri, Matthew I Badour, Khandra N Barrett, Kenneth S Noguchi, Dr. Maureen J MacDonald, Dr. Thomas J Hawke, Dr. Irena A Rebalka Faculty Advisor: Dr. Maureen J MacDonald McMaster University</p>
11:25 a.m.	<p><i>Examining the impact of the natural menstrual cycle and oral contraceptive pill phases on exercise stimulated flow mediated dilation in healthy premenopausal females: a proposal</i> By: Shantal Stade Co-Authors: Jennifer Williams Faculty Advisor: Dr. Maureen MacDonald McMaster University</p>
11:40 a.m.	<p><i>Intraperitoneal Administration of Cardiolipin Enhances Leak Respiration in Skeletal Muscle</i> By: Amanda Laplante Co-Authors: Gabriel Malka, Andreas Bergdahl</p>

11:55 a.m.	<p>Faculty Advisor: Dr. Andreas Bergdahl Concordia University</p> <p><i>Carotid Artery Longitudinal Wall Motion in Children with a Chronic Inflammatory Disease</i> By: Jaimini Patel Co-Authors: Madelyn Byra, Chloe Athaide, Dr. Jason Au, Dr. Tania Cellucci, Dr. Lehana Thabane, Dr. Brian W. Timmons, Dr. Maureen J. MacDonald Faculty Advisor: Dr. Joyce Obeid McMaster University</p>
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Session 2B (WS2007) Biomechanics and Exercise Interventions

10:55 a.m.	<p><i>Comparison of Dominant vs. Non-Dominant Lower Extremity Kinematics in Response to an Anaerobic-Aerobic Fatigue Protocol</i> By: Dveeta Lal Faculty Advisor: Dr. Timothy Burkhart University of Toronto</p>
11:10 a.m.	<p><i>Development of Lower Extremity Neuromuscular maps to optimize return-to-activity decisions following musculoskeletal injury</i> By: Sasha Renton de Lannoy Co-Authors: Dr. Timothy Burkhart, Dr. Jas Chahal, Courtney Marks Faculty Advisor: Dr. Timothy Burkhart University of Toronto</p>
11:25 a.m.	<p><i>Comparing the Effects of Surgical and Non-Surgical Adolescent Idiopathic Scoliosis Interventions on Overall Posture, Kinetics & Kinematics; A Narrative Review.</i> By: Hassaan Mahmood Faculty Advisor: Dr. Timothy Burkhart University of Toronto</p>
11:40 a.m.	<p><i>Postural Stability of Women 65 Years or Older: a 12-week online dance intervention with blood flow restriction</i> By: Mohamed Sangaré Co-Authors: Emma H. Chen, Andreas Bergdahl, Mary Roberts Faculty Advisor: Dr. Andreas Bergdahl Concordia University</p>
11:55 a.m.	<p><i>The effect of an acute bout of isometric handgrip exercise on brain function indices</i> By: Luke Nguyen Co-Authors: Keegan Nhan and Jeremy Walsh</p>

12:10 p.m.	<p>Faculty Advisor: Dr. Jeremy Walsh McMaster University</p> <p><i>The Effect of Focal Point Depth on Echointensity in Muscle Ultrasound</i></p> <p>By: Brinda Prapaharan Co-Authors: Dina Attia Faculty Advisor: Dr.Kirsten Bell McMaster University</p>
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Session 2C (BN304) Skeletal Muscle and Physical Activity	
10:55 a.m.	<p><i>The effect of menstrual cycle phase on resting and postprandial substrate utilization in healthy recreationally active females</i></p> <p>By: Madeleine Pettit Co-Authors: Alexa Govette, Eric Antonen, Anessa Koussiouris, Daniel West, Jenna Gillen Faculty Advisor: Dr. Jenna Gillen University of Toronto</p>
11:10 a.m.	<p><i>The individual and combined effect of leucine-enriched essential amino acid ingestion and resistance exercise on mTORC1 signalling in human skeletal muscle</i></p> <p>By: Jadd El-Iskandarani Co-Authors: Cassidy Tinline-Goodfellow, Paul Babits Faculty Advisor: Dr. Daniel Moore University of Toronto</p>
11:25 a.m.	<p><i>The Efficacy of Protein Supplementation on Muscle Protein Synthesis to Mitigate Sarcopenia in Aging</i></p> <p>By: Caroline Lowisz Co-Authors: J. McKendry, A. Nanthakumar, M. MacDonald, C. Lim, B. S. Currier Faculty Advisor: Dr. Stuart Phillips McMaster University</p>
11:40 a.m.	<p><i>The Effects of Interstitial Glucose on Neuromuscular Fatigue</i></p> <p>By: Mohamed Elsayed Elghobashy Faculty Advisor: Arthur J. Cheng York University</p>
11:55 a.m.	<p><i>An examination of sexual dimorphism in human skeletal muscle protein fractional synthetic rates with aerobic and resistance-based exercise</i></p> <p>By: Liam DeNeve Co-Authors: Aaron Thomas, Changhyun Lim, James Mckendry Faculty Advisor: Dr. Stuart Phillips McMaster University</p>

12:10 p.m.	<p><i>The (vari)ability of non-invasive 13C breath test to detect inactivity-induced anabolic resistance in healthy young adults.</i></p> <p>By: Nigel LeGood Co-Authors: Hugo Fung, Matthew Lees, Paul Babits, Daniel West, Daniel Moore Faculty Advisor: Dr. Daniel Moore University of Toronto</p>
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Session 2D (BN302) Sport Psychology and Physical Activity Intervention

10:55 a.m.	<p><i>Sound the Alarm: How Anatomy Bell-Ringer Exam Structure Changes Can Affect Student Anxiety</i></p> <p>By: Matthew Dunchych Co-Authors: Dr. Danielle Bentley Faculty Advisor: Dr. Danielle Bentley, and Dr. Catherine Amara University of Toronto</p>
11:10 a.m.	<p><i>Athlete perspectives on the prescription of rest following sport-related concussion</i></p> <p>By: William Zavaros-Bairos Faculty Advisor: Dr. Lynda Mainwaring University of Toronto</p>
11:25 a.m.	<p><i>Button battery ingestion in children: Identifying gaps in knowledge, misconceptions, and targets for primary prevention measures</i></p> <p>By: Yasmine Madan Co-Authors: Justine Philteos, Adrian L. James, Evan J. Propst, Olivia Ostrow, Nicole McKinnon, Tobias Everett, Nikolaus E. Wolter Faculty Advisor: Dr. Nikolaus Wolter McMaster University</p>
11:40 a.m.	<p><i>How the education given to patients with an mTBI affected their experience/recovery with PPCS</i></p> <p>By: Jaynee Lie Faculty Advisor: Katherine Tamminen University of Toronto</p>
11:55 a.m.	<p><i>The importance of the vividness and self-relevance of episodic future thinking in decreasing delay discounting</i></p> <p>By: Katriel Read Co-Authors: Dr. Suzanna Becker, Dr. Jeremy Walsh, Isaac Kinley Faculty Advisor: Dr. Suzanna Becker and Dr. Jeremy Walsh McMaster University</p>
12:10 p.m.	<p><i>A Risky Business: Perceived Risk of Concussion Associated with Intentions Toward Health Behaviours</i></p> <p>By: Simon Grasdal Co-Authors: Michael Jorgensen Faculty Advisor: Dr. Fergal O'Hagan</p>

Lunch: 12:25 p.m. – 1:10 p.m. (2nd Floor Benson Lounge)

Session III: 1:10 p.m. – 2:25 p.m.

Session 3A (BN307) Cardiovascular and Muscle Physiology	
1:10 p.m.	<p><i>Effect of the TRPV4 Ion Channel on Angiogenesis Using an Aortic Ring Assay</i> By: Gabriel Malka Co-Authors: Vanessa Salucci Faculty Advisor: Dr. Andreas Bergdahl Concordia University</p>
1:25 p.m.	<p><i>Gender differences in pain perception and cardiovascular reactivity during a 3-minute cold pressor task</i> By: Neha Saroya Co-Authors: Michelle Mei, Elric Allison Faculty Advisor: Dr. Baraa Al-Khazraji McMaster University</p>
1:40 p.m.	<p><i>Examining sex differences in arterial function and stiffness after 12 weeks of sprint interval training in young, healthy, untrained individuals</i> By: Emily Van Berkel Co-Authors: JS Williams, W Bostad, MJ Gibala, MJ MacDonald Faculty Advisor: Dr. Maureen MacDonald McMaster University</p>
1:55 p.m.	<p><i>Assessing Aerobic Fitness in Youth with a Chronic Inflammatory Disease</i> By: Sarah da Silva Co-Authors: Madelyn M. Byra, Dr. Tania Cellucci, Dr. Maureen J. MacDonald, Dr. Lehana Thabane, Dr. Brian W. Timmons, Dr. Joyce Obeid Faculty Advisor: Dr. Joyce Obeid McMaster University</p>
2:10 p.m.	<p><i>Effect of Changes in Peripheral Resistance on Blood Flow Harmonic Profiles in Humans</i> By: Calvin Armstrong Co-Authors: Joshua Cherubini (PhD Student) and Dr. Maureen MacDonald, PhD Faculty Advisor: Dr. Maureen MacDonald McMaster University</p>

Session 3B (WS2007) Injury Rehabilitation and Exercise Interventions

1:10 p.m.	<p><i>Horizontal vs. Vertical Jumps in Return to Sport (RTS) Test Batteries Post-ACL Reconstruction</i> By: Rebecca Chan Faculty Advisor: Dr. Timothy Burkhart University of Toronto</p>
1:25 p.m.	<p><i>A Comparison Between Horizontal and Vertical Jump Tests Following ACL Reconstruction</i> By: Quinn Mulligan Faculty Advisor: Dr. Timothy Burkhart University of Toronto</p>
1:40 p.m.	<p><i>The risk of lower extremity injury in the public post-concussion</i> By: Daniela Daisy Boada Herrera Faculty Advisor: Dr. Timothy Burkhart University of Toronto</p>
1:55 p.m.	<p><i>Effect of an Acute Bout of Exercise on Creativity</i> By: Kabir Sodhi Co-Authors: Samantha Marshall, Gianna Jeyarajan, Jennifer Hanna Al-Shaikh, Raphael Gabiazon Faculty Advisor: Dr. Lindsay Nagamatsu University of Western Ontario</p>
2:10 p.m.	<p><i>The Immediate Effects of Dry Cupping the Lumbar Paraspinals on Range of Motion and Temperature</i> By: Natasha Scavarelli Faculty Advisor: Dr. Paolo Sanzo Lakehead University</p>

Session 3C (BN304) Neurophysiology and Sensorimotor Learning

1:10 p.m.	<p><i>Investigating Physiological Changes from Hand Movement Training in Stroke Patients using Transcranial Magnetic Stimulation (TMS)</i> By: Rosie Nucci Co-Authors: Nucci, R., Ramdeo, K. R., Rehsi, R. S., Nelson, A. J., Meltzer, J. A. Faculty Advisor: Dr. Aimee J. Nelson McMaster University</p>
1:25 p.m.	<p><i>Gamified Hand Rehabilitation Using a Novel Passive Device: An Analysis of User Engagement, Motor Outcome, and Functional Performance in Chronic Stroke</i> By: Sara Perfetto Co-Authors: Doan, A., Dumais, E., Marshall, M., Beauchamp, S., Shima, M., Dorman, S., Grewal, R. Faculty Advisor: Dr. Godwin, A., Johnson, V.B.K.</p>

	Laurentian University
1:40 p.m.	<p><i>"Don't do this" vs. "do that": The influence of instruction on interference effects from observed actions.</i> By: Cassie Chan Co-Authors: Kristina Knox, Xiaoye Michael Wang, Jay Pratt, Jonathon S. Cant, Timothy Welsh Faculty Advisor: Dr. Timothy Welsh University of Toronto</p>
1:55 p.m.	<p><i>Virtually the Same?: Investigating the Execution of Movement in a Virtual World</i> By: Madeleine Corredoura Co-Authors: Xiaoye Michael Wang (University of Toronto), Gabbie Resch (University of Ontario Institute of Technology), Michael Nitsche (Georgia Institute of Technology), Ali Mazalek (Toronto Metropolitan University), Tim Welsh (University of Toronto) Faculty Advisor: Dr. Timothy Welsh University of Toronto</p>
2:10 p.m.	<p><i>Data Management Strategies for Research in Behavioural Kinesiology</i> By: Kavini Rabel Co-Authors: Kelly Arbour-Nicitopoulos and Maeghan E. James Faculty Advisor: Dr. Kelly Arbour-Nicitopoulos University of Waterloo</p>

Session 3D (BN302) Physical Cultural Studies (Hybrid)	
1:10 p.m.	<p><i>Investigating the Effects of Internalized Hegemonic Masculinity and Sport Culture on Mental Health in Retired Professional Male Athletes: An Autobiographical Study Aimed to Identify Precursors and Manifestations of Depression and Suicide *Online</i> By: Sarah Varga Faculty Advisor: Dr. Michael Atkinson University of Toronto</p>
1:25 p.m.	<p><i>Examining Code-Switching Tactics of High-Performance BIPOC Female Sport Coaches</i> By: Wajeeha Rasul Faculty Advisor: Dr. Parissa Safai York University</p>
1:40 p.m.	<p><i>Bending Over Backwards: Gymnastics Canada, Assault, and Sports Culture: A Media Analysis</i> By: Emma Karamanlian Faculty Advisor: Dr. Caroline Fusco University of Toronto</p>
1:55 p.m.	<p><i>Environmental Sustainability Within Sport: The Development of Green Athletics in University</i> By: Kyara Simoes</p>

2:10 p.m.	<p>Faculty Advisor: Dr. Caroline Fusco University of Toronto</p> <p><i>Uncovering Ukrainian athlete representation in Canadian media</i> By: Jenna Petrovic Faculty Advisor: Dr. Simon Darnell University of Toronto</p>
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Break #3: 2:25 p.m. – 2:35 p.m. (2nd Floor Benson Lounge)

Session IV: 2:35 p.m. – 3:50 p.m

Session 4A (BN307) Cardiovascular and Muscle Physiology	
2:35 p.m.	<p><i>Ischemic Preconditioning: Methodological Manipulations</i> By: Alexander Isidori Co-Authors: Liam O'Brien Faculty Advisor: Dr. Ira Jacobs University of Toronto</p>
2:50 p.m.	<p><i>Analyzing the relationship between cardiopulmonary constituents during submaximal cycling</i> By: Blythe Nikita Haily Degilio Co-Authors: Adam N. Di Salvo, Sinan Osman, Robert F. Bentley Faculty Advisor: Dr. Robert F. Bentley University of Toronto</p>
3:05 p.m.	<p><i>Characterizing Exercising Habits and Atrial Fibrillation in Middle-Aged Endurance Runners</i> By: Navraj Brar Co-Authors: Sinan Osman, Robert F. Bentley Faculty Advisor: Dr. Robert Bentley University of Toronto</p>
3:20 p.m.	<p><i>The Effect of Limb Dominance on Forearm Blood Flow and Red Blood Cell Desaturation</i> By: Veronika Katsiuk Co-Authors: Jacob L. Schwartz, Robert F. Bentley Faculty Advisor: Dr. Robert Bentley University of Toronto</p>
3:35 p.m.	<p><i>The Effect of Exogenous Ketone Supplementation on Exercise Efficiency in Endurance-Trained Adults</i> By: Sydney Baumgarten Co-Authors: Jack Bone, Dr. Martin Gibala Faculty Advisor: Dr. Martin Gibala</p>

	McMaster University
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Session 4B (WS2007) Exercise and Mental Health

2:35 p.m.	<p><i>Mental Health and Performance Support in Canadian Varsity Sport: Current Trends and Promising Practices</i> By: Jessica Malcolm Faculty Advisor: Dr. Fergal O'Hagan Trent University</p>
2:50 p.m.	<p><i>Cognitive Dissonance and Risk Perception in Parents of Competitive Gymnasts</i> By: Porter Trevisan Co-Authors: Alex Murata, Niël Strydom, Mia KurtzFavero Faculty Advisor: Dr. Jean Côté Queen's University</p>
3:05 p.m.	<p><i>Understanding the relationships between physical activity, mental health, and body image in adolescent girls</i> By: Sarah Ryan Co-Authors: Maryam Marashi, Kristen Lucibello, Melissa deJonge, Catherine Sabiston Faculty Advisor: Dr. Catherine Sabiston University of Toronto</p>
3:20 p.m.	<p><i>The Relationship Between Body Image, Disordered Eating and Exercise in Retired Elite Women Athletes</i> By: Sara Sutherland Co-Authors: David Brown and Delaney Thibodeau Faculty Advisor: Dr. Catherine Sabiston University of Toronto</p>
3:35 p.m.	<p><i>Exploring Body Image and Self-Sabotage in Athletes</i> By: Sabrina Malouka Co-Authors: Sabrina Malouka, David M. Brown, Catherine M. Sabiston Faculty Advisor: Dr. Catherine Sabiston University of Toronto</p>

Session 4C (BN304) Neurophysiology and Sensorimotor Learning

2:35 p.m.	<p><i>Sensory Contributions to Piano Learning for Novices</i> By: Liam Morassut Co-Authors: Jessica Facchini, and Sadiya Abdulrabba Faculty Advisor: Dr. Gerome Manson Queen's University</p>
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2:50 p.m.	<p><i>The effect of visual context on goal-directed reaches to multisensory targets</i> By: Nick Butler Faculty Advisor: Dr. Gerome Manson Queen's University</p>
3:05 p.m.	<p><i>The Effect of Exercise Induced Muscle Damage on the Online Control of Upper Limb Reaching Movements</i> By: Ryan Chen Co-Authors: Jasmyn Lee, Joshua Aragone-Chiriboga, Sarvenaz Heirani Moghaddam Faculty Advisor: Dr. Gerome Manson Queen's University</p>
3:20 p.m.	<p><i>Eyes without a face: Examining the effects of gaze motion and direction on attention in inverted pareidolia faces.</i> By: Eden Kozma Co-Authors: Rob van der Wel & Tim Welsh Faculty Advisor: Dr. Tim Welsh University of Toronto</p>
3:35 p.m.	<p><i>Can Physical Perturbations of the Mouth Modulate Hand Grip Reaction Time?</i> By: Stephanie Larosa Co-Authors: Joelle Hajj & Luc Tremblay Faculty Advisor: Dr. Luc Tremblay University of Toronto</p>

Session 4D (BN302) Sport Psychology and Physical Activity Intervention

2:35 p.m.	<p><i>The Influence of Meeting Physical Activity and Sleep Duration Guidelines on Psychological Distress Levels in Children with a Chronic Medical Condition or Disability</i> By: Leili Hadayeghi Co-Authors: Madelyn Byra, Dr. Mark Ferro, Dr. Joyce Obeid Faculty Advisor: Dr. Brian Timmons McMaster University</p>
2:50 p.m.	<p><i>Investigating the Role Coaches Play During Adolescent Athlete Injury Rehabilitation</i> By: Olivia Christendat Faculty Advisor: Dr. Katherine Tamminen University of Toronto</p>
3:05 p.m.	<p><i>Exploring inclusive active play-related education and training opportunities within Canadian early childhood education</i> By: Brianna Wallace</p>

	<p>Co-Authors: Maeghan James, Leah Taylor, Trish Tucker Faculty Advisor: Dr. Kelly Arbour-Nicitopoulos University of Toronto</p>
<p>3:20 p.m.</p>	<p><i>Perceptions of Risky Play from Parents and Children with Disabilities</i> By: Avery Cushing Faculty Advisor: Dr. Kelly Arbour-Nicitopoulos University of Toronto</p>
<p>3:35 p.m.</p>	<p><i>Assessing quality participation experiences in sports facilities intentionally designed for inclusion</i> By: Anchal Badwal Co-Authors: Roxy Helliker O'Rourke Faculty Advisor: Dr. Kelly Arbour-Nicitopoulos University of Toronto</p>

Break #4: 3:50 p.m. – 4:00 p.m. (2nd Floor Benson Lounge)

Keynote, Awards, & Closing Remarks: 4:00 p.m. – 5:00 p.m. (BN 307)

ABSTRACTS

(in alphabetical order by surname)

Ali, Zahra

Sex-differences in cerebral blood flow during a transition to standing, in older adults with cognitive impairment

Faculty Advisor: Laura K. Fitzgibbon-Collins

Co-Author(s): Jaspreet Bhangu

McMaster University/Kinesiology

Globally, dementia impacts more than 50 million people, with higher incidence rates in Canadian females compared to Canadian males. Sex-differences in cardiovascular health, seen as strokes, carotid stenosis, aortic diseases, and hypertension, demonstrate the importance of researching different physiological mechanisms between sexes. One way to evaluate vascular mechanisms is during a supine-to-stand transition. Healthy older adults with lower brain oxygenation are known to have postural instability, a known predictor of future falls. What remains unknown, is if sex-differences are associated with changes in cerebral blood flow (CBF) during a transition from supine-to-standing and if these relationships are related to postural control in adults with dementia. Therefore, the objective of this study is to determine if there are any sex-differences in CBF and postural stability that exist between males and females of varying levels of cognitive impairment. It is hypothesized that males will have lower CBF compared to females and have postural instability and lower cognitive scores compared to males. Methods: Male and female participants with varying levels of cognitive impairment underwent a supine-to-stand transition while heart rate, blood pressure, cerebral oxygenation, and CBF velocity were monitored. Postural data, and cognition (Montreal Cognitive Assessment) were also collected. Normality will be tested for, and a One Way ANOVA controlling for age, will be run to determine any sex-differences between the 14 females (75±years) and 28 males (75±years). R-studio will be used to run all statistics and a significance will be set to $p \leq 0.05$. Significance: This research is important as the proper consideration of sex-differences is crucial for the prevention, diagnosis, and treatment of pathophysiological conditions with cardiovascular underpinnings. Furthermore, it is an opportunity to advance patient care for adults with cognitive impairment.

Alzahrn, Mohamed

Perspectives on Return to Work after an Occupational Injury: Health Care Workers' Views of Potential Predictors

Faculty Advisor: Dr. Melissa Wiman

Co-Author(s): N/A

Laurentian University/Kinesiology and Health Sciences

This study aimed to gain a deeper understanding of the challenges faced by healthcare professionals in managing injured or ill workers during the return-to-work (RTW) process. A qualitative phenomenological approach was used, through which semi-structured face-to-face interviews were conducted with a diverse sample of 20 professionals with experience in occupational injury/illness management between December 2022 and May 2023. A list of variables based on previous literature was used to guide the interviews, with professionals identifying the ten most important factors that influence the likelihood of RTW. Analysis of the data revealed that issues of communication and lack of appropriate assessment tools impede the RTW process.

The professionals also underscored the importance of considering the complex, psychological and motivational factors of the injured workers in the assessment process. Based on these findings, recommendations were made to improve patient engagement, collaboration between stakeholders, communication, and the implementation of workplace interventions to aid the RTW process. The study may also contribute to the development of an instrument to streamline the overall process of assessing occupational injuries/illnesses.

Antonen, Eric

Effects of menstrual cycle phase on carbohydrate metabolism following an oral glucose tolerance test in females

Faculty Advisor: Jenna Gillen, Daniel West

Co-Author(s): Alexa Govette, Madeline Pettit, Anessa Koussiouris, Dinesh Kumbhare, Daniel R. Moore
University of Toronto/

Introduction: Effects of menstrual cycle phase on postprandial substrate metabolism are unclear. Limited data suggests that carbohydrate (CHO) oxidation may be higher during exercise in the follicular phase relative to the luteal phase. We aimed to determine total CHO oxidation and exogenous glucose oxidation after a 75g oral glucose tolerance test (OGTT) in the follicular and luteal menstrual cycle phases of young females. Methods: Females (n= 10; 25±6 yr; 61±8 kg; 23±3 kg/m²) completed metabolic trials in the follicular (1-10 d after menses onset) and luteal (20-26 d after menses onset) phases of a menstrual cycle. After a 12-h overnight fast, VCO₂ and VO₂ were measured at baseline, and hourly for 3 h after the consumption of 75g glucose drink for determination of total CHO and fat oxidation during the OGTT. The 75g glucose drink was enriched with [U-13C₆]glucose tracer and breath samples were collected at baseline and every 30 min for 3 h after drink consumption to estimate exogenous glucose oxidation. Results: VO₂ and VCO₂ were ~5% higher in the luteal vs. follicular phase (VO₂: 0.23±0.03 vs. 0.22±0.03 L/min, p=0.02; VCO₂: 0.18±0.04 vs. 0.17±0.03 L/min; p=0.06). Total CHO oxidation during the 3 h OGTT was greater in the luteal vs. follicular phase (6.4±2.9 vs. 5.1±2.6 g/h, respectively, p=0.01); total fat oxidation during the 3 h OGTT was not different between phases (4.6±1.6 vs 4.5±1.3 g/h, respectively, p=0.88). Exogenous glucose oxidation was greater in luteal vs. follicular (3-h AUC: 2112±234 vs 2351±302, arbitrary units; p=0.035). Discussion: Despite similar total fat oxidation between luteal and follicular menstrual cycle phases, total CHO oxidation and exogenous glucose oxidation were elevated in the luteal phase after a 75g OGTT. This data is contrary to prior research and may be important to consider when designing studies investigating substrate metabolism in females.

Arbid, Sasha

Demographic and Clinical Correlates of Daily Step Counts among Prostate Cancer Survivors

Faculty Advisor: Dr. Linda Trinh

Co-Author(s): Lauren Voss, Alexis Whitehorn
University of Toronto

Background: Sedentary behavior (SB) is linked to negative health outcomes, which exacerbate long-term cancer-related side effects. Prostate cancer survivors (PCS) spend the most time in SB or light physical activity (LPA), suggesting that increasing LPA via step counts may be feasible to reduce SB. Purpose: To identify the demographic and clinical correlates of daily step counts among PCS. Methods: This was a secondary analysis of baseline data from a randomized controlled trial on reducing SB in PCS. PCS were recruited through

listservs/flyers distributed in the community. PCS completed self-reported measures of demographic (e.g., age, education, ethnicity, employment), clinical (e.g., number of comorbidities, body mass index), and cancer-specific (e.g., time since diagnosis, disease stage, current/past therapies) variables. The activPAL™ inclinometer assessed step counts, free-living SB, and ambulatory activities. A hierarchical linear regression analysis was conducted to examine the correlates of daily step counts. Model 1 examined demographic factors, Model 2 examined demographic and clinical factors, and Model 3 included demographic, clinical, and cancer-specific factors. Results: Fifty-two PCS (Mage = 69.5±7.3 years,) were included in the study, with 36.5% being diagnosed within the past 5 years and 78.8% having localized cancer. The final model explained 28.2% of the variance in daily steps. Number of comorbidities significantly predicted daily step counts ($\beta = -2383.1$, $p = 0.02$), after adjustment for demographic and cancer-specific variables. Conclusion: A greater number of comorbidities was associated with lower step counts, suggesting that the presence of comorbidities should be considered when designing interventions in this population. Future research should develop strategies to help PCS with additional comorbidities to overcome barriers to engage in LPA and reduce SB.

Armstrong, Calvin

Effect of Changes in Peripheral Resistance on Blood Flow Harmonic Profiles in Humans

Faculty Advisor: Dr. Maureen MacDonald

Co-Author(s): Joshua Cherubini (PhD Student) and Dr. Maureen MacDonald, PhD

McMaster University/Faculty of Science, Department of Kinesiology

INTRODUCTION: The ability of blood flow patterns to induce endothelial cell (EC) structure and function changes is well established. However, these findings are contrasting and unclear. These relationships can be explored more comprehensively in the frequency domain by analyzing the harmonic distributions of arterial waveforms. While the relationship between harmonic distributions and endothelial function are underexplored in-vivo, early research suggests that lower frequency harmonics characterize atheroprotective states. However, regulatory mechanisms that alter harmonic distributions in arteries are not yet understood. One potential mechanism at play may be peripheral resistance. Changes in peripheral resistance may change the magnitude and shape of arterial waveforms, thus changing the harmonic distribution. The purpose of this study is to examine the influence of peripheral resistance on MBV and shear harmonic profiles. **METHODS:** 36 male and female healthy young adults will be recruited to participate in this pre-post interventional study. Peripheral resistance will be manipulated with forearm heating and cooling. Mean blood velocity (MBV) will be measured continuously at the brachial artery via ultrasonography and perfusion will be measured at the cuticle as a proxy for peripheral resistance via laser doppler imaging at baseline and after each temperature stimulus. **EXPECTED RESULTS:** It is hypothesized that changes in peripheral resistance will result in changes to the harmonic profiles of MBV and shear waveforms. More specifically, it is hypothesized that increases in peripheral resistance will increase the relative amplitudes of mid-to-high-range harmonics, while decreases in peripheral resistance will increase the relative amplitudes of lower harmonics for both MBV and shear. **SIGNIFICANCE:** This study aims to advance our mechanistic understanding of the association between atheroprone haemodynamic states and frequency-domain profiles in-vivo. Furthering an understanding of the mechanisms regulating harmonic frequency profiles will increase our ability to explain and predict haemodynamic adaptations to different stimuli.

Attia, Dina

Using Ultrasonography to Non-Invasively Assess Site-Specific Body Composition in Healthy Pregnant Persons Compared to Age, BMI, and Exercise-Matched Controls

Faculty Advisor: Kirsten Bell

Co-Author(s): Brinda Prapaharan

McMaster University/Faculty of Kinesiology

Background: Traditional body composition assessment tools are either unsafe, inaccessible, or inaccurate in pregnant populations. However, ultrasonography is a body composition tool that has been validated in healthy non-pregnant populations and may help in assessing body composition in pregnant populations.

Ultrasonography can provide information regarding site-specific body composition, while simultaneously minimizing the drawbacks of traditional body composition measures. Presently, only one study has assessed site-specific fat thickness using ultrasound in pregnant populations, whilst none have assessed other components of body composition in pregnant populations using ultrasound. Purpose: To characterize site-specific body composition in a pregnant individual through describing fat thickness, muscle thickness and muscle quality in various body-sites. Additionally, we aim to compare fat thickness, muscle thickness and muscle quality in a pregnant individual to a sex, age, pre-pregnancy BMI and exercise matched controls.

Methods: We aim to recruit 18 pregnant persons who are 14-28 weeks gestation, as well as 18 non-pregnant controls matched for age, sex, pre-pregnancy BMI and physical activity levels. All participants must be free of metabolic diseases, have no joint replacements/surgical implants, and non-smokers. Non-pregnant controls must be at least one-year post-partum if previously pregnant, and must not be breast-feeding. Using a B-mode ultrasound and a multi-frequency linear array transducer (18L5: 6-18 MHz), we imaged nine body sites on each participant: the anterior and posterior upper arm, the anterior and posterior upper and lower leg, the abdomen, the subscapular region, and the forearm. Fat thickness, muscle thickness, and muscle echo intensity were measured in each image. A two-tailed paired t-test will be used to test for differences in fat thickness, muscle thickness and muscle homogeneity between the pregnant and non-pregnant participants. Conclusion: This study will help us understand site-specific changes in body composition during pregnancy, and predict whether individuals may be at greater cardiometabolic health risks.

Badwal, Anchal

Assessing quality participation experiences in sports facilities intentionally designed for inclusion

Faculty Advisor: Dr. Kelly Arbour-Nicitopoulos

Co-Author(s): Roxy Helliker O'Rourke

University of Toronto

Participation in sport can provide numerous physical, mental, and social benefits. Despite these benefits, sport participation rates amongst persons with disabilities continue to be lower than the general population. Quality sport experiences are theorized to lead to sustained physical activity participation. A quality participation experience is achieved when individuals view their involvement in sport to be satisfying and enjoyable and are able to achieve valued outcomes. Within the disability sport literature, quality participation experiences have been shown to result from satisfying one or more of six building blocks - autonomy, belongingness, mastery, challenge, engagement and meaning - across the physical, program, and social environments of sports. To date, limited research has examined whether sport facilities that are intentionally designed to be accessible and inclusive to persons with disabilities are facilitating quality sport participation experiences. The purpose of this study was to understand how the design and programming of sport facilities that are designed to be

'accessible' and 'inclusive' translate, or not, to quality sport participation experiences for persons with disabilities. Semi-structured interviews are being conducted with sports administrators and programmers responsible for implementing recreation, leisure and/or sports activities within sport facilities intentionally designed for inclusion of persons experiencing disability. The interview guide is structured according to the six building blocks of quality participation to assess the program staffs' perspectives of the interactions between quality participation experiences within the program, social and physical environments, and the inclusive design of the physical space. The ongoing interviews will be transcribed and analyzed using reflexive thematic analysis. The findings from this study may assist in addressing whether sport spaces that are designed for inclusion drive more progressive programming and foster quality participation experiences for individuals with disabilities.

Bagri, Gurleen Kaur

Targeting vascular and skeletal muscle health to improve quality of life in males and females with type 1 diabetes: Trial protocol development and refinement

Faculty Advisor: Dr. Maureen J MacDonald

Co-Author(s): Gurleen K Bagri, Matthew I Badour, Khandra N Barrett, Kenneth S Noguchi, Dr. Maureen J MacDonald, Dr. Thomas J Hawke, Dr. Irena A Rebalka

McMaster University/Faculty of Science, Department of Kinesiology

Diabetes is a chronic disease characterized by states of hyperglycemia. Type 1 diabetes (T1D) accounts for 5-10% of diabetic cases globally and approximately 300,000 people in Canada. Research on T1D shows declines in skeletal muscle (SM) health, through greater declines in SM strength and greater SM dysfunction compared to controls. T1D also affects vascular health, characterized through increased cardiovascular disease risk, hypertension, and diabetic retinopathy. Exercise training results in improvements in the microvascular and macrovascular function in individuals with type 2 diabetes; however, limited research is available on exercise training effects in those with T1D. The purpose of the larger study is to determine whether the current exercise guidelines for individuals with diabetes illicit healthy adaptations in those with T1D. This sub-project will focus on the development and refinement of the intervention and optimizing testing-day protocols. Participants will undergo an exercise training protocol that consists of 150 minutes of moderate-to-vigorous intensity aerobic exercise and 2 resistance training sessions per week, which meet the current exercise guidelines published by Diabetes Canada. The activity will be tracked using wearable technology. The intervention details will be adapted to align with the T1D Exercise Initiative (T1-DEXI) by the Helmsley Fund to compare with and contribute to their existing data. The current study involves 12-weeks of home exercise training, and thus the protocol development must consider approaches to increase compliance and adherence to the intervention. An exercise calendar will be developed with guided videos to help aid in the ease of exercise completion, with one mandatory T1-DEXI video biweekly. The testing-day protocol will also be optimized. Doing this prior to the initiation of the full-scale study will ensure that the exercise regime, wearable technology, and testing-day protocol we are proposing is feasible for both participants and researchers.

Baumgarten, Sydney

The Effect of Exogenous Ketone Supplementation on Exercise Efficiency in Endurance-Trained Adults

Faculty Advisor: Dr. Martin Gibala

Co-Author(s): Jack Bone, Dr. Martin Gibala

McMaster University/Department of Kinesiology

Exercise efficiency is broadly defined as the relationship between energy output and energy input during exercise. Exogenous ketone supplements have been suggested to acutely alter physiological responses during exercise. There are limited and equivocal data regarding the effect of this practice on exercise efficiency. The potential influence of supplement dose and relative exercise intensity are also not well understood. Purpose: To clarify the effects of ketone monoester supplementation on exercise efficiency in endurance-trained adults. We hypothesize supplementation will alter exercise efficiency compared to a placebo. Methods: Thirty healthy, endurance-trained adults are being recruited for this ongoing randomized, double-blind, placebo-controlled, crossover study. To be eligible, individuals must habitually consume carbohydrates (>50 g/d), engage in endurance exercise for at least 3 h/wk, and have an estimated peak oxygen uptake in the 90th percentile for age and sex. Participants complete three exercise trials after familiarization and baseline testing. One of three volume-matched drinks is ingested 30 min prior to exercise: either 600 or 300 mg/kg of a ketone monoester supplement, or flavour matched placebo. A single venous blood sample is obtained at rest and analysed for the ketone body β -hydroxybutyrate prior to exercise. The protocol involves a four-stage incremental cycling test, with the intensity for the first three 5-min stages corresponding to 75%, 100% and 125% of individual ventilatory threshold. This is followed by a ramp increase to volitional exhaustion in which the intensity increases by 1 watt every 2 seconds. Expired gases and ventilation rate are measured continuously, and peak power is also measured on test cessation, for the determination of exercise efficiency. Heart rate and rating of perceived exertion using the 20-point Borg scale are also recorded at the end of each test stage. Significance: This study will advance knowledge regarding the effect of ketone supplementation on exercise responses.

Bedi, Anjali M.

Investigating the impact of high-intensity interval training on deficits in mood and changes in inflammation after acute sleep restriction.

Faculty Advisor: Dr. Jennifer J. Heisz

Co-Author(s): Connor Gibala and Dr. Jennifer J. Heisz

McMaster University/Department of Kinesiology, Faculty of Science

Sleep is crucial in determining a person's mood, ability to regulate stress, and future health outcomes. Past studies demonstrate correlations between acute sleep restriction (2-4 hours for one night), negative mood states (anxiety, aggression, depression), and markers of inflammation. Inflammation has been established as a critical player in negative mood states and may also be imperative in understanding the relationship between poor sleep and mood. Current treatments targeting sleep restriction and negative mood states involve a combination of pharmacological interventions and counselling, leaving out individuals that may have aversions surrounding these treatment types. Exercise has shown promising results in improving overall mood and reducing inflammation in various populations. Therefore, this research aims to explore whether high-intensity interval training (HIIT) can improve mood and inflammation levels after one night of sleep restriction in young adults by analyzing objective measures of sleep physiology and inflammation and subjective measures of mood. We will employ a within-subject randomized control trial study design spanning over two weeks. Using the Depression, Anxiety, and Stress Scale - 21 items (DASS-21), the State-Trait Anxiety Questionnaire - 6 items (STAI-6), the Positive and Negative Affect Scale (PANAS), and the State Hostility Scale, participants' mood will be assessed prior to and after a night of sleep restriction under the sedentary and exercise conditions. In addition, inflammatory levels will be analyzed via a blood draw that will occur in the morning before and after sleep restriction. Sleep physiology will be assessed by examining deep sleep intensity,

delta-wave activity, sleep spindle length, heart rate variability, and sleep efficiency, monitored through an at-home dry EEG device known as a Muse-S. The information gathered will help to review the role of inflammation in sleep-induced mood deficits and how therapies such as exercise can be leveraged to relieve psychological and physiological symptoms of poor sleep.

Bell, Jamie

Quadriceps muscle size and echogenicity correlate with physical function in Idiopathic Pulmonary Fibrosis

Faculty Advisor: Dr. Daniel West & Dr. Jenna Gillen

Co-Author(s): Sahar Nourouzpour, Ryan Koh, Dinesh Kumbhare, Jenna Gillen, Dmitry Rozenberg, Daniel West
University of Toronto

Intro: Idiopathic pulmonary fibrosis (IPF) is the most common form of interstitial lung disease (ILD). Frailty and fat-free mass loss are strong predictors of health-related quality of life as well as mortality in ILD. Ultrasound imaging is a clinical-friendly tool that can identify low muscle cross-sectional area (CSA) and muscle fat infiltration (high echogenicity) contributing to frailty. This study aimed to explore correlations between rectus femoris CSA, echogenicity, and measures of physical function in IPF patients. Methods: 14 IPF patients (13 male, 1 female) underwent body composition assessment (bioelectrical impedance), quadricep ultrasound imaging and functional testing at Toronto General Hospital. Functional testing consisted of a 6-Minute Walk Test (6MWT), quadriceps force measurement, the Short Performance Physical Battery (SPPB) and gait speed (GS) assessment. Rectus femoris (RF) CSA and echogenicity were determined using B-mode ultrasound. Results: RF echogenicity was strongly correlated with 6MWT and quadriceps force ($r=-0.66$, $p=0.05$; $r=-0.63$, $p=0.03$; respectively); correlations of RF echogenicity with SPPB and gait speed were moderate/weak ($r=-0.39$ and $r=-0.27$, respectively; NS). RF CSA and gait speed were strongly correlated ($r=-0.78$, $p=0.009$). RF CSA and 6MWT and quadriceps force were moderately correlated ($r=0.59$, $p=0.1$; $r=0.45$, $p=0.14$; respectively). RF CSA and SPPB were weakly correlated ($r=0.40$, NS). RF echogenicity was correlated with body fat % ($r=0.65$, $p=0.02$) but not subcutaneous adipose tissue thickness ($r=0.02$). Preliminary machine learning analysis of 31 texture features of US images suggests that machine learning may be useful in predicting functional outcomes (mean absolute error percentage of 20-30%, actual vs. predicted). Conclusion: These findings suggest that skeletal muscle echogenicity is coincident with increased body fat (%) and is negatively correlated with physical function in IPF patients. Ultrasound-based assessment of limb muscle CSA and echogenicity may be useful in prognosis and treatment monitoring in chronic lung disease.

Boada Herrera, Daniela Daisy

The risk of lower extremity injury in the public post-concussion

Faculty Advisor: Timothy Burkhart

Co-Author(s): N/A

University of Toronto

There have been novel studies that suggest post-concussion athletes are at an elevated risk of a lower extremity injuries months or years after their initial injury. This population is seen to have decreased knee flexion, and increased hip flexion which increases the risk of an anterior cruciate ligament injury. Nonetheless, there is little knowledge on the modifications of movement patterns that post-concussion individuals may experience. This study will examine the kinematics of a jump and cut motion during a dual task of individuals with concussion histories that have little recreational to no activity levels (test group) and compare them to

individuals that have not sustained a concussion (control). Knee flexion /angle, initial contact, external rotation of the knee, relative vertical center of mass, hip flexion and time to stabilize joint were evaluated during the study. The hypothesis of the study was that the post-concussion group will demonstrate motor impairments movement such as: decreased knee flexion, increased center of mass displacement, decreased external knee rotation, decreased knee flexion angle at initial contact of the ground from a jump, increased hip flexion, increased knee moment, decreased knee angular excursion, decreased reaction time, increased double support, longer time to single leg stabilize and greater vertical ground reaction force. These movements have been linked to increased risk of lower musculoskeletal injury and occur more on a single leg rather than double leg. The purpose of this study was to identify if individuals with little to no activity have the same risks as higher-level athletes when they are moving on a single leg and engaging in a cognitive dual task post-concussion.

Brar, Navraj

Characterizing Exercising Habits and Atrial Fibrillation in Middle-Aged Endurance Runners

Faculty Advisor: Robert Bentley

Co-Author(s): Sinan Osman, Robert F. Bentley

University of Toronto

Background: It is well known that regular physical activity reduces all-cause mortality. However, some evidence suggests that high intensity endurance sport participation and training over long periods of time may increase the risk of atrial fibrillation (AF) by 3- to 5-fold of that seen in healthy individuals, although this is not well described. Purpose: We wanted to characterize lifetime exercise habits while comparing the prevalence of AF in marathon and 5-10km runners. Methods: Participants at least 55 years of age who have run at least one marathon or 5-10km race were recruited from running organizations across Canada. Data was collected via a self-administered online questionnaire detailing the athlete's health status and lifetime exercise training history including race participation. Results: Data are presented as median (Q1-Q3). In total, 349 runners started the survey with 82 (75% marathon runners) completing the survey. Marathon and 5-10km runners were not different with respect to age [61 (58-65) vs. 63 (59-69) yrs, $p=0.137$], body mass index [22.1 (20.6-24.3) vs. 23.5 (21.4-26.1) kg/m², $p=0.138$], age at first race [45 (34-51) vs. 49 (33-55) yrs, $p=0.32$], or lifetime kilometres ran [2600 (1092-6018) vs. 2005 (729-3788) km, $p=0.328$]. Marathon runners ran fewer respective races [8 (3-20) vs. 19 (12-35) races, $p=0.002$], raced less recently [56 (51-60) vs. 61 (58-69) yrs, $p<0.001$], and had shorter racing careers [9 (4-19) vs. 16 (8-24) yrs, $p=0.02$]. In total, three athletes (3.7%) had AF, 2 of whom were marathon runners. Conclusions: Runners of marathons and 5-10km races do not differ in their lifetime exercise habits, although marathon runners participate in less races and have a shorter racing window. A larger sample size is required to confidently explore factors predisposing middle-aged endurance runners to AF.

Butler, Nick

The effect of visual context on goal-directed reaches to multisensory targets

Faculty Advisor: Gerome Manson

Co-Author(s): N/A

Queen's University/Kinesiology

When reaching for a cup of coffee on a crowded table, visual information about the position of objects on the table must be factored into the movement plan. Previous studies have found that movements to visual targets

were more accurate when non-target visual information (e.g. visual contextual cues) were present in the reaching environment compared to when reaching in a dark environment. Although visual contextual cues play a role in movement planning to visual targets, it is unknown if this information is also used when planning movements to non-visual targets such as somatosensory targets (e.g., body positions). The goal of the present study is to determine if the presence of visual contextual cues influences movements to somatosensory targets. Neurologically-healthy participants performed upper limb reaches to unseen somatosensory targets (e.g., fingers on the non-reaching hand) and seen visual targets. Participants performed movements to both target modalities with and without contextual cues (e.g., non-target light emitting diodes [LEDs]). To assess the impact of contextual information, radial error (i.e., errors in movement amplitude with respect to target position) and angular error (i.e., angular difference between the movement vector and the hand-target vector) were computed. Initial results revealed that participants had lower radial error when reaching to somatosensory as compared to visual targets. Furthermore, similar to previous studies, participants had lower radial error when reaching to visual targets with contextual cues present. Critically, the presence of contextual cues did not influence radial error when reaching to somatosensory targets. Overall, these results provide evidence that visual contextual information may be important when planning and reaching to visual targets and less relevant when reaching to somatosensory targets. Thus the findings of this study argue that environmental sensory information may be weighted differently depending on the task and sensory conditions.

Chan, Cassie

"Don't do this" vs. "do that": The influence of instruction on interference effects from observed actions.

Faculty Advisor: Dr. Timothy Welsh

Co-Author(s): Kristina Knox, Xiaoye Michael Wang, Jay Pratt, Jonathon S. Cant, Timothy Welsh

University of Toronto

During the execution of goal-oriented actions, perceived incongruency of an observed movement from another person may result in an interference effect in which the contradicting movements interrupts the motor codes of the desired behaviour. In this process, the observation-evoked response codes activate the same mechanisms as response codes that arise internally with voluntary movement. This conflict can present itself in executed actions, with the observer completing their motor plan with features that do not align with their desired behaviour, but rather include manifestations of the differing movements observed from the contradicting movements of another. To investigate the effects of task instruction on this contagion effect, the present study aimed to investigate the impact of ironic processing, a phenomenon that involves the tendency to perform an action that is intended to be avoided. Participants ($N = 23$, $\text{Mage} = 20.5 \pm 1.0$ years) simultaneously completed cyclical horizontal arm movements while observing a recorded individual on a projector. The observed movements consisted of congruent (horizontal) or incongruent (vertical) arm movements along with visual and verbal instructions that were either positive ("keep movements as flat/horizontal as possible) or negative ("do not make any up or down/vertical movements"). Participants' arm movements were recorded and deviations from the main horizontal trajectories were analyzed. The results indicate a significant relationship between task instruction and perceived movements ($p = 0.043$). Confirming previous findings in ironic processing, differences in vertical displacements were mainly prominent in the negative instructions during congruent and incongruent trials. But interestingly, the ironic effects were more prominent in vertical displacements in congruent trials rather than increases in the incongruent trials. These results further demonstrate the impact of instruction on higher-order processing to dampen the effects of observation-evoked motor codes on goal-oriented tasks.

Chan, Rebecca

Horizontal vs. Vertical Jumps in Return to Sport (RTS) Test Batteries Post-ACL Reconstruction

Faculty Advisor: Timothy Burkhart

Co-Author(s): N/A

University of Toronto

Horizontal jump tests are by far the most commonly employed test in RTS test batteries for ACLR patients (Roe et al., 2021). However, recent studies have demonstrated persisting lower extremity biomechanical deficiencies in ACLR patients during vertical jump tests despite having been cleared to return to sport (Kotsifaki et al., 2021). The purpose of this study, therefore, is to compare and quantify lower extremity muscle activation of healthy controls during horizontal and vertical jump tasks. Instrumentation of this study includes surface electromyography (sEMG) sensors (Trigno™ wireless system; Delsys Inc. Natick MA) placed bilaterally on the biceps femoris, vastus medialis, vastus lateralis, rectus femoris, semimembranosus, semitendinosus and the medial and lateral heads of the gastrocnemius of healthy participants. Two AMTI force plates (BP600900; Advanced Mechanical Technology, Inc., Water-town, MA, USA) will collect ground reaction forces, and the Biodex™ (Biodex Medical Systems, Inc, Shirley, NY, USA) will measure maximal extension and flexion torque. Kinematic data will be collected using the marked motion capture system, QTM (Qualysis, version 2021.1; Gotenborg, Sweden). The experimental protocol of this study involves maximal voluntary isometric contractions (MVIC) of the hamstrings, quadriceps and gastrocnemius, and a test battery consisting of vertical and horizontal jumping tasks. The test battery includes the single-leg horizontal, single-leg vertical, two-footed vertical and stop jumps, as well as the triple hop, carried out in a randomised order. Data will be analysed using Visual 3D (C-Motion, Kingston, ON), QTM and MATLAB. The vertical jump tasks are hypothesised to yield more quadriceps and hamstring muscle activation and be a better reflection of quadriceps and hamstring strength. Moreover, this study is conducted in the hopes that its findings can contribute to the creation of more stringent RTS test batteries that can better identify readiness to return to sport via biomechanical deficiencies that would be otherwise masked.

Chen, Ryan

The Effect of Exercise Induced Muscle Damage on the Online Control of Upper Limb Reaching Movements

Faculty Advisor: Dr. Gerome Manson

Co-Author(s): Jasmyn Lee, Joshua Aragone-Chiriboga, Sarvenaz Heirani Moghaddam

Queen's University/School of Kinesiology and Health Studies

In daily life and in recreational activities, we may have to make corrections to our movements to achieve our goals and prevent injury (e.g., catching a falling object or recovering from a slip on an icy sidewalk). Adjusting to these perturbations require the coordination and control of multiple muscle groups. Intense training can result in exercise-induced muscle damage (EIMD) which can affect an individual's ability to control their movement post-exercise. The objective of this study is to investigate the effects of EIMD on online control processes. Recreationally active (<3 hours of weekly structured weight training), neurologically healthy, right-handed female participants were recruited. All participants performed four experimental sessions, including: two equipment familiarization sessions (S1-S2), an exercise protocol session (S3), and a 24-hours post-exercise session (S4). In each session, participants' biceps maximal voluntary contraction (MVC) was assessed using a Humac-Norm isokinetic dynamometer. Additionally, participants completed a reaching task using a KINARM exoskeleton robot (BKIN technologies) in S2, S3, and S4. Participants performed reaches to a visual

target position using bicep flexion. To assess online control processes two types of perturbations were introduced. In one set of trials, the target would jump to a new location (TJ trials) on one third of the trials. In another set of trials, a force perturbation (FP trials) would be applied to the elbow joint on one third of the trials. Initial results revealed that participants were more variable in perturbation trials compared to no perturbation trials in both TJ trials and FP trials. Findings of this study could help inform coaches and athletes on EIMD in the context of online control, performance, and injury prevention.

Christendat, Olivia

Investigating the Role Coaches Play During Adolescent Athlete Injury Rehabilitation

Faculty Advisor: Dr. Katherine Tamminen

Co-Author(s): N/A

University of Toronto

Over 33% of high school and middle school children in the USA are estimated to experience a serious injury related to sport participation (Adirim & Cheng, 2003). This is significant as serious injuries at this age could lead to negative effects for adulthood activity levels, mental health disorder development, and long-term quality of life (Haraldsdottir & Watson, 2021). Adolescents who are injured require social support as part of their successful recovery (Bianco, 2001), especially from coaches who are in a unique position to promote positive and appropriate injury rehabilitation strategies (Whatman et al., 2018). There is limited research on what athletes believe the role of the coach should be during adolescent athletes' rehabilitation from injury. The purpose of this study was to investigate what role coaches play during adolescent athletes' injury rehabilitation and return to sport. This study uses a constructivist qualitative approach (Scotland, 2012), where participants participate in a semi-structured interview and complete a timeline of their experiences in sport as an adolescent (Adriansen, 2012). Interviews are being conducted with eight varsity athletes who had previously been injured in sport while they were adolescent athletes. Interviews are currently underway. Initial results have shown that coaches creating opportunities for athletes to remain involved within the team is one way that helps athletes have a more positive and successful injury rehabilitation and experience overall. Participants also expressed that having coaches be relatable and having gone through similar experiences was helpful because they are more likely to understand what they are going through. Initial findings suggest that coaches can help improve adolescent athletes' experiences during rehabilitation by providing access to resources, being understanding and relatable, and providing opportunities for them to stay involved within the team.

Corredoura, Madeleine

Virtually the Same?: Investigating the Execution of Movement in a Virtual World

Faculty Advisor: Dr. Timothy Welsh

Co-Author(s): Xiaoye Michael Wang (University of Toronto), Gabbie Resch (University of Ontario Institute of Technology), Michael Nitsche (Georgia Institute of Technology), Ali Mazalek (Toronto Metropolitan University), Tim Welsh (University of Toronto)

University of Toronto

Virtual reality (VR) is increasing popularity as a medium of training both fundamental cognitive abilities and a variety of specialized occupational skills. Although VR technologies offer promising opportunities, the training efficacy of these technologies remains inconsistent, which may be attributed to a limited understanding of the perceptual-motor processes that underly interactions in VR. Thus, it is crucial to understand how individuals interact with virtual environments to develop effective training programs and interventions. The present study

was designed to examine the execution of movement in VR and its effects on movements in the real/unmediated world. Participants performed a series of goal-directed pointing movements in VR to an Ebbinghaus visual illusion (a central target circle was presented within surrounding circles of varying sizes). When the surrounding circles are small, the central circle is perceived as larger than typical and when the surrounding circles are large the central circle is perceived as smaller than typical. The effect of different annuli surrounding a target was analyzed using the speed-accuracy relationship in conditions where the stimulus was either present or absent during action execution. Results showed that when the stimulus is absent, participants reached a shorter distance and had shorter movement times (MT) compared to when the stimulus was present. MT was found not to be modulated by size of the surrounding circles. However, reach distances differed when surrounding circles were small relative to medium or large in size. Moreover, reaching distances were shorter in a real/unmediated environment after immersion in VR than before immersion in VR. These findings suggest that perceptual-motor processes differ in VR compared to in unmediated environments.

Cushing, Avery

Perceptions of Risky Play from Parents and Children with Disabilities

Faculty Advisor: Kelly Arbour-Nicitopoulos

Co-Author(s): N/A

University of Toronto

Outdoor play is an important part of child development as it provides the space for children to explore and take risks. The current conceptualization of risky play involves play, primarily outdoors, that includes a level of physical injury across six categories outlined by Sandseter (2009). While there is growing support for active outdoor play to be implemented into every child's life, children with disabilities are often not allotted these same opportunities. This may, in part, be due to a lack of understanding of what is considered risky play for children with disabilities. Thus, the purpose of this study was to explore risky play from the perspectives of families of children with disabilities. This study was a secondary analysis of interviews conducted with parents of children with disabilities and their children. The interviews were originally conducted to learn about families' experiences using playgrounds designed to be inclusive and accessible. The interviews, audio-recorded and transcribed verbatim, were analyzed using a hybrid approach that combined both deductive and inductive thematic analyses. The interviews were coded using Sandseter's (2009) six categories of risky play (i.e., great heights, high speeds, dangerous tools, dangerous elements, rough-and-tumble, and disappear or get lost) while also considering unique ways risky play is perceived by the participants. Twenty-three interviews were conducted with parents, two interviews were conducted with children with disabilities, and three interviews were conducted with both present. The qualitative analysis is currently underway, and key themes generated relating to risky play will be presented and discussed. The findings will be situated within the social-ecological model of health to provide a conceptualization of risky play for children with disabilities at the intrapersonal, interpersonal and environmental level. The results of this study can expand our understanding of risky play and inform strategies for supporting risky play in children with disabilities.

da Silva, Sarah

Assessing Aerobic Fitness in Youth with a Chronic Inflammatory Disease

Faculty Advisor: Dr. Joyce Obeid

Co-Author(s): Madelyn M. Byra, Dr. Tania Cellucci, Dr. Maureen J. MacDonald, Dr. Lehana Thabane, Dr. Brian W. Timmons, Dr. Joyce Obeid

Introduction. Aerobic fitness is a powerful marker and an established predictor of cardiometabolic health and cardiovascular disease. Although aerobic fitness testing provides an integrated assessment of metabolic, muscular, and cardiorespiratory function, the test has traditionally been reduced to a single measure of peak oxygen uptake (VO_{2peak}). Existing literature suggests youth with a chronic inflammatory disease (CID) have reduced VO_{2peak} compared to their healthy peers. However, no study to date has comprehensively examined other aerobic fitness testing outcomes. As such, this study aimed to; (1) describe seven cardiovascular and five ventilatory parameters from aerobic fitness tests in youth with a CID, and (2) compare these parameters in youth with a CID to healthy controls. **Methods.** Youth aged 7-17 years with a single, confirmed diagnosis of a CID for ≥ 1 year were recruited from McMaster Children's Hospital subspecialty clinics. Healthy, age-matched participants were recruited from the general Hamilton community. Basic anthropometric measurements were collected followed by a cardiopulmonary exercise test (CPET) using the McMaster All-Out Continuous Progressive Cycling protocol on a cycle ergometer. Descriptive statistics and independent samples t-tests were performed to examine differences between CID and healthy controls. **Results.** Analyses are in progress and will be presented at the Bertha Rosenstadt National Undergraduate Research Conference in Kinesiology and Physical Education. **Significance.** A comprehensive description of CPET parameters in youth with a CID may provide insight into potential underlying physiological pathologies that can serve as the basis for future evidence-based interventions to improve overall health in youth with a CID.

Degilio, Blythe Nikita Haily

Analyzing the relationship between cardiopulmonary constituents during submaximal cycling

Faculty Advisor: Robert F. Bentley

Co-Author(s): Adam N. Di Salvo, Sinan Osman, Robert F. Bentley

University of Toronto

Introduction: The interaction of the cardiopulmonary system can be assessed by exploring the amount of cardiac output (Q) required to facilitate an increase in oxygen consumption (VO_2) by 1 L/min during aerobic physical activity. This is known as the Q - VO_2 relationship and while cardiac and pulmonary responses to exercise are well documented, how the constituents of Q and VO_2 interact while considering the Q - VO_2 relationship is poorly understood. **Purpose:** To examine how cardiac parameters correlate to pulmonary parameters during submaximal cycling while considering Q - VO_2 . **Methods:** Twenty-five healthy individuals (25 ± 5 years, 48% female) completed semi-upright cycling on a tilt-recline table ergometer at a cadence of 70 rpm. Exercise started at 40W and increased by 40W every five minutes until 120W. Pulmonary gas exchange (indirect calorimetry) and central hemodynamics (finger photoplethysmography) were measured continuously and averaged during the final 30 seconds of rest and each intensity. Q - VO_2 was assessed as the slope between 40-120W (Δ from rest). **Results:** The range of Q - VO_2 between individuals was 1.9-15.2 L/min. Exercise resulted in an increase in all cardiac and pulmonary parameters (all $p \leq 0.025$). Correlations between cardiopulmonary parameters were not impacted by Q - VO_2 until 120W. While heart rate was not correlated with tidal volume (TV) or respiratory rate (RR) at 120W, the correlation between stroke volume (SV) and TV was significantly improved accounting for Q - VO_2 ($r=0.358$ to $r=0.565$, $p=0.018$) as was the correlation between SV and RR ($r=0.145$ to $r=0.521$, $p=0.036$) and the correlation between Q and VE ($r=0.280$ to $r=0.751$, $p < 0.001$). **Conclusion:** Accounting for heterogeneity in Q - VO_2 significantly improved correlations between constituents of Q and VO_2

from small/medium to large effect sizes. Individuals with a greater Q-VO₂ also had a greater SV, TV, and RR at a given VO₂. The implications of such require further exploration.

DeNeve, Liam

An examination of sexual dimorphism in human skeletal muscle protein fractional synthetic rates with aerobic and resistance-based exercise

Faculty Advisor: Dr. Stuart Phillips

Co-Author(s): Aaron Thomas, Changhyun Lim, James Mckendry

McMaster University/Faculty of Science (Kinesiology)

Our understanding of how different aerobic and resistance exercise modalities result in distinct phenotypes is incomplete. It is also uncertain if muscle adaptation differs between sexes. When observing muscle protein synthesis rates following exercise, we can separate muscle into myofibrillar and sarcoplasmic fractions, allowing for a more comprehensive understanding of how specific components/ proteins of muscle adapt to exercise. After acute exercise, we investigated fractional muscle protein synthetic responses in 12 young, healthy, untrained males (n = 6) and females (n = 6) using L-[ring-¹³C₆] phenylalanine tracer infusion with a unilateral within-person model. We used a within-person design to minimize between-person variability and conserve resources. Muscle biopsies were performed immediately after and three hours following each exercise bout. We hypothesized that we would not observe sex-based differences in outcomes but that we would observe differences between exercise modes. Unilateral exercise consisted of one leg performing aerobic exercise (AE), and the contralateral leg performing resistance exercise (RE). The AE bout consisted of 40 minutes of single-leg cycling at 65% of peak VO₂. The RE bout consisted of 3 sets x 10 reps of unilateral leg press and leg extension at 80% 1RM. We observed no sex-based differences in the synthesis rates of proteins in either fraction following each exercise bout. We found that RE increased muscle protein synthesis in both the myofibrillar and sarcoplasmic protein fractions, with greater rates observed in the myofibrillar fraction. AE increased the sarcoplasmic and the myofibrillar rate protein synthetic rates, but there were no differences between AE and RE for the rates of sarcoplasmic protein synthesis. We conclude that males and females respond similarly to specific exercise modalities regarding muscle protein synthesis. Future work in this area will be aimed at determining the responses to training.

DiLeo, Stefania

Outcomes of Surgical vs. Non-Surgical Treatments for Femoral-Acetabular Impingement Syndrome (FAIS) in Female Athletes

Faculty Advisor: Dr. Timothy Burkhart

Co-Author(s): Margaret Harrington

University of Toronto

Background: Femoroacetabular Impingement Syndrome (FAIS) is a clinical hip disorder characterized by abnormal articulation of the femur and acetabulum. Bone overgrowth occurs on one or both structures, informing classifications for impingements as pincer-, cam-, or combined-type. Impingements may be treated surgically and/or non-surgically. The prevalence of FAIS tends to be greater among athletes compared to non-athletes and females demonstrate a significantly greater incidence than males, as well as poorer hip-related pain, function, and quality of life (QoL) prior to treatment. Despite this, previous research on FAIS frequently underrepresents females which may account for the poorer treatment outcomes shown in this population.

Objective: To compare the outcomes of surgical and non-surgical treatments for FAIS in female athletes. **Methods:** Five patient-reported outcome measures (PROMs) will be collected remotely from 120 regularly active females (age=18-40 years) who are healthy (n=40) or have undergone surgical (n=40) or non-surgical (n=40) treatment for FAIS. Using Kinovea®, lower extremity kinematics will also be quantified from videos submitted by participants depicting four body-weight squats and four lateral lunges. One-way repeated measures ANOVAs will be used to compare PROMs, maximum squat depth, and peak joint angles at maximum squat depth between the three groups. A multivariate linear regression will be used to determine the relationship between demographics, PROMs, maximum squat depth, and joint angles. **Expected Results:** It is expected that surgery will manage the impingement and mitigate its influence on pre-mature constraint of motion more effectively. Therefore, the surgical group will demonstrate superior PROMs, as well as increased maximum squat depths and peak joint angles, relative to the non-surgical group. However, both FAIS groups will demonstrate inferior PROMs and biomechanics relative to healthy controls. **Implications:** Establishing effective methods for the treatment of FAIS in female athletes will be essential for improving long-term outcomes and QoL within this population.

Dojutrek, Alexandra

Characterizing heart rate responses and postprandial glucose during bodyweight exercise and walking in women with or at-risk for type 2 diabetes

Faculty Advisor: Amy Kirkham and Jenna Gillen

Co-Author(s): Alexa Govette, Rebecca Christensen, Elia Rishis, Stephanie Small, Olivia Lee, Sasha High, Sarah Neil-Sztramko, Catherine M Sabiston, Jenna B Gillen, Amy A Kirkham

University of Toronto

INTRODUCTION: Previous laboratory-based research has demonstrated that high-intensity interval exercise can improve postprandial glycemia. However, exercise is often performed at a pre-determined intensity with specialized equipment, which may not reflect exercise performed at home. Whether unsupervised exercise can elicit similar heart rate responses and improvements in blood glucose concentration is unknown. **PURPOSE:** To characterize the self-selected exercise intensity of unsupervised walking vs. bodyweight interval exercise (BWI) and the association with postprandial glycemia in older women. **METHODS:** 86 women (age: 60 ± 6 yr, BMI: 31 ± 7 kg/m²) with (pre)diabetes or a moderate-to-high Canadian Diabetes Risk score (≥ 21 points) were recruited from across Ontario, Canada. In a randomized and counterbalanced order, participants performed 15 minutes of video-guided BWI (8 x 1-min, with 1-min rests) or a 30-minute walk (WALK), or a non-exercise control (CTL) after free-living dinner on three separate days at home. Participants were instructed to walk at a self-selected moderate pace or complete as many repetitions as possible. Blood glucose concentration and heart rate were measured by continuous glucose monitor and physical activity tracker, respectively. Self-selected exercise intensity was characterized by mean and peak percentage of heart rate reserve (%HRR). Pearson's correlation was performed to determine the relationship between %HRR and 3h postprandial glucose incremental area under the curve (iAUC). **RESULTS:** All sessions were completed without adverse events. Mean %HRR (59 ± 12 vs. 54 ± 12 , $p < 0.001$) and peak %HRR (88 ± 15 vs. 75 ± 18 , $p < 0.0001$) were higher in BWI vs. WALK. No significant linear correlation was found between %HRR and change in postprandial glucose iAUC (vs. CTL) for either session. **CONCLUSION:** Older women can safely and effectively complete unsupervised BWI at a higher intensity than walking. However, self-selected exercise intensity was not correlated with postprandial glucose iAUC. Further research investigating volume-matched, at-home exercise is needed to understand the effect of exercise intensity on postprandial glucose regulation.

Dunchych, Matthew

Sound the Alarm: How Anatomy Bell-Ringer Exam Structure Changes Can Affect Student Anxiety

Faculty Advisor: Dr. Danielle Bentley, and Dr. Catherine Amara

Co-Author(s): Dr. Danielle Bentley

University of Toronto

Background: Healthcare is a complex and demanding field that requires a thorough understanding of the human body. As such, human anatomy is a foundational subject in healthcare education that traditionally includes "bell-ringer" laboratory exams. These are often associated with high levels of stress and anxiety among students. Given the known negative impact of stress and anxiety on academic performance, it is crucial to identify strategies that can mitigate these effects. Altering the traditional structure of "bell-ringer" anatomy exam may reduce student stress. Aim: This directed reading project aims to 1) investigate the impact of laboratory exam structure on student test anxiety and academic performance, and 2) explore student perceptions of the laboratory exam experience. Methods: Related literature was reviewed, in duplicate, and salient information extracted. Initial sources were provided by the primary investigator, with additional sources identified from associated reference lists. Exam structure elements of interest were examination timing, collaborative testing components, and exam-room environmental changes. Results: 18 articles were included for review. It was determined that giving students additional time to complete the laboratory examinations reduced test anxiety and improved test taking experience. Despite this, the effect of additional total time on academic performance was mixed and inconsistent. Collaborative testing did not affect test anxiety, but significantly improved academic performance. Finally, environmental changes like aromatherapy and playing classical music had no effect on test anxiety or academic performance but did improve test taking experience. Implications: These findings suggest that exam structure modifications, depending on the modification, can reduce student test anxiety, improve academic performance, and enhance students' experience of the anatomy "bell-ringer" laboratory exam. Interestingly, no singular modification appears to address all components significantly. Integration of several modifications may be meaningful for future research.

El-Iskandarani, Jadd

The individual and combined effect of leucine-enriched essential amino acid ingestion and resistance exercise on mTORC1 signalling in human skeletal muscle

Faculty Advisor: Dr. Daniel Moore

Co-Author(s): Cassidy Tinline-Goodfellow, Paul Babits

University of Toronto

The mechanistic target of rapamycin complex 1 (mTORC1) is a primary regulator of protein synthesis in skeletal muscle. Muscle contraction and/or essential amino acid ingestion (primarily leucine) stimulate mTORC1 activation. Studies suggest mTOR translocates to the periphery of skeletal muscle fibers with amino acid ingestion alone and with resistance exercise, however, exercise effects alone are unclear. The purpose of this study was to examine the effect of resistance exercise, leucine-enriched essential amino acid (LEAA) ingestion, and a combination of the two stimuli on mTORC1 signalling and its subcellular translocation. Young, healthy participants (n=5; 4M/1F) performed unilateral lower-body resistance exercise to volitional failure. Following exercise, participants consumed a LEAA beverage (4 g total EAAs; 1.6 g leucine) to enhance muscle protein synthesis or an isocaloric placebo (PLA; maltodextrin). Phosphorylation of mTORC1 targets were measured via

Western blotting as a proxy for activation at baseline and 4 h post-exercise. Localization of mTORC1 activation will be detected via immunofluorescent staining of p-RPS6 Ser240/244 - a downstream readout of mTORC1. Preliminary (nutrient-blinded) results revealed a main effect of exercise on increased ($P < 0.01$) p-RPS6 Ser240/244 phosphorylation and with a trend for ($P = 0.055$) p-4E-BP1 Thr37/46 phosphorylation irrespective of nutrition. p-mTOR Ser2448 and p-ERK1/2 Thr202/Tyr204 phosphorylation did not significantly change with exercise and/or nutrition ($P > 0.05$). These results confirm that exercise is a greater stimulus for mTORC1 activation compared to LEAA consumption. The lack of effect of LEAA may be related to biopsy timing being inadequate to capture amino acid-induced mTORC1 activation. Consistent with Western blotting results, future immunofluorescence analysis is expected to reveal a main effect of exercise on increased p-RPS6 Ser240/244 phosphorylation in the periphery of the muscle fiber irrespective of nutrition.

Elsayed Elghobashy, Mohamed

The Effects of Interstitial Glucose on Neuromuscular Fatigue

Faculty Advisor: Arthur J. Cheng

Co-Author(s): N/A

York University/Faculty of Health

Endurance exercise performance is determined by the energy demand of the exercise being met by energy supply, with one such energy supply being carbohydrates consumed as food that increases glucose availability to be used by the neuromuscular system during exercise. However, glucose has not been previously deemed as a rate limiting cause of exercise-induced fatigue. Thus, the goal of this research is to identify whether fatigue during voluntary endurance exercise performed in humans is associated with fatigue-associated changes in interstitial glucose levels assessed with a continuous glucose monitor (CGM), and further we aim to distinguish whether fatigue-induced changes in interstitial glucose levels are due to central (neural) or peripheral (intramuscular) factors. The fatigue protocol consisted of a paced isokinetic single-leg raising exercise at a contraction intensity of 20% of the maximal voluntary contraction (MVC) torque, resembling submaximal endurance exercise. The magnitude of central and peripheral fatigue was evaluated on an intermittent basis using a combination of low and high frequency stimulations and the interpolated twitch technique (ITT) to discern the central and peripheral origins of fatigue. Participants, through a randomized cross-over design, ingested carbohydrates in the form of simple sugars in one condition and a flavour-matched placebo in another condition while performing the endurance exercise task. This was all performed while tracking in regular time intervals the live interstitial glucose readings generated by the CGM. It was hypothesized that time to task failure will be higher in the carbohydrate feeding condition in comparison with the placebo. Additionally, the carbohydrate condition was also hypothesized to show less evidence of central as well as peripheral fatigue.

Fabiano, Madeline

Exploring Barriers to Physical Activity Participation Post-COVID-19 Restriction Removal Among Female Undergraduate Students

Faculty Advisor: Dr. Erin Pearson

Co-Author(s): Elizabeth Wall

Lakehead University/Kinesiology

Background: Participating in regular physical activity (PA) can aid in preventing and treating various health conditions, yet most Canadians fail to meet national guidelines. Females are particularly likely to experience PA barriers including low self-efficacy, motivation, and comfort. While researched before the pandemic, there is a paucity of studies exploring these barriers in conjunction with the pandemic's trajectory: especially among female undergraduate students. Considering PA's benefits, identifying these barriers is timely and vital.

Objective: The study's purpose was to qualitatively explore barriers to PA participation post-COVID-19 restriction removal among female undergraduate students at a mid-sized Canadian university.

Method: For this descriptive study, full-time undergraduate students who identified as female, were 18 years or older, wanted to become more active, had access to online technology or the ability to commute to the University, and were fluent in English were eligible. A semi-structured interview guide was developed to ask about PA habits, reasons for/barriers to engagement, and COVID-19-related experiences. Data were analyzed inductively, and several strategies were employed to enhance trustworthiness.

Results: Ten participants (M age= 20.6; M year= 3.6) were interviewed one-on-one. Overall, participants' PA behaviour decreased post-COVID-19 restriction removal. According to participants, this was due to limited knowledge on how to structure workouts and operate equipment from years of being provided pre-arranged workouts. A lack of confidence to be active and feeling too intimidated to go to the gym in the absence of an exercise partner were also noted frequently.

Conclusion: Despite pandemic-related restriction removal (e.g., gym closures), participants reported a PA decline suggesting that individual barriers are salient and warrant attention. A better understanding of PA barriers for this population will enable the creation of tailored programs to enhance engagement and the likelihood of experiencing related benefits. To this end, findings will inform the development of a peer-mentorship program.

Grasdal, Simon

A Risky Business: Perceived Risk of Concussion Associated with Intentions Toward Health Behaviours

Faculty Advisor: Fergal O'Hagan

Co-Author(s): Michael Jorgensen

Trent University/Department of Psychology

All sports maintain some level of risk of injury. For contact sports, the risk of concussion is guaranteed to be elevated. Athletes' perception of this risk motivates their adherence to protective health behaviours on and off the pitch. While it is clear from prior research that athlete estimates of likelihood and severity are central driving factors in adherence to health behaviours, the strength of these variables and the associated moderating variables are still unclear. Our goal was to examine these cognitive components of perceived risk and the intent to execute the appropriate health behaviours per the Common Sense Model of Illness Representation presented by Diefenbach and Leventhal (1996). We predicted that higher estimates within severity and likelihood components would lead to greater intention toward health behaviours. Additionally, we predicted that retrospective adherence to these protective behaviours would also be related to greater estimates of severity and likelihood. Finally, we hypothesized that optimism bias would be a moderating variable for estimating direct likelihood and intentions toward health behaviours. Results were achieved using a series of regression analyses on data collected for two prior studies (N = 315, 57% male) using standard measures of risk representation. Results indicated that factors of Schmitt and colleagues' (2021) updated concussion perception questionnaire contributed to the association between risk estimates and intention toward health behaviours. These results illustrate that a complete understanding of the injury is more likely to result in intentions toward health behaviours but also indicate the need for further research into the motivating factors behind health intentions and behaviours.

Hadayeghi, Leili

The Influence of Meeting Physical Activity and Sleep Duration Guidelines on Psychological Distress Levels in Children with a Chronic Medical Condition or Disability

Faculty Advisor: Dr. Brian Timmons

Co-Author(s): Madelyn Byra, Dr. Mark Ferro, Dr. Joyce Obeid

McMaster University/Faculty of Kinesiology

Physical activity (PA) and sleep duration (SD) are movement behaviours that collaboratively influence the psychological distress levels of adolescents. PA and SD have been investigated independently in children with a chronic medical condition or disability (CMCD), but never collectively in the context of their relationship with psychological distress. Current literature has established that children with a CMCD tend to participate in less physical activity and sleep less than their healthy counterparts, while often exhibiting greater psychological distress than their healthy peers. Therefore, this study will examine (1) the effects of meeting PA and SD guidelines on the psychological distress levels in children with a CMCD; (2) whether PA or SD has a more significant impact on psychological distress levels in children with a CMCD. Children ages 12-17 years with a diagnosis of a CMCD for ≥ 1 year are being recruited from the McMaster Children's Hospital clinics, previous studies from The Child Health & Exercise Medicine Program, and social media. Health surveys are used for data collection. Groups will be compared using a one-way ANOVA, followed by Bonferroni comparisons. Analyses are in progress and will be presented at the National Undergraduate Research Conference. This study may provide insight into how meeting PA and SD guidelines impact the psychological distress levels of children with a CMCD and add to the collective importance of movement behaviours. This may aid in mitigating condition-related symptoms to improve the quality of life of children with a CMCD.

Haddadi, Ghazal

Exploring Whether MDM2 SNP309 is a Genomic Determinant of Cardiorespiratory Fitness

Faculty Advisor: Emilie Roudier

Co-Author(s): Brian Lam, Loren Yavelberg, Veronica Jamnik, Emilie Roudier

York University/Faculty of Health

The predominant index of cardiorespiratory fitness (CRF) is maximal oxygen consumption (VO_{2max}). Central cardiac function and peripheral capacity to extract oxygen determine VO_{2max} . Cardiac function supports an efficient O_2 delivery to the muscle, and muscle capillarization favours O_2 extraction. MDM2, murine double-minute 2 plays a role in skeletal muscle angiogenesis and in controlling myocardial hypertrophy. In murine models, expression of MDM2 is required to prevent pathological hypertrophy of the heart, to maintain basal level of capillaries in the skeletal muscle, and for angiogenesis to occur during endurance training. These results question whether changes in MDM2 expression could determine CRF. Both environmental factors and genetics influence cardiorespiratory fitness (CRF). The literature suggests that 22-57% of the variability in VO_{2max} is attributable to genetic variation. Single nucleotide polymorphism (SNP) is a single base pair substitution and the most common type of genetic variation found in the human genome. A single nucleotide polymorphism with T-to-G substitution (SNP309) on the promoter of MDM2 gene is highly frequent in human populations (allele frequency ranging from 0.11 to 0.49). SNP309 enhances transcription, increasing cellular level of MDM2 mRNA and protein. Here, we propose to study whether MDM2 SNP309 could determine VO_{2max} , hypothesizing that SNP309 is critically related to CRF. Saliva samples were collected from 64 York University students aged 22.5 years old. After purification of genomic DNA from saliva, SNP309 (rs2279744) was genotyped using qPCR Taqman Probes. Cardiorespiratory fitness and morphometric data were collected,

including VO₂max, height, body mass, age, and maximal heart rate. Analysis of variance (ANOVA) will be used to compare the effect of SNP309 on VO₂max. The result of this research will contribute to the literature by testing whether polymorphism on the MDM2 promoter could be a genomic predictor of CRF by investigating the relationship between SNP309 and VO₂max.

Hlady, Courtney

Early Specialization and Biomechanical Considerations: Hip Kinematics in Ice Hockey Goaltenders

Faculty Advisor: Dr. Timothy Burkhart

Co-Author(s): Margaret Harrington

University of Toronto

BACKGROUND: Ice hockey goaltenders are at an increased risk of hip and groin injuries due to their highly specialized movement patterns, at end range hip flexion, adduction and internal rotation (FAdIR). Increased pressure for goaltenders to engage in early specialization to achieve an elite status may also increase their risk of sport-specific injuries due to altered movement patterns; however, this has not been quantified. Therefore, the purposes of this study are 1) to compare hip kinematics during goaltending and sport-specific tasks between specialized and non-specialized goaltenders; and 2) to determine the relationship between hip kinematics and patient-reported outcome measures (PROMs). **METHODS:** Current goaltenders (16-25 years) will be recruited and divided into two groups, specialized (n=15) and non-specialized (n=15). A previously-developed questionnaire will be used to determine specialization status based on hockey participation before grade 9 of high school and training greater than eight months of the year. Participants will complete five PROMs to evaluate hip function, pain, physical activity levels, and quality of life. Participants will then perform three trials of five goaltending specific and two sport-specific tasks. An eight-camera markerless motion tracking system will be used to quantify 3D lower extremity joint kinematics. Hip angles and PROMs will be compared between groups using independent t-tests. **EXPECTED RESULTS:** To date, data has been collected on a single non-specialized participant. I expect that the specialized group will demonstrate increased high risk hip motion (i.e., FAdIR) compared to the non-specialized group due to poorer physical literacy. In addition, I expect that the specialized group will report increased pain and decreased function. **IMPACT:** This study will identify high risk movement patterns in specialized and non-specialized ice hockey goaltenders which will inform coaches, athletes and rehabilitation teams in the development of hip and groin injury risk reduction protocols.

Idrissova, Daniya

Validation of a noninvasive amino acid 'breath test' to detect increased anabolic sensitivity in females on oral contraceptives

Faculty Advisor: Daniel Moore

Co-Author(s): Nicki Pourhashemi, Hugo Jern Wai Fung, Jonathan Aguilera, Daniel West, Daniel Moore

University of Toronto

Dietary amino acids (AA) can be used to build new body proteins (i.e., protein synthesis) or utilized as energy (i.e., oxidized). Anabolic sensitivity determines the amount of AA directed toward protein synthesis, which can be enhanced by resistance exercise to support lean tissue (including muscle) growth. In research, anabolic sensitivity is typically measured via invasive (e.g., blood sampling) and/or time-consuming collection methods, making them impractical for use in vulnerable populations or free-living settings. Recently, our laboratory

developed a non-invasive breath test to measure anabolic sensitivity across various populations based on the metabolic fate of the essential amino acid leucine. Although the breath test has been investigated previously in females on their natural menstrual, many Canadian females take oral contraception (OC) (i.e., 43.7% of women not planning to conceive), which might affect protein metabolism. Thus, the purpose of this study is to explore the ability of the breath test to detect exercise-induced increases in anabolic sensitivity in females taking combined OC (COC). We will recruit 10 healthy females (aged 18-35) who are taking monophasic COC. Participants will ingest a carbohydrate (0.75g/kg) and crystalline AA (0.25 g/kg protein modelled after egg protein enriched with 5% [¹³C]leucine) drink at rest (FED) and after a bout of whole body resistance exercise (EXFED) designed to increase anabolic sensitivity. During the following 6h, breath samples will be collected every 20-30 minutes to measure ¹³CO₂ by isotope ratio mass spectrometry and CO₂ production by indirect calorimetry to determine total leucine oxidation (OX). Leucine retention (leucine intake - OX) will be used as a proxy for anabolic sensitivity. We hypothesize that participants will oxidize less leucine during EXFED than FED and validate the use of the breath test to detect increased anabolic sensitivity in females taking COC, a population that is largely understudied in metabolic research.

Isidori, Alexander

Ischemic Preconditioning: Methodological Manipulations

Faculty Advisor: Ira Jacobs

Co-Author(s): Liam O'Brien

University of Toronto

This study investigated the time dependency between the application of ischemic preconditioning (IPC) and the commencement of exercise. Prior research demonstrated that IPC may have an ergogenic impact on exercise performance. Yet, the varying methodologies reported in the literature confound interpretation. Three (n=2 male, n=1 female) moderately (≥ 3 days/week) trained (lower body) individuals participated in four trials: familiarization followed by three conditions: (I) no IPC (CON), (II) IPC short (IPC-S), and (III) IPC long (IPC-L). IPC-S involved a 5-minute delay following IPC application, whereas IPC-L had a 30-minute delay. Participants performed a 10-minute time trial (TT) on an electrically braked cycle ergometer set in isokinetic mode. The objective of the trial was to complete as much work as possible in 10 minutes without being given any indication of time or effort. The study measured oxygen uptake (VO₂), blood lactate levels (mmol/L) after the TT and work done (kJ) during the 10 min TT. Neither IPC condition enhanced performance in comparison to the control condition. IPC-S induced greater total work, peak blood lactate, average heart rate, and VO₂ responses compared to IPC-L. Although a limited sample size, the study indicates that IPC did not improve performance relative to a control trial. Further data collection is required to confirm the observation that all 3 participants performed better with the shorter delay after IPC compared to the longer delay.

Kandappa, Shivanthi

Examining the Association Between TNF- α Levels and Physical Activity in Children with Inflammatory Bowel Disease

Faculty Advisor: Dr. Joyce Obeid

Co-Author(s): Samantha Morin, Madelyn Byra, Dr. Robert Issenman, Dr. Mary Zachos, Dr. Mary Sherlock, Dr.

Nikhil Pai, Emily Brackenridge, Dr. Brian W. Timmons, Dr. Joyce Obeid

McMaster University/Faculty of Health Sciences

Introduction: Inflammatory Bowel Disease (IBD) is a chronic inflammatory disease that causes symptoms such as bloody diarrhea, abdominal pain, weight loss, and fatigue, and has no known cure. Elevated Tumor Necrosis Factor-alpha (TNF- α) is a hallmark of IBD and is a driver of the chronic inflammation seen in children with IBD. Existing evidence suggests that physical activity may regulate TNF- α levels in adult and animal populations, but few studies have examined the link between physical activity and TNF- α in pediatric IBD. Therefore, the aim of this study was to examine the association between habitual physical activity levels and TNF- α concentrations in children with IBD. Methods: Children with a confirmed diagnosis of IBD (Crohn's disease or Ulcerative colitis) between 7-17 years of age with stable medication use were recruited from the McMaster Children's Hospital Gastroenterology Clinics. To assess habitual physical activity, participants wore an ActiGraph GT1M or GT3X accelerometer around the waist for 7 consecutive days. We used ActiLife software to quantify average daily light, moderate, and vigorous physical activity. Blood samples were collected and analyzed in duplicate for TNF- α concentrations using high-sensitivity enzyme-linked immunosorbent assays. Multiple regression analyses were performed to determine the relationship between physical activity intensity and TNF- α . Results: Analyses are in progress and will be presented at the National Undergraduate Research Conference. Implications: Examining the link between physical activity and TNF- α levels may guide the development of future evidence-based physical activity interventions to support health in children with IBD.

Karamanlian, Emma

Bending Over Backwards: Gymnastics Canada, Assault, and Sports Culture: A Media Analysis

Faculty Advisor: Caroline Fusco

Co-Author(s): N/A

University of Toronto

The purpose of this study is to analyze media news articles from the CBC, Global News, and Sportsnet, on their reports of recent abuse allegations within Canadian gymnastics. Amidst gymnasts' calls for an independent investigation into the toxic culture of gymnastics, more athletes have spoken up about their experiences with abuse. The research on toxic sports cultures focus on technologies of the body within high performance athletics and wider sociocultural contexts and the power imbued within coach-athlete relationships. Eight media news articles from the CBC, thirteen from Global News, and eight from Sportsnet were collected from March 2022 to October 2022. A thematic analysis of the media news articles was conducted through coding the articles in terms of forms of abuse (i.e., 'psychological abuse' 'physical abuse'/'sexual abuse'), 'gymnasts' feelings', 'coach-athlete relationship', and 'authority' (i.e., perspectives from Gymnastics Canada, Sport Canada, etc.). From these codes two themes emerged within the news articles. The news articles reported on and used individualized athlete stories and contradictory language when describing the gymnasts' words versus the words of the authority figures. The themes were analyzed within the framework of critical media studies and feminist studies. This study found that the media news articles offer a problematic dual view on the toxic culture of abuse in gymnastics. While the news articles raised awareness of the harassment culture and abuse within gymnastics, the narratives used in the articles also functioned to reinforce power imbalances between authority figures and athletes. The use of contradictory narratives ends up positioning the athletes as empowered but also, problematically, as victims.

Katsiuk, Veronika

The Effect of Limb Dominance on Forearm Blood Flow and Red Blood Cell Desaturation

Faculty Advisor: Dr. Robert Bentley

Co-Author(s): Jacob L. Schwartz, Robert F. Bentley

University of Toronto

Introduction: Red blood cells (RBCs) carry oxygen and the cardiovascular system delivers this oxygen to skeletal muscle. RBC desaturation plays an important role in controlling muscle blood flow. While it has been shown that the dominant limb receives more blood flow during exercise, the impact on RBC desaturation is not well described. Purpose: To explore the effect of limb dominance on muscle blood flow and RBC desaturation during submaximal forearm exercise. Methods: Ten healthy individuals (90% female, 22 ± 2 years) completed four, 3-minute bouts of supine rhythmic forearm exercise: two on each arm, with one at an absolute target of 10kg and the other at a relative target of 30% of the participant's maximum voluntary contraction. Each exercise bout was separated by 10 minutes. Intensity and exercising limb were randomly assigned and counterbalanced. Beat-by-beat measures of forearm blood flow (FBF; ml/min), mean arterial blood pressure (MAP; mmHg) and RBC desaturation (SmO_2 ; %, flexor digitorum profundus) were measured continuously and averaged during the final 30 seconds of rest, exercise and recovery. Results: Data are \bar{x} from rest (mean \pm SD or Median (Q1-Q3)). Maximum voluntary contraction did not differ between left and right arms [27, (24-30) vs. 27, (23-32) kg, $p=0.445$). The absolute intensity of forearm exercise did not differ between left and right arms (6.7 ± 1.2 vs. 7.2 ± 1.5 kg-s, $p=1$), but relative intensity exercise was lower in the left (5.6 ± 2.9 vs. 7.0 ± 3.2 kg-s, $p=0.013$). FBF ($p<0.001$) and FVC ($p<0.001$) increased with exercise and fell during recovery, while SmO_2 ($p=0.087$) and MAP ($p=0.332$) did not differ by time. There was no main effect of condition for any variable (all $p>0.05$). Conclusion: Limb dominance does not impact forearm hemodynamics or RBC desaturation in our cohort, although a greater difference in exercise intensity may have an impact.

Khan, Maliha

Social Identity and Mindfulness of Mental Health in University Students

Faculty Advisor: Dr. Jennifer Heisz

Co-Author(s): N/A

McMaster University/Kinesiology

Introduction: Mindfulness may be effective in managing mental health symptoms in response to stress, anxiety and depression among youth populations which are more vulnerable to negative mental health outcomes. However, majority research utilizes a predominately Caucasian study population, lacking an intersectional approach that accounts for social identity factors such as race and socioeconomic status. The minority stress theory suggests members of stigmatized groups face additional group-specific stressors, leading to larger health disparities. Mindfulness research through an intersectional lens may be a powerful tool to combat stressors and appropriately address mental health in stigmatized student populations. Additionally, many students note they lack access to culturally and socially appropriate mental health resources. Therefore, this study aims to 1) develop an appropriate measurement tool to assess social identity characteristics contributing to privilege in current Canadian society and 2) investigate the impacts of social identity factors on mindfulness of mental health in university students. Methods: We hypothesize that 1) lower social identity privilege will predict lower mindfulness and poorer mental health outcomes and 2) greater perceived discrimination will predict poorer mental health outcomes. Participants will complete an online survey composed of a demographics questionnaire measuring social identity factors as an indicator of privilege. Second, three

measures of perceived discrimination; 1) the Perceived Ethnic Discrimination Questionnaire (PEDQ-CV), 2) the Schedule of Sexist Events Questionnaire (SSE) and 3) the Perceived Discrimination Scale (PDS). Finally two measures of mental health; 1) the Depression, Anxiety and Stress Scale - 21 items (DASS-21) and 2) the Positive and Negative Affective Scale (PANAS). Conclusion: Mindfulness provides a safe, inexpensive, and effective method to combat external stressors daily as a consistent self-regulatory mechanism among student populations. Intersectional-focussed research can enhance mindfulness techniques to target specific stressors faced by stigmatized minority groups to better design mental health resources for diverse communities.

Kozma, Eden

Eyes without a face: Examining the effects of gaze motion and direction on attention in inverted pareidolia faces.

Faculty Advisor: Tim Welsh

Co-Author(s): Rob van der Wel & Tim Welsh

University of Toronto

It is well established that direct gaze (i.e., eyes looking towards the observer) is advantageous in capturing attention in social contexts, in comparison to averted gaze (i.e., eyes looking away from the observer). Furthermore, previous literature demonstrates that sudden direct gaze, which occurs when the eyes abruptly shift from averted to direct gaze, has a greater effect on attention capture than static direct gaze, which involves a continuous gaze at the observer. This effect is present in both upright human and pareidolia faces (i.e., faces that are perceived in non-human objects, such as viewfinders). The sudden direct gaze effect, however, is absent when human faces are inverted due to the disruption of configural processing of the face. The current study investigated whether or not the sudden direct gaze effect is present in inverted pareidolia faces. Participants identified targets presented randomly on one of four inverted pareidolia faces; one depicting static direct gaze, one depicting static averted gaze, one depicting sudden direct gaze, and one depicting sudden averted gaze. Reaction time (RT) to the target was measured to understand the effect of gaze direction and motion on attention capture. The sudden direct gaze effect was not found in inverted pareidolia faces. Although there was a significant effect of motion on RT, there was no effect of gaze direction. These findings are consistent with the inversion effect in human faces and suggest that configural processing is required for gaze cuing effects to emerge with pareidolia faces.

Lal, Dveeta

Comparison of Dominant vs. Non-Dominant Lower Extremity Kinematics in Response to an Anaerobic-Aerobic Fatigue Protocol

Faculty Advisor: Dr. Timothy Burkhart

Co-Author(s): N/A

University of Toronto

The majority of anterior cruciate ligament (ACL) injuries are non-contact in nature with females more likely to sustain an injury in their non-dominant leg compared to males. One potential cause of this is neuromuscular fatigue that results in abnormal lower extremity kinematics that subsequently leads to increased strain on the ACL. However, limited research has focused on quantifying kinematics between legs and sexes in response to localized neuromuscular fatigue. Twenty healthy participants (10 males, 10 females) will be recruited and exposed to an aerobic-anaerobic fatigue protocol: sets of five squat jumps and 20 seconds of high knees until

fatigued. Bilateral surface electromyography (sEMG) data will be collected from 8 lower extremity muscles and the mean power frequency (MnPF) of the EMG signal will be monitored in real-time; decreases in the MnPF have been correlated with the onset of fatigue. Two force plates will measure ground reaction forces and three-dimensional kinematics will be quantified with a markerless motion tracking system. Time to volitional fatigue and objective fatigue (10% decrease in MnPF) will also be measured. A mixed repeated measures ANOVA will be conducted to determine if there are differences in the knee joint kinematics between legs (dominant vs. non-dominant) and sex. Based on current research, it is hypothesized that the non-dominant leg in females will become fatigued faster compared to their dominant leg but that in males, the dominant leg will become fatigued first. This will result in kinematic alterations that are associated with an increased risk of ACL injuries. By comparing the fatigue-related kinematic changes between the dominant and non-dominant leg and between sexes, this research will provide information leading to the development of methods and targeted programs to prevent neuromuscular fatigue in the lower extremity musculature and consequently reduce the risk of non-contact ACL injuries.

Laplante, Amanda

Intraperitoneal Administration of Cardiolipin Enhances Leak Respiration in Skeletal Muscle

Faculty Advisor: Andreas Bergdahl

Co-Author(s): Gabriel Malka, Andreas Bergdahl

Concordia University/Health, Kinesiology and Applied Physiology

Cardiolipin is a phospholipid found in the inner mitochondrial membrane and functions in energy metabolism [1]. Research has demonstrated that cardiolipin is released from mitochondria following myocardial ischemia and reperfusion injury [2]. While smooth muscle cell migration has shown to be affected by cardiolipin [3], its effects on skeletal muscle are unknown. **OBJECTIVE:** Examine the effects of cardiolipin on aerobic capacity and mitochondrial respiration of skeletal muscle in a mouse model. **METHODS:** C57BL/6 mice were randomized to an experimental and a control group (n=8/group). Over a 6-week period, the mice were injected 2x/week with 0.1ml of cardiolipin (0.5mg/ml) or placebo solution. Aerobic capacity was assessed at baseline, week 3 and week 6 on a treadmill at a speed of 16m/min, whereby maximum running time was recorded. Vastus lateralis muscle tissue was extracted and mitochondrial respiratory capacity was measured by high-resolution respirometry. Complex I of the electron transport chain was stimulated via sequential addition of malate (2mM), glutamate (10mM) and pyruvate (6mM). ADP (5mM) was administered to initiate complex I-dependent respiration, followed by cytochrome c (10 μ M) to test membrane integrity. Succinate (10mM) and oligomycin (2 μ g/ml) were used to measure maximal and leak respiration, respectively. Lastly, an FCCP titration (0.25 μ M) was carried out to measure maximal uncoupled respiration. Respiratory control ratio (RCR) and acceptor control ratio (ACR) were calculated. Two-tailed T-tests were used to compare the respirometry data between groups. **RESULTS:** Mice injected with cardiolipin showed strong trends of increased respiration rates. Succinate increased notably but did not show significance, whereas glutamate (p<0.05) and oligomycin (p<0.05) did. No significant differences in functional aerobic capacity, RCR or ACR were seen. **CONCLUSION:** Cardiolipin enhances leak respiration and may have a positive effect on oxidative phosphorylation in skeletal muscle. Future experiments include increasing sample size and analyzing mitochondrial size and density of this tissue.

Larosa, Stephanie

Can Physical Perturbations of the Mouth Modulate Hand Grip Reaction Time?

Faculty Advisor: Luc Tremblay

Co-Author(s): Joelle Hajj & Luc Tremblay

University of Toronto

Athletes constantly verbalize during sport, whether they are calling for a pass or grunting as they hit a ball. This raises the question of whether items in the mouth that affect speech (ie. mouthguards) can affect performance. Previous research has established many relationships between hand and mouth movements. Relevant to the current study, Vainio et al. (2013) found reaction time (RT) for a precision grip to be relatively shorter when /t/ or /p/ was verbalized compared to /k/ or /m/. Conversely, it was seen that power grip RT was significantly longer when /t/ or /p/ were verbalized compared to /m/ or /k/. These results were explained by the compatibility between hand and mouth movement features. Specifically, the tip of the tongue or lips produces the verbalization of /t/ or /p/, resembling a precision grip that uses the fingertips. Conversely, the body of the tongue or lips produces the verbalization of /k/ or /m/, resembling a power grip that uses the whole hand. As such, it becomes relevant to ask if perturbing mouth movements affect hand grip RT. The present study investigated whether limiting lip movement during covert reading interfered with hand grip RT. In one condition, participants read the syllables /ti/ and /pi/ and subsequently completed a precision or power grip. In another condition, participants initiated hand grips alone (i.e. without reading syllables). In both conditions, a lip retractor was occasionally worn to perturb certain mouth movements. It was hypothesized that when wearing the lip retractor, hand grip RT would increase when compatible syllables are displayed (e.g. /pi/ and a precision grip) compared to when the lips are not perturbed. The results will discuss the acute impact and aftereffects of the lip retractor on the initiation of hand grips, providing additional evidence about the relationships between hand and mouth movements.

LeGood, Nigel

The (vari)ability of non-invasive ^{13}C breath test to detect inactivity-induced anabolic resistance in healthy young adults.

Faculty Advisor: Dr. Daniel Moore

Co-Author(s): Hugo Fung, Matthew Lees, Paul Babits, Daniel West, Daniel Moore

University of Toronto

Dietary amino acids (AA) can be used to build new proteins to help maintain lean body mass. Bouts of inactivity can blunt the use of dietary AAs for protein synthesis (especially in muscle); a phenomenon known as anabolic resistance that can lead to losses of lean body mass over time. We have shown that a non-invasive amino acid breath test can detect exercise-induced increases in anabolic sensitivity. Thus, to further explore the tests utility, we sought to determine: i) its day-to-day variability, and; ii) whether it can detect inactivity-induced anabolic resistance. Participants ($n = 13$, 6M/7F, age = $23 + 4.1$) underwent consecutive 3-day habitual activity (HA) (>7000 steps/day) and step reduction (SR) (<2000 steps/day) phases each followed by a metabolic trial. Participants ingested a carbohydrate (0.75g/kg) and AA (0.25g/kg; composition modelled-off egg protein) enriched to 5% L-[1- ^{13}C] leucine beverage followed by breath sample collection over 6-hours to determine $^{13}\text{CO}_2$ enrichment, total leucine oxidation (OX) and leucine retention (RET = intake - OX) as a proxy for anabolic sensitivity. Day-to-day variability was assessed in a separate cohort of participants ($n = 8$, 4M/4F, age = $25.75 + 4.37$). Participant step count was successfully reduced ($10765.5 + 3566.8$ to $1448.2 + 439.9$). OX peaked at ~ 120 minutes post-igestion in both conditions and remained above baseline by 14.0% and

17.6% by 6h in HA and SR, respectively. Although RET was ~2.3% greater in HA than SR, this difference did not reach significance (14.3 + 1.7 and 14.0 + 2.0 mg/kg, respectively; $p = 0.1$). Day-to-day variability data is currently being analyzed. The non-invasive breath test was unable to detect anabolic resistance with short-term (3 day) step reduction in healthy young adults. Insight into breath test variability will better inform on the minimum detectable difference in anabolic sensitivity by this non-invasive breath test.

Lie, Jaynee

How the education given to patients with an mTBI affected their experience/recovery with PPCS

Faculty Advisor: Katherine Tamminen

Co-Author(s): N/A

University of Toronto

Background: Mild traumatic brain injuries (mTBI) or concussions are a commonly encountered injury in children, adolescents, and adults (Wilber et al., 2021). The typical timeframe for recovery of a non-sport-related concussion may take up to three months for adults (Leddy et al., 2012). However, it is estimated that up to 15% of adults with a concussion may take even longer to recover, which has been coined the term persistent post-concussion symptoms (PPCS) (Wilber et al., 2021; Leddy et al., 2012). There may also be an underestimation of PPCS cases, ranging for 5 to 50%, due to a lack of gold standard for the diagnosis and recovery of PPCS (Wilber et al., 2021). Many intrinsic factors such as age, history of concussion, and mental health disorders have been studied in the literature to learn about their effect on concussion and PPCS. However, extrinsic factors such as the education provided to patients has not been studied. Purpose: Therefore, the purpose of this study was to explore how the education given to patients with an mTBI affected their experience/recovery with PPCS. Methods: Five female participants (between the ages of 39 to 50) took part in one-on-one semi-structured online interviews to share their experience with their concussion and PPCS. The interview transcripts were analyzed using thematic analysis to identify main themes regarding their experiences. Results: The main themes identified related to a) the variety and variability of education received, b) the timing of the education in relation to their concussion diagnosis, and c) the impact of the education and the process of getting information about PPCS. Conclusion/implications: The main themes indicate that there is a need for more research and proper education delivery on concussion and PPCS management among health care professionals to improve the experiences and recovery of patients with an mTBI.

Liu, Yikai

Impact of dairy and dairy alternative beverages on whole-body protein balance after exercise in active adolescents

Faculty Advisor: Daniel Moore

Co-Author(s): Nicki Pourhashemi, Hugo Fung, Daniel Moore

University of Toronto

Physical activity is a stimuli to facilitate growth and development of adolescent with dietary protein ingestion providing the amino acid building blocks to support it. Dairy and dairy alternative beverages as whole foods have different food matrices and protein quantities and qualities. Milk has been shown to support post-exercise protein synthesis in adults and children with less known about dairy-free beverages, especially during the critical growth years of adolescence. We aim to determine the effect of whole beverages (2% fat milk and plant-based almond, soy, and rice beverages) on the ability to support whole-body protein synthesis after

exercise in adolescents. Using a single-blinded crossover study design, 8 males and 8 female adolescents (-0.5 to +1.5y within their peak height velocity) will perform a simulated bout of soccer (Loughborough Intermittent Shuttle Test) before consuming in a random order one of four test beverages. All beverages will be consumed over 5h and will be isoenergetic to the quantity of 2% milk (the comparator) provided at 0.3g/kg protein. Whole body protein synthesis will be determined noninvasively according to the indicator amino acid oxidation principle, whereby [¹³C] phenylalanine and excess tyrosine will be added to each hourly beverage to achieve metabolic and isotope steady state. Breath samples will be analyzed for ¹³C₂O₂ to determine phenylalanine oxidation as an inverse proxy for whole body protein synthesis. We hypothesize that 2% milk will promote greater post-exercise whole-body protein synthesis than protein-based dairy alternatives due to greater protein quantity and/or quality.

Lowisz, Caroline

The Efficacy of Protein Supplementation on Muscle Protein Synthesis to Mitigate Sarcopenia in Aging

Faculty Advisor: Dr. Stuart Phillips

Co-Author(s): J. McKendry, A. Nanthakumar, M. MacDonald, C. Lim, B. S. Currier

McMaster University/Faculty of Science

Background: Sarcopenia is characterized by a progressive loss of skeletal muscle mass and function with age. Skeletal muscle mass is determined predominantly by feeding- and activity-induced fluctuations in muscle protein synthesis (MPS). Older adults display a reduced MPS response to protein consumption, known as "anabolic resistance". Consumption of insufficient protein in a skewed fashion, often observed in older individuals, combined with anabolic resistance, exacerbates the rate at which skeletal muscle is lost. We hypothesized that increasing total protein intake, evenly distributing daily protein intake, and improving protein quality would enhance MPS rates in healthy older men. Methods: Thirty-one pre-sarcopenic older men were randomly assigned to 1 of 3 experimental groups: whey protein (WHEY), pea protein (PEA), and a control collagen protein (COLL). During the control phase (days 1-7), participants consumed a standardized diet, with protein intake fixed at the recommended daily allowance (RDA; 0.8 g protein ·kg⁻¹ ·d⁻¹). During the supplement phase (days 8-15), participants consumed the same diet, with an additional 50g of protein/d, as two 25 g protein drinks (WHEY, PEA, or COLL) at the breakfast and lunchtime meals. Deuterated water (2H₂O) was consumed throughout the study, and muscle biopsies were collected on days 1, 8, and 15 to assess integrated rates of MPS. Results: The data for this study are pending, but we hypothesize that MPS will be greater in the supplement phase compared to the control phase. We also hypothesize that consuming WHEY or PEA will enhance MPS when compared with COLL. Conclusions: We propose that increasing protein intake and improving the distribution and quality of protein consumption can potentially increase MPS rates in older men. Preserving skeletal muscle mass is critical for maintaining physical independence and extending an individual's healthspan. This study will contribute to knowledge around optimal protein intake recommendations for aging persons.

Madan, Yasmine

Button battery ingestion in children: Identifying gaps in knowledge, misconceptions, and targets for primary prevention measures

Faculty Advisor: Dr. Nikolaus Wolter

Co-Author(s): Justine Philteos, Adrian L. James, Evan J. Propst, Olivia Ostrow, Nicole McKinnon, Tobias Everett, Nikolaus E. Wolter

Introduction: Pediatric esophageal button battery (BB) ingestions are a devastating and preventable occurrence. Efforts to reduce esophageal BB ingestions have included primary preventative measures. It is integral to assess the public's knowledge about BB injuries to tailor future efforts. **Methods:** Participants were notified about a crowdsourcing survey-based study through the SickKids Twitter and Instagram accounts. Data collection occurred over three months. The study included 5 demographic questions, 3 follow-up questions and 11 survey questions with 4 additional follow-up questions. **Results:** There were 929 completed survey responses. The demographic distribution of study takers indicate that 68% were between 30-50 years old, 74.3% were Canadian, 75.7% had a university degree or equivalent, 82.6% had a yearly income of at least \$70,000 USD, and 37.7% identified as a healthcare worker. The survey found that 69.1% of participants knew that BBs could cause death if ingested and that this information was mostly learned in school (219/929, 23.6%). Only 7.8% (72/929) of participants were aware that the proper way to dispose of a dead BB was to cover it in tape; and only 10.1% (94/929) of participants knew to give children over 12 months old honey to eat after suspected BB ingestion. wrapping BBs in tape before discarding them. Unfortunately, since many BB ingestions are unwitnessed, efforts must still be directed at primary prevention and battery safety. **Conclusion:** The current study provided insight for gaps in the public's understanding of BB injury including: the presentation of injury, the importance of honey after ingestion, and wrapping BBs in tape before discarding them. Unfortunately, since many BB ingestions are unwitnessed, efforts must still be directed at primary prevention and battery safety.

Mahmood, Hassaan

Comparing the Effects of Surgical and Non-Surgical Adolescent Idiopathic Scoliosis Interventions on Overall Posture, Kinetics & Kinematics; A Narrative Review.

Faculty Advisor: Timothy Burkhart

Co-Author(s): N/A

University of Toronto

Rationale: As practitioners of kinesiology and physical education, we should be aware of how bodies outside of the somatic norm behave differently than bodies within it from a biomechanical perspective. Adolescent Idiopathic Scoliosis (AIS) is a prevalent orthopedic disorder that affects the biomechanics of 0.5%-5% of children and adolescents, and 0.2%-0.6% of the general population. Therefore, understanding the unique biomechanics that those with AIS engage in before and after treatment interventions can help tailor physical activity and rehabilitation interventions in a way that promotes health, wellness, and inclusion for an otherwise alienated population. **Aim:** To compare the overall postural, kinetic, and kinematic outcomes of common AIS management and treatment interventions pre- and post- intervention. **Method:** A literature review was done using articles from PubMed, Google Scholar, Scopus, and Medline. Studies included were published between 2008 and 2023, and described the effect that surgical and non-surgical interventions had on lower limb, intervertebral and upper limb posture, kinetics, and kinematics. Search terms included "Adolescent Idiopathic Scoliosis"; "Posture", "Kinematics" or "Kinetics"; and "Exercise", "Bracing", "Fusion Surgery" or "Non-Fusion Surgery". **Expected Findings:** That all interventions significantly address AIS-related compensations of posture, range of motion within and moments at joints throughout the body, though to varying degrees. That consistent bracing will weaken force production and reduce range of motion about the intervertebral and hip joints. That non-fusion surgeries will promote evenly distributed force production and range of motion across effected areas of the spine (segmental motion), while fusion surgeries will lead to a loss of segmental motion, taxing

the intervertebral joints adjacent to the affected area. Conclusion: Surgical and non-surgical approaches significantly impact overall posture, kinematics, and kinetics compared to baseline AIS to varying degrees. Therefore, we must consider the history of interventions undergone when designing physical activity and rehabilitation programs including people with AIS.

Malcolm, Jessica

Mental Health and Performance Support in Canadian Varsity Sport: Current Trends and Promising Practices

Faculty Advisor: Fergal O'Hagan

Co-Author(s): N/A

Trent University/Department of Psychology

University varsity athletes face multiple demands in their efforts to balance school, life and sport - a potentially stressful mix. To varying degrees, universities provide student-athletes with resources to prevent, protect and handle the negative mental consequences that may be associated with student-athlete stressors. However, our understanding of the nature of resources and the extent to which they are making a difference is limited. To provide an overall picture, this research investigated mental health (MH) and performance (MP) resources offered to varsity athletes across Canada. Themes around resourcing and supports relate to navigation, accessing services, capacity building, and practical usage. Concerning barriers to MH and MP supports, financial, motivational, and communicational themes were identified. We offer suggestions to raise the quality of MH and MP resources offered to this population, including a community of practice among varsity support programs to innovate, develop, and share resources.

Malka, Gabriel

Effect of the TRPV4 Ion Channel on Angiogenesis Using an Aortic Ring Assay

Faculty Advisor: Dr. Andreas Bergdahl

Co-Author(s): Vanessa Salucci

Concordia University/Health, Kinesiology and Applied Physiology

Angiogenesis is the physiological process of creating new blood vessels. It is the body's natural healing response to restore blood flow to damaged tissue. In the case of ischemic heart disease, the angiogenic response can be compromised. In the case of cancer research, inhibition of the angiogenic response can be studied as a mechanism to disrupt the growth of cancerous tumors. Calcium ions play an important role in several cellular processes, including cell proliferation and gene transcription. Transient Receptor Potential cation channel subfamily Vanilloid member 4 (TRPV4) is moderately permeable to Ca^{2+} and can be found in endothelial cells, which make up the inner lining of blood vessels. This study investigated the potential link between the TRPV4 channel and angiogenesis using an Aortic Ring Assay (ARA) mouse model. 4-day-old C57Bl/6 pups were euthanized prior to the removal of the aortas. The vessels were cleaned and cut into ± 1 mm wide rings and kept viable in a collagen growth matrix. By exposing the rings to specific TRPV4 agonist (GSK1016790) and antagonist (HC067047), we measured the length and number of new sprouts. The results revealed a significant decrease in number and length of sprouts when rings were exposed to the antagonistic compound and a significant increase in sprout length when exposed to the agonist compound. This study can provide pertinent information on TRPV4 playing an important role as a mediator for intracellular signaling where inhibition and stimulation of the ion channel can potentially be a therapeutic target for vascular

remodeling. Thus, leading to future research on treatment and prevention of diseases dealing with abnormal angiogenic growth

Malouka, Sabrina

Exploring Body Image and Self-Sabotage in Athletes

Faculty Advisor: Dr. Catherine Sabiston

Co-Author(s): Sabrina Malouka, David M. Brown, Catherine M. Sabiston

University of Toronto

Body image has received significant attention as a potential barrier to participation in sport and physical activity, and there is research to suggest a strong relationship between body image and global shame. Self-sabotage, referring broadly to the thought processes and behaviours individuals engage in that ultimately prevent them from achieving their goals, is also strongly linked to shame. However, little is known about whether body image relates to self-sabotage, and how self-sabotage is perceived and experienced in the context of sport and exercise. With this said, the purpose of the current study is to explore (1) how body image develops in athletes over the course of their careers and into retirement (if applicable), (2) how self-sabotage in the context of sport and exercise is perceived and experienced, and (3) how body image and self-sabotage are related within this context. Using a qualitative description approach, 8-10 current or former athletes (aged 18+ years) will participate in semi structured interviews. Framed within a social constructivist paradigm, data will be analyzed using inductive thematic analysis. Knowledge generated from this study may advance our understanding of how self-sabotage is experienced in sport and exercise, and how body image relates to self-sabotage. These findings can advance theory and research on a novel concept, and inform future studies seeking to improve participation in sport and exercise despite barriers relating to body image and self-sabotage.

Morassut, Liam

Sensory Contributions to Piano Learning for Novices

Faculty Advisor: Gerome Manson

Co-Author(s): Jessica Facchini, and Sadiya Abdulrabba

Queen's University/School of Kinesiology and Health Studies

Previous research has examined the sensory contributions involved in expert piano playing, however, limited research has examined the role of sensory information in novice piano learning. The purpose of this study was to investigate the contributions of auditory and visual feedback to music sequence learning in novice participants. Novice piano players (age = 21.7), with no prior musical training, participated in this study. Participants performed a pre-test where they replicated three 7-note piano sequences. After the pre-test, participants practiced the sequences at both 60 and 120 bpm in an acquisition phase. Critically, sequences were practiced in one of three sensory conditions: Audiovisual (both visual and sensory feedback), Audio Only (no visual feedback), and Visual Only (no auditory feedback). Participants' performance was then assessed in a post-test and a 24-hour retention test that was the same as the pre-test. All tests were performed in the Audiovisual condition. A MIDI (Musical Instrument Digital Interface) keyboard was used to evaluate accuracy (i.e., the ability of the learner to hit correct notes) and timing (i.e., the ability to reproduce the correct time between key presses assessed as the average percent difference between the goal and the played sequence). Initial results indicate that training in the Audiovisual condition yielded greater accuracy compared to Visual

Only and Audio Only, with no errors in 100% of retention trials. Regarding timing, training in both Audiovisual and Visual Only conditions yielded better performance (i.e. timing differences of 17.8% and 20.7% respectively) than the Audio Only condition (timing difference = 24.6%). Overall, these results provide evidence that visual information may play a larger role than auditory information in novice piano learning. Thus, for novices, it may be more important to provide visual information about the spatial location and timing of key presses in the early stages of learning.

Mulligan, Quinn

A Comparison Between Horizontal and Vertical Jump Tests Following ACL Reconstruction

Faculty Advisor: Dr. Timothy Burkhart

Co-Author(s): N/A

University of Toronto

This review examines the effectiveness of current Return to Sports (RTS) guidelines following Anterior Cruciate Ligament Reconstruction (ACLR). ACL injuries typically occur with excessive knee abduction moments, and/or excessive anterior translation of the tibia and are most common in individuals aged 20-29. Common mechanisms of injury include intercondylar impingement at the distal region of the ACL, increased compressive loads from quadriceps contraction and co-contraction of the hamstrings. Current RTS guidelines employ, among others, vertical and horizontal jump tests to compare the height and distance achieved bilaterally and/or unilaterally. Vertical jumps have been theorized as the more reliable metric as they require greater knee contributions, resulting in an increased force applied about the knee in take-off and landing periods. Jump tests are evaluated using the Limb Symmetry Index (LSI) that normalizes the strength of the injured limb to the uninjured limb. While current criteria suggest an LSI score of $\geq 90\%$ is acceptable to RTS, as many as 20% of athletes who have successfully passed RTS guidelines sustain a subsequent ACL injury. This suggests that the current guidelines may not be reliable determinants of physical readiness. Therefore, the comparison between vertical and horizontal jump tests is essential for refining guidelines to reduce the risk of reinjury. Three online databases will be utilized (PubMed, EMBASE, MEDLINE). Search terms will include anterior cruciate ligament reconstruction, anterior cruciate ligament injury, anterior cruciate ligament surgery, return to sport, horizontal jump and vertical jump. The search will assess the effectiveness of horizontal jump tests as an intervention, compared to vertical jump tests as a control. The outcomes that will be assessed are reinjury rate, and level and duration of participation. It is expected that vertical jumps will prove to be the more reliable assessment due to the increased stresses placed on the knee.

Nguyen, Luke

The effect of an acute bout of isometric handgrip exercise on brain function indices

Faculty Advisor: Dr. Jeremy Walsh

Co-Author(s): Keegan Nhan and Jeremy Walsh

McMaster University/Faculty of Science – Department of Kinesiology

Introduction: Performing whole body exercise is a proven intervention strategy for improving cognition. Interestingly, performing small muscle mass exercise, like isometric handgrip exercise (IHG), may also be a strategy to transiently improve cognition. The underlying mechanism may be the exercise pressor response to IHG, which increases arousal levels and cerebral blood flow. Whether IHG responses are different between males and females is currently unknown. We speculate females will experience greater improvements in

cognition following IHG compared to males given that females have a lower exercise-pressor response, resulting in optimal arousal and higher cerebral blood flow, which may facilitate greater cognition. The purpose of this study was to investigate whether there are sex-differences in the cognitive response to IHG. We tested the hypothesis that females would have a lower exercise pressor response, increased middle cerebral artery blood velocity (MCAv), and correspondingly greater improvements in cognition compared to males following IHG. Methods: Thirty young adults (n=15 females) completed two experimental visits in a randomized crossover trial of IHG compared to seated rest (control condition). IHG consisted of 4 sets of 30% maximal voluntary handgrip contraction for 2 minutes interspersed with 3 minutes of recovery. Cerebral blood velocity was measured using the transcranial doppler ultrasound in the right MCAv. Cognitive function was assessed using a computerized battery of psychometrically valid tests including the 4 Choice Reaction Time, the N-Back, and the Corsi Block Tapping task. Arousal was assessed using the Felt Arousal Scale. Anticipated Results: To date, n=22 (n=8 female) participants have been collected and data analysis is underway. We anticipate that females to have a lower exercise-pressor response from IHG and perform better on the cognitive tests compared to males. Significance: This study will establish the mechanisms underlying exercise-induced improvements in cognition following IHG and explore potential sex differences in this response.

Nucci, Rosie

Investigating Physiological Changes from Hand Movement Training in Stroke Patients using Transcranial Magnetic Stimulation (TMS)

Faculty Advisor: Aimee J. Nelson

Co-Author(s): Nucci, R., Ramdeo, K. R., Rehsi, R. S., Nelson, A. J., Meltzer, J. A.

McMaster University/Faculty of Science

With stroke being a leading cause of death and long-term disability globally, discovering ways to treat and manage symptoms is becoming a greater concern, especially in the growing population of aging individuals. Motor impairment is one of the most common consequences of stroke and as a result, reinforce the need for efficient methods to treat limb dysfunction in stroke victims. Literature has pointed to non-invasive brain stimulation (NIBS), specifically transcranial magnetic stimulation (TMS), as a viable method to not only investigate the reorganization of neuronal networks in the brains of stroke patients but enhance cortical plasticity and improve motor performance in these individuals. It is hypothesized that through the examination of motor cortex function using TMS, a motor training protocol in the hand may positively influence changes in cortical excitation and inhibition to reflect recovery and potentially improve post-stroke impairments like limb function. Six dependent measures (TMS protocols) including short-interval intracortical inhibition (SICI), long-interval intracortical inhibition (LICI), contralateral silent period (CSP), ipsilateral silent period (ISP), recruitment curve (RC) and long interhemispheric inhibition (LIHI) will be found before (T0) and following (T1) a 15-day period of hand movement exercises in eligible participants. The proposed research aims to use TMS to assess changes in electrophysiological activity associated with hand motor training in stroke patients and support the use of motor training as a therapeutic intervention for stroke management and recovery.

Paramanatharajah, Nelani

Muscle protein synthesis in response to the ingestion of plant-based protein blends in young men and women

Faculty Advisor: Dr. Stuart M. Phillips

Co-Author(s): Nelani Paramanatharajah, Brad S. Currier, Changhyun Lim, Tom Janssen, Stuart M. Phillips

Skeletal muscle is critical for human health and function, and skeletal muscle mass is governed by the dynamic balance between muscle protein synthesis (MPS) and muscle protein breakdown. Ingesting dietary protein is important for MPS; essential amino acids (EAA) and leucine (Leu) are required to synthesize proteins and activate MPS, respectively. Animal-derived proteins are typically considered higher quality than plant-based proteins because of a higher EAA content, increased digestibility, and higher protein content per serving. However, plant-based proteins are increasing in popularity for various (environmental, ethical) reasons. With a growing demand for plant-based protein combined with directions in Canada's Food Guide, solutions are required to provide consumers with adequate dietary protein for MPS and muscle development. Therefore, the purpose of this study is to determine the efficacy of three protein supplements in stimulating MPS. Healthy young adults ($n = 8$, 4 females/4 males, 18-30 years) will consume a novel (canola and pea) plant-based protein blend (PBP), a PBP fortified with leucine (PBP + Leu), and whey protein isolate (WPI) on three separate occasions in a randomized crossover design. MPS will be measured at rest and after each supplement's consumption using a primed constant infusion (L-[ring- $^{13}\text{C}_6$] phenylalanine) and the precursor-product method. Muscle protein synthesis will be measured with repeated blood sampling and muscle biopsies using gas chromatography-mass spectrometry. Likert scale questionnaires will be administered to determine the tolerability of each supplement. Analysis is ongoing; results are anticipated for presentation at the conference.

Patel, Jaimini

Carotid Artery Longitudinal Wall Motion in Children with a Chronic Inflammatory Disease

Faculty Advisor: Dr. Joyce Obeid

Co-Author(s): Madelyn Byra, Chloe Athaide, Dr. Jason Au, Dr. Tania Cellucci, Dr. Lehana Thabane, Dr. Brian W. Timmons, Dr. Maureen J. MacDonald

McMaster University/Department of Paediatrics

Children with a chronic inflammatory disease (CID) may be at an increased risk of developing cardiovascular disease (CVD). Early signs of CVD progression can be identified by established ultrasound- and tonometry-based markers of vascular structure and function such as pulse wave velocity (PWV), β -stiffness index, carotid intima-media thickness (cIMT), and flow-mediated dilation (FMD). Carotid artery longitudinal wall motion (CALM) is a novel ultrasound-based marker of cardiovascular (CV) health that represents the longitudinal pre-stretch of arteries, which is linked to vessel wall elastin content and overall vessel health. CALM may yield insight into CV health independent of information from established markers of vascular health; however, no previous studies have examined CALM in children with a CID. Therefore, this study aims to: (1) compare CALM outcomes including segmental longitudinal wall displacement, velocity, and acceleration between children with a CID and healthy controls; and (2) examine the relationship between CALM outcomes and established markers of vascular health in children with a CID and healthy controls. Children 7-17 years old with a single, confirmed CID diagnosis for ≥ 1 year were recruited from McMaster Children's Hospital. Healthy controls were recruited from the Hamilton, ON community. Participants completed one study visit where PWV, β -stiffness index, FMD, cIMT, and CALM were measured. Analyses are in progress and results will be presented at the National Undergraduate Research Conference in Kinesiology and Physical Education. Exploring CALM in these special populations may provide us with a more comprehensive understanding of CV health, which may inform early interventions to minimize CVD progression.

Perfetto, Sara

Gamified Hand Rehabilitation Using a Novel Passive Device: An Analysis of User Engagement, Motor Outcome, and Functional Performance in Chronic Stroke

Faculty Advisor: Godwin, A., Johnson, V.B.K.

Co-Author(s): Doan, A., Dumais, E., Marshall, M., Beauchamp, S., Shima, M., Dorman, S., Grewal, R.
Laurentian University/School of Kinesiology and Health Sciences

Stroke is the leading cause of adult disability in North America, with many persons with stroke (PWS) experiencing long-lasting upper extremity disability. Despite the tremendous impact stroke has on daily function, few interventions have been successful in upper extremity rehabilitation. Gamified rehabilitation has demonstrated increased user engagement, resulting in greater impacts on upper limb function in comparison to traditional treatment methods. However, gamified rehabilitation, such as robotics, are seldomly integrated into clinical practice. This study continued research on the effects of gamified rehabilitation on user engagement and functional performance post-stroke. This study examined four chronic PWS (4.18 ± 3.48 years post-stroke, 52.6 ± 17.5 years of age) who underwent 24 intervention sessions over 12 weeks with a passive hand function training device. The sessions were 1.5 hours in duration, consisting of a 30-minute warm-up period with basic digitized feedback, followed by one hour of voluntary participation using one of five device-operated games. User engagement was measured with the NASA task load index (NASA-TLX). Functional outcome measures were the Box and Block Test (BBT) and the Chedoke Arm and Hand Activity Inventory version 9 (CAHAI-9). This study found that the intervention led to statistically significant increases in the mean scores of the CAHAI-9 (PRE: 34.75 ± 2.17 , POST: 46.50 ± 2.17 , $p = 0.034$), but not the BBT (PRE: 22.50 ± 2.67 , POST: 24.88 ± 2.67 , $p = 0.231$). The change in CAHAI-9 scores also met the minimal clinically important difference of 6.3 points. No significant correlation was found between reported engagement (NASA-TLX) and the functional measures (BBT: $r = -0.028$, $n=4$, $p=0.964$, CAHAI: $r = -0.10$, $n=4$, $p=0.87$). The findings from this study demonstrate the potential for gamified passive hand rehabilitation in functional recovery of chronic stroke. Future work should continue to develop rehabilitation methods that target functional recovery and investigate these techniques using larger sample sizes and randomized control trials.

Petrovic, Jenna

Uncovering Ukrainian athlete representation in Canadian media

Faculty Advisor: Dr. Simon Darnell

Co-Author(s): N/A

University of Toronto

The Russian invasion of Ukraine has challenged Ukrainian athletes at all levels, both in their training and competition. Most major Canadian media outlets have covered how Ukrainian athletes have been affected by the war. The purpose of this project was to examine specific themes in Canadian media coverage of Ukrainian athletes in relation to the Russian invasion. To do so, a content analysis of Canadian media coverage was conducted. The final sample was comprised of thirty-six articles published in the eleven months after the first day of the Russian invasion on February 24, 2022. Three major themes emerged: identification with or differentiation from Canada or Canadians; militarism; and athlete resilience. Notably, in the coverage during the initial months of the invasion, themes of differentiation from Canada and militarism were more evident in the articles, while after approximately six months of media coverage, articles portrayed more identification with the athletes and their resilience. These results suggest Canadian investment in and attachment to both

Ukraine and Ukrainians. In conclusion, the importance of future research into Canadian media coverage of athletes affected by war is discussed.

Pettit, Madeleine

The effect of menstrual cycle phase on resting and postprandial substrate utilization in healthy recreationally active females

Faculty Advisor: Dr. Jenna Gillen

Co-Author(s): Alexa Govette, Eric Antonen, Anessa Koussiouris, Daniel West, Jenna Gillen

University of Toronto/

Introduction: Decreased carbohydrate and increased fat utilization during moderate-intensity exercise have been observed in the luteal (LP) compared to the follicular (FP) phase of the female menstrual cycle. These differences have been attributed to the higher circulating estrogen in the LP compared to FP. Whether menstrual cycle differences in fuel utilization also occur in the fasted and postprandial states when females are at rest is unknown. Purpose: To determine the effect of menstrual cycle phase on substrate utilization at rest and in response to carbohydrate ingestion. Methods: Thirteen eumenorrheic females (25 ± 6 yrs.; 22.5 ± 2.5 kg/m²) completed a metabolic trial in the FP (day 7 ± 2) and the LP (day 22 ± 3) of a single menstrual cycle. Following a 12h overnight fast, participants consumed a 75g oral glucose tolerance test (OGTT). Respiratory gas exchange was measured via indirect calorimetry for 15 min in the fasted state and every hour postprandially for 3h to determine respiratory exchange ratio (RER) and rates of carbohydrate and fat oxidation. Capillary glucose concentrations were measured when fasted and every 30 min for 3h postprandially via glucometer for determination of glycemia. Results: Fasting glucose concentration (FP: 5.3 ± 0.2 vs. LP: 5.3 ± 0.4 mmol/L) and 3h postprandial glucose mean (FP: 6.7 ± 0.8 vs. LP: 6.8 ± 0.9 mmol/L) were not different between menstrual phases ($p > 0.05$). RER was higher in the fasted (0.79 ± 0.07 vs. 0.75 ± 0.04 ; $p = 0.03$) and postprandial (0.84 ± 0.06 vs. 0.80 ± 0.03 ; $p = 0.06$) states in LP vs. FP. Accordingly, the rate of carbohydrate oxidation in the fasted (0.09 ± 0.07 vs. 0.04 ± 0.04 g/min; $p = 0.02$) and postprandial (0.14 ± 0.05 vs. 0.10 ± 0.03 g/min; $p = 0.02$) state was higher in LP compared to FP. Conclusion: Contrary to our hypothesis, carbohydrate oxidation was higher in the luteal vs. follicular phase of the menstrual cycle in both fasted and postprandial states. These findings contribute to understanding the influence of menstrual cycle phase on substrate metabolism in females.

Prapaharan, Brinda

The Effect of Focal Point Depth on Echointensity in Muscle Ultrasound

Faculty Advisor: Dr. Kirsten Bell

Co-Author(s): Dina Attia

McMaster University/Faculty of Science

Introduction: Muscle composition, a measure identifying connective and adipose tissue infiltrates in muscle, can provide an advanced understanding of skeletal muscle health. Ultrasound is a non-invasive and cost-efficient method to measure muscle composition. Texture features of pixels that compose an ultrasound image, including pixel brightness, also known as echointensity, and orientation, detail muscle composition. Texture features may be altered by adjustable instrument settings within ultrasounds. In newer ultrasounds, sophisticated settings, namely focal point, which adjusts the focus in an image at varying depths, has an unknown effect on texture features despite its visual influence on an image. Purpose: This study aims to

investigate the effect of focal point depth (deep, mid, superficial) on echointensity of the rectus femoris. We hypothesized that texture feature outcomes will be greatest when comparing images with a superior location of focal point versus deep location of focal point. Methods: We have recruited 25 healthy participants (23-28 years, 22.9-2.35kg/m², 64% female, target n = 32). Transverse images of the rectus femoris at 2/3 distance of the anterior thigh were obtained using a B-mode ultrasound and a multi-frequency linear array transducer (18L5: 6-18MHz). A clamp stabilized the probe as 3 images with varying focal point depths were taken. Statistical analysis was conducted with a 1-way repeated measures ANOVA with depth as a factor (deep vs. mid vs. superior). Results: ImageJ was used to obtain values of echointensity. Data showed that echointensity at a deep location of focal point was significantly greater ($p < 0.001$) than mid and superior locations of focal point, and that mid and superior locations were statistically similar. Conclusion: These results suggest that altering focal point location to greater depths can increase echointensity in comparison to shallower depths. Further texture analysis will determine whether focal point location elicits changes to pixel orientation.

Rabel, Kavini

Data Management Strategies for Research in Behavioural Kinesiology

Faculty Advisor: Kelly Arbour-Nicitopoulos

Co-Author(s): Kelly Arbour-Nicitopoulos and Maeghan E. James

University of Waterloo/Faculty of Health

Effective data management plays a significant role in obtaining accurate and reliable results, as well as facilitating data interpretation. Proper management of data allows for optimal utilization that can be shared and presented in a manner that allows for efficient data extractions. This is especially important when working with large datasets consisting of data from multiple sources (e.g., surveys and activity monitoring devices). Sufficient data management early on within a project allows for study initiatives to remain organized and replicable which serves as a benefit for large-scale and longitudinal studies using multiple data sources. In this presentation, the processes used to effectively synthesize data from multiple sources across multiple data collection platforms will be critiqued, using a case study of the National Physical Activity Measurement (NPAM) study. The NPAM study is currently the largest physical activity surveillance study in Canada for children and youth with disabilities. The study consists of questionnaires completed by both parents ($N = 547$) and children ($N = 79$) as well as children ($N = 208$) wearing activity monitors. In this case study, the platforms Qualtrics and REDCap were used to aide in providing optimal data collection of families of children experiencing disability and management of the data. A robust database was created to synthesize all of the data sources within the NPAM study. Discussions will be had on the process of the data integration, highlighting the challenges faced during the integration process, benefits of varying data management platforms for data synthesis, and recommendations and insights into data management in behavioural kinesiology.

Raha, Arya

The impact of high-intensity and moderate intensity arm cycling ergometry on recovery: A preliminary analysis.

Faculty Advisor: Dr. Maureen MacDonald

Co-Author(s): Sydney Valentino

McMaster University/Department of Kinesiology

Introduction: High-intensity interval training arm cycling ergometry (HIIT-ACE) has shown considerable cardiovascular benefits compared to moderate-intensity continuous training (MICT). Based on recent qualitative research, we found individuals with a spinal cord injury (SCI) have concerns regarding the feasibility (ability to complete activities of daily living following exercise) and tolerability (level of pain and discomfort felt following exercise) of HIIT-ACE. Taken together, the purpose of the current study is to examine the feasibility and tolerability of HIIT-ACE compared to MICT-ACE in non-disabled individuals and individuals with SCI. We hypothesized that 1) HIIT-ACE would not be less tolerable or feasible than MICT-ACE regardless of arm cycling experience, and 2) arm strength and heart rate recovery (%HRR) following a peak oxygen uptake test (VO_{2peak}) will be related to the tolerability of recovery. Methods: Participants completed a baseline testing visit (BL) consisting of arm strength, peak oxygen uptake (VO_{2peak}), heart rate recovery (2 min), and overall exercise enjoyment questionnaires. Participants returned to complete either HIIT-ACE and MICT-ACE in a randomized order within 1-5 days. Following HIIT-ACE and MICT-ACE, a 65-point questionnaire was administered, where a lower score is indicative of higher tolerability, feasibility, and enjoyability in the 24 hours of recovery post-exercise. Results: Two non-disabled individuals (2F/0M) completed three testing visits. Based on preliminary visual analysis, there are no differences between heart rate recovery (HIIT-ACE: 38.7% vs. MICT-ACE: 26.5%) and the 24-hr recovery recall questionnaire (HIIT-ACE: 19.5 ± 0.707 vs. MICT-ACE: 12.5 ± 3.54). Within the enjoyment domain, HIIT-ACE was scored as more enjoyable than MICT-ACE in both participants. Conclusions: There are no indications that HIIT-ACE is less feasible or tolerable than MICT-ACE. This research may provide exercise professionals with a physiological indicator (arm strength or %HRR) to predict whether HIIT or MICT is more tolerable in individuals with lower limb impairments.

Rasul, Wajeaha

Examining Code-Switching Tactics of High-Performance BIPOC Female Sport Coaches

Faculty Advisor: Dr. Parissa Safai

Co-Author(s): N/A

York University/Faculty of Health

Examining Code-Switching Tactics of High-Performance BIPOC Female Sport Coaches The under-representation of women in sport leadership and coaching has long been a topic of much interest among sport researchers and advocates (e.g., see Demers & Kerr, 2018; Norman et al., 2020; The Rally Report, 2020; Unck, 1992). Although there is a robust body of research on the range of constraints faced by women sport leaders, there remains much room for more scholarship examining the ways in which gender and racial identity intersect within sport as a workplace, particularly for racialized women in sport coaching. This paper will highlight data from a one-year undergraduate honours thesis study that focused on female sport coaches, especially those who identify as BIPOC, and their use of code-switching as a tactic to navigate within their respective working environments. This undergraduate thesis study employed qualitative research methods, specifically semi-structured interviews, and was nested within a broader E-Alliance-funded study that examined the sport-work-gender nexus within the Canadian high-performance sport coaching context. Study participants shared their working experiences as sport coaches and preliminary findings demonstrate that there are a variety of tactics that female sport coaches feel they must use to address the challenges they face (e.g., racism, sexism, ageism, etc.) and operate in their sport coach working environments. Insights from the study participants highlight how these tactics, although perceived as necessary, are understood as undermining or compromising their identity as women and BIPOC (where applicable). This paper will conclude with a discussion of the implications of women's need to employ tactics such as code-switching in order "to get by" in the sport coaching workplace.

Read, Katriel**The importance of the vividness and self-relevance of episodic future thinking in decreasing delay discounting**

Faculty Advisor: Dr. Suzanna Becker and Dr. Jeremy Walsh

Co-Author(s): Dr. Suzanna Becker, Dr. Jeremy Walsh, Isaac Kinley

McMaster University/Department of Kinesiology; Department of Psychology, Neuroscience and Behaviour

Introduction: Episodic future thinking (EFT) is the mental simulation of personal future events, whereas semantic future thinking (SFT) is the mental simulation of general aspects of the future. Engaging in EFT during intertemporal choice tasks decreases delay discounting across various populations. However, the mechanisms underlying this reduction are unknown. Possible mediating factors of EFT are the vividness and self-relevance of the imagined future events. This study employs an experimental manipulation to disrupt the vividness of imagined events using a visuospatial working memory task. It is hypothesized that self-relevance of imagined future events will play a more prominent role in decreasing delay discounting compared to vividness. Methods: Undergraduate student participants at McMaster University were pseudo-randomly assigned into an EFT or SFT condition. Participants were prompted to describe 5 future events that were either personal (EFT) or non-personal (SFT). Participants completed a series of intertemporal monetary decisions, some of which were cued to imagine the episodic or semantic future events. Participants rated the vividness of the cued events at the end of each trial. Certain trials included a concurrently performed visuospatial task where participants were asked to remember multiple shapes that were tested at the end of the trial; this manipulation was intended to decrease the vividness of imagined events. Predicted Results: Data collection and analyses are ongoing. Despite differences in vividness levels, EFT cues are expected to increase farsighted decision-making (i.e., decrease delay discounting) compared to the other conditions due to the high self-relevance of the future events. Conclusion: This study is an important step to determine if certain factors of EFT, namely vividness and self-relevance, are important in reducing delay discounting. Work of this kind is essential to lay the foundation for future EFT interventions that aim to reduce delay discounting in individuals who tend to make more impulsive decisions.

Renton de Lannoy, Sasha**Development of Lower Extremity Neuromuscular maps to optimize return-to-activity decisions following musculoskeletal injury**

Faculty Advisor: Timothy Burkhart

Co-Author(s): Dr. Timothy Burkhart, Dr. Jas Chahal, Courtney Marks

University of Toronto

Lower extremity musculoskeletal injuries are common among soccer players. Kicking is a common, and distinctive aspect of a soccer athlete's activity and injuries have been shown to occur during this set of motions. However, a thorough understanding of muscle activation patterns and appropriate coordination of the lower extremity is lacking. Therefore, the aim of this study is to define muscle activation characteristics of the lower extremity and abdominal muscles during a maximal in-step kicking tasks. 40 healthy, competitive soccer athletes will be recruited for this study. Surface electromyography (EMG), collected bilaterally from eight lower extremity and trunk muscles (normalized to each participant's maximal voluntary isometric contraction (MVIC)) and three-dimensional kinematics will be quantified in response to three maximal in-step kicks. For analysis,

five phases of the kick will be identified: i) preparation; ii) back swing; 3) leg cocking; iv) acceleration; and v) follow-through. Expected results include minimal rectus abdominus (RA) activation during the preparation phase despite trunk flexion, I also expect minimal RA during the leg cocking phase despite max hip extension occurring. The greatest semitendinosus, semimembranosus and biceps femoris activation in both supporting and kicking leg occur during the cocking phase. The RA, rectus femoris, vastus lateralis, vastus medialis, and adductor longus maximally activate during acceleration and follow-through. These expected findings suggest that certain lower extremity muscle groups are exposed to greater demands during certain phases and that the supporting and kicking limbs are loaded differently. An improved definition of lower extremity function during kicking provides a basis for improved insight into injury prevention and rehabilitation. Future research should investigate how differences in neuromuscular activation between healthy and injured participants may relate to differences in the risk of lower extremity injury among soccer athletes.

Roach, Jada

Redefining Exercise Identity in People Living With and Beyond Cancer: A Qualitative Exploration of Exercise Behaviour within Early Survivorship

Faculty Advisor: Dr. Linda Trinh

Co-Author(s): Allyson Tabaczynski MSc, PhD(c)e, William Goodman, PhD(c)

University of Toronto

Background: Exercise is beneficial for people living with and beyond cancer (LWBC); however, many people LWBC fail to meet the exercise guidelines. Having an identity, a component of self-concept, surrounding physical activity is theorized to motivate people LWBC to continue to engage in exercise behaviours that align with their identity. In the general population, having a strong exercise identity correlates with exercising more frequently. For people LWBC, many barriers including treatment-related side effects, lack of time, fatigue, psychological barriers to physical activity exist, which have been shown to negatively interact with exercise identity. Therefore, understanding how exercise identity influences exercise behaviours in cancer survivorship is warranted. Purpose: To explore the perceived impact of people LWBC and their exercise identity on exercise behaviors. Methods: Semi-structured interviews were conducted to identify influences of exercise identity on exercise behaviour. Twelve participants of mixed diagnoses in the early survivorship period (i.e., within five years of completion primary treatment or diagnosis) were recruited from local cancer organizations so far, with the final sample size determined by data saturation. Those who self-identified as having an 'exercise identity' were interviewed regarding this identity, its interactions with their cancer diagnosis and treatments and its impact on exercise participation. Transcripts were transcribed verbatim and will be analyzed using thematic analysis. Results: Data collection is ongoing with 8 interviews completed so far. Full results will be presented at the Undergraduate Conference. Conclusion: Results of this study have implications for the design and implementation of exercise programs for people LWBC and will provide insights into what keeps people exercising during and following cancer treatment.

Ryan, Sarah

Understanding the relationships between physical activity, mental health, and body image in adolescent girls

Faculty Advisor: Catherine Sabiston

Co-Author(s): Maryam Marashi, Kristen Lucibello, Melissa deJonge, Catherine Sabiston

University of Toronto

Background: Adolescence marks a fundamental period of development. With the onset of pubertal, physical, and social changes, adolescents experience both positive and negative influences on their mental health, with a key facet of body image. Physical activity may be one mechanism through which positive mental well-being and body image can be promoted, however, most adolescents are not achieving the recommended physical activity guidelines. This statistic is most notable among adolescent girls, a third of whom will have dropped out of recreational sport by the age of sixteen. Body image concerns in physical activity contexts have been linked to poor experiences and reduced participation, thus impacting girls' opportunities to attain benefits from physical activity. Yet, the experiences of body image, mental health, and physical activity are not well understood. Purpose: This study aims to explore the physical activity experiences of adolescent girls to better understand how mental health and body image are navigated and negotiated within varying physical activity frequencies and types. Methods: Using a qualitative description approach, ten adolescent girls (aged 14-17 years) will participate in a virtual semi-structured interview. Data will be analyzed using reflexive thematic analysis. Predicted outcomes: Knowledge generated from the findings of this study may contribute to our understanding of how girls' physical activity, mental health, and body image interact and influence experiences and participation. Theoretical and conceptual advancements may be garnered through the exploration of the interplay between physical activity, mental health, and body image.

Sangaré, Mohamed

Postural Stability of Women 65 Years or Older: a 12-week online dance intervention with blood flow restriction

Faculty Advisor: Andreas Bergdahl

Co-Author(s): Emma H. Chen, Andreas Bergdahl, Mary Roberts

Concordia University/Faculty of Arts and Science

Postural stability declines with age due to deteriorations of the musculoskeletal and sensory systems [1]. Following falls, women have a rate of hospitalization 1.8 times that of men [2]. It is well-known that dance improves postural stability [3]. There are several obstacles to face-to-face dance classes such as lack of transport and social-distancing guidelines. The addition of blood flow restriction (BFR) to dance classes may improve muscular strength during low intensity exercise [4]. OBJECTIVE: Investigate whether 12-weeks of online dance classes with BFR can improve the postural stability of older women. METHOD: 3 females (74.7 years, SD=5.5) were recruited from the Montreal community and participated in dance classes on Zoom for 1 hour and 15 minutes, twice per week. All participants were asked to wear 5cm elastic BFR cuffs on the proximal portion of their thighs during the classes. Postural stability was evaluated at week 0 and week 12 using 30 seconds of quiet standing with eyes-open, eyes-closed and on a foam pad. During the trials, a camera was placed to the side, and displacement distance of the shoulders and hips were obtained from the recordings through frame-by-frame analysis using the software Kinovea.org. Significance was evaluated using non-parametric Wilcoxon signed rank test, $p < 0.05$. RESULTS: No significant improvements pre to post in shoulder or hip displacement were found in any of the conditions due to the low sample size. This project is part of a larger study. CONCLUSION: Despite the lack of significance, this study demonstrated that dance can be combined with BFR and that using BFR in an online intervention is safe. These online dance classes with BFR help increase the accessibility of exercise for older women and may contribute to improved health, independence and quality of life.

Saroya, Neha

Gender differences in pain perception and cardiovascular reactivity during a 3-minute cold pressor task

Faculty Advisor: Dr. Baraa Al-Khazraji

Co-Author(s): Michelle Mei, Elric Allison

McMaster University/Department of Kinesiology

A cold-pressor test (CPT) is a non-invasive noxious stimuli that can be used to measure pain perception and cardiovascular reactivity (CVR). CVR may predict the development of preclinical cardiovascular disease states. Males typically have lower pain ratings on CPT's than females and increased CVR may result in a greater pain response to a CPT. However, there is a lack of consistent evidence that explains the differences in pain perception and CVR found between sexes in response to a CPT. This may be due to the psychosocial factors at play that impact how individuals perceive pain. The impact of individual alignment with more feminine or masculine traits, regardless of biological sex, on pain and CVR have not been studied. The purpose of this study is to determine if there are gender differences in pain perception and cardiovascular reactivity to a CPT. Thirty healthy individuals (15 males and 15 females; 18-35 years old), are being recruited for this study. Participants are connected to an ECG and a continuous blood pressure monitor. A 15 minute rest period is followed by manual blood pressure measurements. The participant's left hand is then submerged in a 0-1°C water bath for three minutes. The visual analog pain scale is used to collect pain scores at the end of every minute of the CPT. Participants complete the Bem sex-role inventory, a measure of gendered personality traits, in order to assess gender differences. The impact of gender on cardiovascular reactivity and pain perception will be analyzed using a two-way ANOVA. It is hypothesized that individuals with more feminine traits may have increased pain perception and CVR in response to the CPT. This study will provide further exploration into the role gender plays in the experience of pain and a preliminary insight into its relationship to cardiovascular reactivity.

Scavarelli, Natasha

The Immediate Effects of Dry Cupping the Lumbar Paraspinals on Range of Motion and Temperature

Faculty Advisor: Dr. Paolo Sanzo

Co-Author(s): N/A

Lakehead University/Faculty of Kinesiology

Background: The paraspinal muscles of the lumbar spine function as back stabilizers and extensors. Considering the essential function of these muscles, they are constantly contracting, meaning they are easily subjected to fatigue and tightness. Dry cupping is a therapeutic intervention used to cause a negative pressure, which stretches both the skin and underlying tissue. This mechanism is said to promote the flow of oxygenated blood to the area being treated and cause a physiological stretch in the muscle, allowing it to elongate, as well as potentially change skin temperature. The perceived effectiveness of this intervention on the lumbar spine, however, has not been thoroughly examined. Objective: The purpose of this study was to explore the immediate effects of dry cupping the lumbar paraspinals on range of motion (ROM) and skin temperature of the lumbar spine. Method: 30 healthy individuals between the ages of 18-30 years were recruited. A dry cupping treatment was performed on the lumbar paraspinal muscles for 10-minutes. Two plastic cups were placed on the bilateral paraspinals muscles at L1 and L5. Lumbar spine flexion ROM and skin temperature at L1 and L5 were measured pre- and post-intervention. Descriptive statistics and paired sample T-tests were used to analyze the data with a $p < .05$. Results: There was a statistically significant

increase in lumbar spine flexion ROM measured with the Sit and Reach Test, $t(29)=12.624$, $p=.001$; $d=2.343$, and inclinometry, $t(29)=11.103$, $p=.001$; $d=3.8562$, with a large effect size. In addition, there was a statistically significant decrease in the skin temperature of the lumbar spine paraspinals, $t(29)=-2.227$, $p=.034$; $d=0.7543$, with a medium effect size, post-treatment. Conclusion: Dry cupping may be an effective treatment strategy to increase lumbar spine ROM and decrease stiffness, promote recovery, and reduce functional limitations. Future research may examine the difference in effectiveness of static compared to dynamic cupping.

Schwarz, Natalie

Arm Technique Comparison during a Figure Skating Jump

Faculty Advisor: Dr. Shawn M Robbins & Dr. Celena Scheede-Bergdahl

Co-Author(s): P Renaud, L Holman, ARB Phillips

McGill University/Faculty of Kinesiology and Physical Education

Figure skating jumps performed during competition are vital for the athlete's program scores. Figure skating biomechanics research has focused on the jump kinematics of the skaters in the air to analyze their different rotational phenomenon. Many figure skaters have altered their arm technique for easier takeoff motion and better body alignment while in the air. There is no empirical evidence for which arm technique yields a better jump result, only anecdotal evidence. The objective of this study is to analyze the changes in rotational motion when arm technique is altered from traditional crossed arms to both arms being extended above the head during the flight phase in a flip jump in experienced jumping skaters. Methods: Two nationally competitive skaters that can complete multi-revolution jumps with both arm conditions performed a double flip jump on ice with arms crossed and above their head. Four trials of each condition were recorded. Kinematic data were collected with inertial sensors (XSens MVN, XSens Technologies B.V., Netherlands), capturing 240 Hz on major body segments (upper and lower extremities, trunk, pelvis, and head). Data analysis was done on Excel. Primary outcomes include peak angular velocity and acceleration of the trunk, pelvis, and right-shoulder. Results were varied between participants and each skater showed higher angular velocity and acceleration values for different arm techniques. A biomechanical lens to analyze jump technique in multi-revolution jumps can further our understanding on the most effective jump techniques. Results from this research can help skaters to optimize their performance by using more advantageous techniques. Coaches could use this information to ensure that they teach effective jump technique to their students. This would allow for more standard technique procedures for elite competitive figure skaters to obtain better technical scores and grades of execution scores.

Simoes, Kyara

Environmental Sustainability Within Sport: The Development of Green Athletics in University

Faculty Advisor: Caroline Fusco

Co-Author(s): N/A

University of Toronto

In light of the growing importance of environmental responsibility and conservation efforts within the sports industry, sustainability plans are being increasingly adopted by athletic departments within higher education institutions. This study aims to examine the engagement of USports member universities in the Green Athletics category of the Sustainability Tracking, Assessment and Rating System (STARS). Quantitative content analysis

methodology was used to determine the number of USports members universities that actively report the Green Athletics category and to assess their efforts to satisfy the sustainability criteria outlined in the Green Athletics category. Results demonstrated that among the 56 USports member universities, 20 universities were observed to be actively utilizing STARS, with 3 universities having successfully attained points in the Green Athletics category. The findings in this paper reveal that the reporting of sustainability efforts within athletics is a relatively uncommon practice among Canadian universities, with a considerable number of institutions failing to report such initiatives. This study highlights the need for greater consistency and standardization in the reporting of sustainability initiatives in the context of athletics among Canadian universities. By establishing clearer guidelines and protocols for reporting, universities can ensure that their sustainability efforts are more accurately and comprehensively reflected in their institutional reporting, ultimately enabling more effective and impactful progress towards a more sustainable future.

So, Jared

Sex differences in cognitive function following an acute bout of high intensity aerobic exercise

Faculty Advisor: Dr Jeremy Walsh

Co-Author(s): N/A

McMaster University/Kinesiology

A single bout of exercise transiently improves cognition; however, there may be sex-based differences in this response. Exercise intensity is commonly prescribed as a percentage of VO₂max, but variables such as heart rate, lactate, and substrate utilization vary between men and women at the same relative workload. We propose that prescribing exercise at critical power (i.e., the highest exercise intensity that can be sustained indefinitely) could standardize the acute exercise stimulus and allow for investigation of sex-based differences in the effect of acute exercise on cognition. The purpose of this study was to test the hypothesis that there will be no sex differences in cognition due to an equal metabolic exercise stimulus prescribed using critical power. Thirty-nine young adults (age=21.5±1.7 yrs; n=17 females) were allocated to either an exercise or control condition. Exercise was performed for 45 min at a power output corresponding with 50% between lactate threshold and critical power. Participants in the control condition watched a movie for 45 min to match exercise timing. Participants completed the Mnemonic Similarity Task (MST) of hippocampal-dependent memory before and after each intervention. Anthropometric data and menstrual cycle information was collected from participants prior to commencing the study, and heart rate was measured throughout using a FitBit device. To date, n=35 have been collected for this trial and data analysis is currently underway. We expect that there will be no differences in MST performance between males and females in both groups, due to an equal metabolic exercise stimulus using critical power. Our novel approach of setting exercise intensity using critical power will provide better insight into investigating whether sex differences exist in the effect of acute exercise on cognition as all participants will be exposed to an equivalent metabolic stimulus of exercise.

Sodhi, Kabir

Effect of an Acute Bout of Exercise on Creativity

Faculty Advisor: Dr. Lindsay Nagamatsu

Co-Author(s): Samantha Marshall, Gianna Jeyarajan, Jennifer Hanna Al-Shaikh, Raphael Gabiazon

University of Western Ontario/Faculty of Health Sciences

Previous research suggests there is a relationship between physical activity and cognitive function across various populations. One domain of cognitive function that requires further exploration in relation to physical activity is creativity. This study aims to be a ground-breaking pilot study to investigate the effects of a 30-minute acute bout of an aerobic moderate-intensity cycle ergometer test on one's creative output. 60 students at Western University are expected to be recruited to participate in this between-subjects intervention, which includes one laboratory visit per participant. Individuals will be randomly assigned to one of three groups (i) exercise pre-creativity test, (ii) exercise during creativity test, (iii) a non-exercise video watching control condition pre-creativity test. Guilford's Alternate Uses Task (AUT) will be administered to assess divergent creative thinking. Creativity task performance will be scored across four dependent parameters which include fluency (i.e., total number of ideas), flexibility (i.e., total number of categories), originality (i.e., responses thought of by <5% of the sample), and elaboration (i.e., degree of additional details provided per idea). If findings suggest that exercise improves creative abilities, further research could investigate possible brain regions associated with improvements utilizing neuroimaging techniques, as well as exploring the effects of supplemental forms of exercise on creative capabilities.

Stade, Shantal

Examining the impact of the natural menstrual cycle and oral contraceptive pill phases on exercise stimulated flow mediated dilation in healthy premenopausal females: a proposal

Faculty Advisor: Dr. Maureen MacDonald

Co-Author(s): Jennifer Williams

McMaster University/Faculty of Science, Department of Kinesiology

Oral contraceptive pills (OCPs) are the most frequent prescription for women aged 15-49 in Canada, with the most common formulation containing ethinyl estradiol (EE) and a progestin (2nd generation (OCP2) = levonorgestrel; 3rd generation (OCP3)= desogestrel or norgestimate). Prior research has found that natural menstrual cycle (NAT) and OCP phases may influence brachial artery endothelial function, measured by reactive hyperemia flow mediated dilation (RH-FMD). Preliminary evidence proposes that rhythmic handgrip exercise flow mediated dilation (EX-FMD) can identify endothelial dysfunction earlier than RH-FMD in certain conditions; however, the influence of hormonal phases on EX-FMD has not yet been studied. Therefore, the purpose of this study is to examine the effect of natural menstrual (NAT) and OCP cycle phases on brachial artery endothelial function, assessed by EX-FMD. Forty-nine premenopausal females (n=17 NAT, n=17 OCP2, n=15 OCP3) participated in two experimental visits in the low (LH: early follicular/placebo) and high (HH: mid-luteal/active) hormone phases of the NAT and OCP hormonal cycles respectively, in a randomized order. Brachial artery endothelial function was assessed with EX-FMD. Changes in brachial artery diameter were represented as a percent (%EX-FMD). To assess possible changes in baseline diameter and %EX-FMD between phases (LH, HH) and between groups (NAT, OCP2, OCP3), a two-way mixed ANOVA was used. It is hypothesized that females will have similar responses to EX-FMD as observed previously with RH-FMD. Specifically, it is suspected that in the HH phase compared to the LH phase %EX-FMD will decrease in OCP2, increase in OCP3, and decrease in NAT. Additionally, it is hypothesized that %EX-FMD response will be lower in OCP2 compared to NAT and OCP3. Exploring this novel area will inform future studies on female populations and hormonal cycling controls necessary for increased female inclusion in research.

Sutherland, Sara

The Relationship Between Body Image, Disordered Eating and Exercise in Retired Elite Women Athletes

Faculty Advisor: Dr. Catherine Sabiston
Co-Author(s): David Brown and Delaney Thibodeau
University of Toronto

Women are 1.75-3 times more likely to develop an eating disorder (ED) over their lifetime than men. Body image is a factor that significantly contributes to the development of disordered eating (DE) and subsequent EDs. A complicating factor for women who identify as athletes is navigating the sociocultural pressures to maintain a thin ideal perpetuated in the general population while balancing the contradicting body ideals in their sport-specific environment. As a result, women athletes encounter a higher prevalence of subclinical or clinical EDs. To better prevent and treat ED/DE, it is important to understand the body image experiences of women athletes. The purpose of this current study was to explore, using qualitative semi-structured interviews, (1) the experience of body image, ED/DE, and exercise behaviours in retired elite (i.e., provincial, varsity, [inter]national, professional) women athletes, and (2) the ways various social agents (i.e., parents, peers, teammates, coaches, fans) connect with athletes' body image and ED/DE over the course of their athletic career and into retirement. The participants self-identified as women ($n = 8$) who had elite athletic careers in a variety of sports including figure skating, water polo, archery, hockey, swimming, and soccer. Participants self-identified as Asian and South East Asian ($n = 1$), Black or African American ($n = 1$), Hispanic, Latinx, or Spanish Origin ($n = 1$), and White/Caucasian ($n = 5$). Interviews will be transcribed verbatim and analyzed using an interpretative phenomenological analysis. With the limited amount of qualitative research on body image in this sample (Sabiston et al., 2019), it is our primary objective to gain a better understanding of women athletes' experiences. Results will be discussed in the context of the social-cultural model of ED development to inform intervention strategies to improve the overall health and well-being of this population.

Swift, Hayley

The Effects of Ankle Taping on the Mean Sway Velocity, 95% Ellipse Area, and Path Length of the GRF of Simulated Drop Landings in Female Competitive Gymnasts

Faculty Advisor: Dr. Paolo Sanzo

Co-Author(s): N/A

Lakehead University/School of Kinesiology

Background: Competitive gymnasts are exposed to a greater risk of injury due to their high training loads, a combination of highly technical skills, and physical capability to perform difficult routines. Research shows the most common injury among competitive gymnasts includes ankle sprains. By providing mechanical support and improved proprioception to the ankle, preventive therapies, like taping, is believed to reduce the incidence of ankle sprains. There is little information on how tape affects landings and ground reaction forces (GRF) that are specific to youth gymnasts. Objective: To investigate the effects of ankle taping versus no tape on the mean sway velocity, 95% ellipse area, and path length of the GRF of simulated drop landings. Methods: Participants were recruited through random sampling and completed a dismount simulation landing test without and with zinc oxide tape. Mean sway velocity, 95% ellipse area, and path length were measured using the AMTI© force platform. A Wilcoxon Signed Rank Test with a significance level of $p < .05$ was used for the pre- and post-analysis. Results: 8 female youth participants (aged $M=13.75$; $SD=3.06$ years; height $M=150.88$; $SD=11.9$ cm; mass $M=45.73$; $SD=13.52$ kg) completed the study. There was no statistically significant decrease in path length with tape ($M= 9.82$ in) compared to without tape ($M= 7.77$ in), $Z=-1.82$, $p=.069$; 95% ellipse area with tape ($M=0.16$ in.in) compared to without tape ($M=0.14$ in.in), $Z=-0.42$, $p=.674$; and mean sway velocity with tape ($M=1.93$ ft/sec) compared to without tape ($M=1.55$ ft/sec), $Z=-1.82$, $p=.069$.

Conclusion: The application of taping to the ankle resulted in no statistical difference when compared to no tape on the ankle for the mean sway velocity, 95% ellipse area, and path length of the GRF of simulated drop landings. Future research could explore different gymnastic skills, types of tape, or taping techniques as a preventative method and their effects.

Trevisan, Porter

Cognitive Dissonance and Risk Perception in Parents of Competitive Gymnasts

Faculty Advisor: Dr. Jean Côté

Co-Author(s): Alex Murata, Niël Strydom, Mia KurtzFavero

Queen's University/Kinesiology

The Theory of Cognitive Dissonance (Festinger, 1962) states that individuals who experience inconsistency between their cognitions (i.e., their knowledge and beliefs) and behaviours will be motivated to change their behaviours to relieve experiences of psychological discomfort. The concept of cognitive dissonance has previously been explored in several important domains (McMaster & Lee, 1991; Hinkle, 2005; Burke et al., 2008; Ong et al., 2017); however, to our knowledge, there has been minimal research done exploring this research topic in relation to parents and athletes in competitive youth sports. As such, the present study proposes to explore how parents perceive and mitigate their personal perceptions of risk associated with their children's sport participation. We propose to recruit 200 sport parents to complete a questionnaire testing their knowledge and risk perception related to sport specialization in gymnastics. It is hypothesized that parents may perceive their child's risk of burnout, dropout, or injury as lower than for other children in gymnastics. It is also thought that their responses may be incongruent with their levels of factual knowledge. These hypothesized findings would indicate that sport parents may experience cognitive dissonance in relation to their child's sport participation, highlighting potential problem areas in parental attitudes and behaviours. Results of this study may foster the development of educational programs for sport parents to ensure that their young athletes are engaging in sport safely and effectively, which is beneficial for their development and long-term participation.

Van Berkel, Emily

Examining sex differences in arterial function and stiffness after 12 weeks of sprint interval training in young, healthy, untrained individuals

Faculty Advisor: Dr. Maureen MacDonald

Co-Author(s): JS Williams, W Bostad, MJ Gibala, MJ MacDonald

McMaster University/Faculty of Science, Department of Kinesiology

Introduction: Sprint interval training (SIT) can improve arterial function and stiffness similar to moderate intensity training despite reduced training volume and time commitment. The time course of the potential impact of biological sex on SIT-induced changes in arterial function and stiffness are unclear. The purpose of this study was to investigate potential sex differences in arterial function and stiffness after 4 and 12 weeks of SIT in young, healthy, untrained individuals. Methods: Twenty participants (10M/10F, age: 21 ± 4) completed SIT 3 times/week for 12 weeks on a cycle ergometer. SIT consisted of 3x20s "all out" sprints against an individualized resistance ($\sim 7.5\%$ of body mass). Brachial artery flow mediated dilation (FMD), central (carotid-femoral), arm (carotid-radial), and leg (femoral-dorsalis pedis) pulse wave velocity (PWV) were measured at 0, 4 and 12 weeks to assess arterial function and stiffness. Results: There was no effect of sex or time on

central ($p=0.31$), arm ($p=0.15$), or leg PWV ($p=0.07$ vs week 0). A main effect of sex was seen in %FMD, where females had a greater response than males ($p=0.03$); however, there was also a main effect of sex on baseline diameter ($p<0.0001$), such that when baseline diameter was controlled in the analysis using allometric scaling, there was no difference between sexes for %FMDscaled (males: week 0: $7.49\% \pm 1.22$, week 4: $7.62\% \pm 1.26$, week 12: $7.26\% \pm 1.25$; females: week 0: $6.72\% \pm 1.22$, week 4: $8.02\% \pm 1.27$, week 12: $7.91\% \pm 1.24$; $p=0.96$). Conclusion: These data suggest that SIT does not systemically affect the vasculature but may have local effects on the exercising muscle (legs) that are not different between sexes. The present study may have been underpowered to assess sex-differences in leg PWV and further research is warranted to examine this topic. Funding: NSERC

Varga, Sarah

Investigating the Effects of Internalized Hegemonic Masculinity and Sport Culture on Mental Health in Retired Professional Male Athletes: An Autobiographical Study Aimed to Identify Precursors and Manifestations of Depression and Suicide

Faculty Advisor: Michael Atkinson

Co-Author(s): N/A

University of Toronto

The development of mental illness among high-performance male athletes is highly prevalent, yet a systematically understudied phenomenon. Despite professional sportsmen being of significant predisposition to depression and other mental disorders, compared to the general population, the elite sporting industry is saturated with willful ignorance to protect the image and success of a team, at the expense of the mental wellbeing and potentially, the life, of an athlete. Not only do the demands of sporting culture enforce an ideal of physical toughness and lack of emotional vulnerability, but the social stigmatisms that exist around masculinity also create immense pressures for male athletes to remain silent with their mental struggles. Autobiographical research has supported this phenomenon, in that it demonstrates the clear evidence of these athletes coming forward with their mental illness battles, only after retiring from sport. This study uses autobiographical research to discuss retired professional male athletes and their experience with mental illness during their career, focussing on depression and suicide ideation, to gain knowledge on the early precursors and manifestations of depression. It uses narrative inquiry to understand the experiences of Ricky Hatton and Tyson Fury, along with other retired professional sportsmen. It was found that the external demands of sport culture and an internalization of masculine norms produce internal stress and psychological disturbances that correlate to the development of mental illness during an athlete's professional career. An analysis of data revealed shared experiences between athletes, which reflected specific precursors and signs of depression. These include withdrawal from sport, excessive alcohol and drug consumption, denial of ill mental health, and feelings of increased pressure to succeed. The lack of mental health advocacy and support resources additionally fosters an apathetic environment towards mental well-being and ultimately, reproduces toxic stigmatisations towards the ideal male athlete.

Wallace, Brianna

Exploring inclusive active play-related education and training opportunities within Canadian early childhood education

Faculty Advisor: Kelly Arbour-Nicitopoulos

Co-Author(s): Maeghan James, Leah Taylor, Trish Tucker

Education is a universal human right. Every person should have equal opportunities and access to quality education regardless of their differences. Within early childhood care facilities, it is essential that workers understand how to support children, with and without a disability, from different cultures, socioeconomic statuses, genders, ethnicity/races, and languages. Early childhood education training programmes directly affect an early childhood educator's ability to work with children from various backgrounds. An environmental scan conducted by the research team found that a total of 282 courses across post-secondary early childhood education training programmes provided content related to EDI (equity, diversity, and inclusion). The purpose of this study was to further develop the previous environmental scan and explore the aspects of EDI within early childhood training programs. Based on the initial 282 courses found in the environmental scan a total of 16 syllabi were randomly selected from the east coast, west coast, central, and territories from publicly available information found on Canadian post-secondary school websites. A content analysis was conducted using public Canadian university and college websites. Data were synthesized according to the course's application of EDI principles including diversifying education. Results will be presented based on an inductive analysis of key themes that are constructed by the research team based on the team's interpretation of the information in the course syllabi. The knowledge gained from this research can help further the understanding of how various topics are covered within EDI courses in early childhood education training programs. Furthermore, the results from this study could be used to aid in the development of early childhood education.

Weerasooriya, Archana

Evaluating the Effect of Environmental Heat on the Autophagic Response to High-Intensity Aerobic Exercise in Peripheral Blood Mononuclear Cells from Healthy Young Women

Faculty Advisor: Pascal Imbeault

Co-Author(s): Nicholas Goulet, James J. McCormick, Morgan K. McManus, Kelli E. King, Pascal Imbeault, Glen P. Kenny

University of Ottawa/Faculty of Science

Introduction: Autophagy is a cellular survival mechanism that degrades damaged organelles and proteins, preventing the accumulation of toxic protein aggregates in response to acute physiological stressors (e.g., starvation, heat, exercise). We have previously demonstrated that autophagic responses to exercise are intensity-dependent, with further increases after high-intensity exercise in a hot environment, however, these findings were limited to healthy young men. Considering that sex-related differences in autophagy and thermoregulation during the lifespan could contribute to heat-vulnerability, we evaluated the effect of environmental heat on autophagic responses to high-intensity exercise in healthy young women. Methods: Four healthy young women (mean [SD]; 21 [4] years, 41.0 [4.2] ml/kg/min peak oxygen consumption (V_{O2peak})) performed 30 min of high-intensity semi-recumbent cycling (70% V_{O2peak}) in temperate (25°C) and hot (40°C) environments. The autophagic marker LC3-II was assessed via Western blot in peripheral blood mononuclear cells (PBMCs), normalized to β -actin (internal control), and reported as a relative quantity (RQ) to its respective baseline. PBMCs were collected before, immediately after exercise, and 3-h and 6-h postexercise recovery. Heart rate and mean body temperature (0.64-rectal temperature + 0.36-skin temperature) were measured continuously. Results: Heart rate and mean body temperature changed over time (time: $p < 0.001$) and increased higher following exercise in the heat (condition: $p \leq 0.018$). In the thermoneutral condition, LC3-II decreased after 3h (0.79 RQ [0.4]) and increased after 6h (2.08 RQ [0.9]) compared to baseline, however, in the heat, LC3-II increased after 3h (1.64 RQ [0.2]) and decreased after 6h (0.98 RQ [0.2]) compared to baseline (time x condition: $p = 0.002$). Conclusion: Although speculative, an earlier spike in LC3-II following exercise in

the heat may result from hastened autophagic responses to degrade the increased protein aggregates. However, in comparison to healthy young men, changes in LC3-II appear to be delayed in healthy young women.

Yang, Antony

The effect of exercise on the human skeletal muscle phosphoproteome

Faculty Advisor: Dr. Stuart Phillips

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Advances in mass spectrometry now allow for a non-biased approach to identifying phosphorylated proteins. Analysis of the entire phosphoproteome is not feasible with traditional Western blotting as this method requires investigators to selectively choose the proteins of interest. We used a unilateral model to randomize 12 participants' (6 men and 6 women) legs to performance of resistance exercise (RE) or aerobic exercise (AE). Skeletal muscle biopsies were taken before, immediately after, and 3 hours after RE or AE and underwent a mass spectrometry-based analysis of the phosphorylated proteins following exercise. Each phosphorylated protein detected following exercise was categorized into clusters of proteins with similar patterns of change in phosphorylation and consistency of signal within and between subjects. Our data suggest that one cluster (Cluster 1) of proteins may be involved in pathways that lead to metabolic adaptations, such as mitochondrial biogenesis, and that a separate cluster (Cluster 4) of proteins may be linked with activating pathways that lead to muscle hypertrophy. However, we do not have extensive data on specific proteins that make up each cluster. We found that MAPKAPK2, MAPKAPK3, and MAPKAPK5 were activated immediately and 3h following RE. MAPKAPK2 was the only one of these proteins activated immediately following AE. These proteins were not activated in any of the other post-AE time points. Additionally, myofibrillar and sarcoplasmic protein synthesis were increased following both RE and AE, with myofibrillar protein synthesis rates being the highest following RE. Our findings provide insight into how acute exercise affects the phosphorylation status of various proteins, setting the groundwork for future studies, including how chronic exercise affects their phosphorylation status.

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Athlete perspectives on the prescription of rest following sport-related concussion

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Background: Following a formal diagnosis by a medical professional, athletes who have sustained a sport-related concussion (SRC) are typically prescribed some form of rest. Awareness of athlete perspectives regarding the prescription of rest is crucial to determining the overall efficacy of concussion management processes, yet athlete perspectives are surprisingly absent in the research. Objective: Therefore, this study aims to investigate athletes' perspectives regarding the prescription of rest following personal SRC injury. Methods: This research employs a mixed-methodological design. Method one. Participants will complete a brief survey examining their experiences and perspectives regarding the prescription of rest following SRC. Questions look at who prescribed their rest, how they personally define rest, and how well they adhered to the prescription of rest. The anticipated survey sample is 30 to provide a wide range of experiences. Participants must have sustained a SRC at any level of sport within the past year and be 18+ years of age. Method Two. Following completion of the survey, 6-8 participants with diverse experiences will be invited to complete a

follow-up 30-minute semi-structured interview to explore the survey themes in greater detail. An inductive approach will be used, where the data emerging from the surveys and interviews will guide the developing analysis. Results: Preliminary data from the surveys suggest that nearly all athletes formally diagnosed with a SRC receive some form of rest prescription that they typically closely adhere to. Notably, athlete perspectives suggest that prescriptions of rest frequently misalign with current concussion rehabilitation best practice guidelines. Complete data and its analysis will be presented at the conference. Conclusion: Athlete perspectives gathered from this study can help to inform the effectiveness of SRC recovery guidelines, and if they are being communicated adequately by professionals and internalized properly by athletes to promote athlete safety and timely recovery.