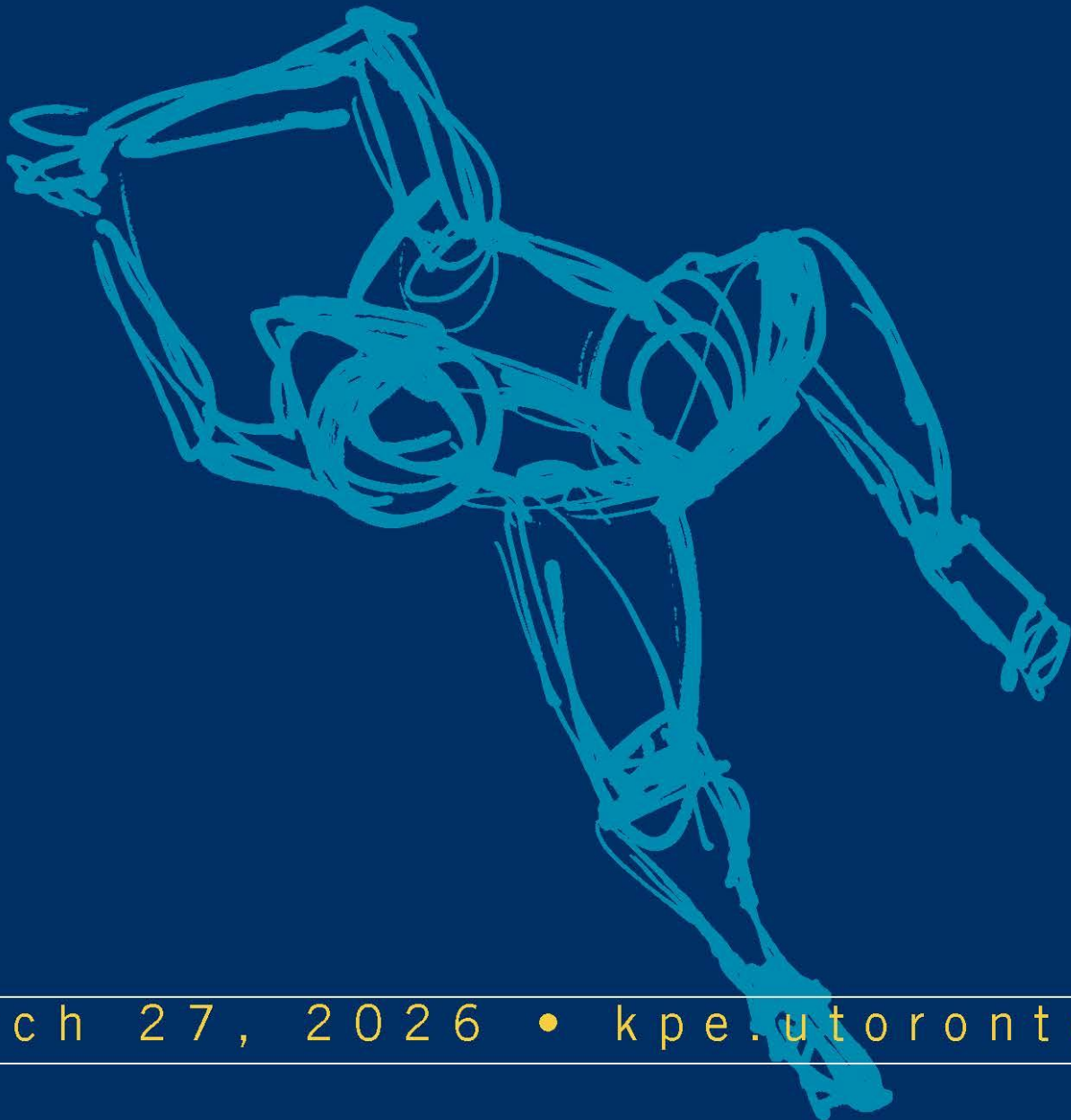




UNIVERSITY OF TORONTO
FACULTY OF KINESIOLOGY & PHYSICAL EDUCATION

THE 26th ANNUAL BERTHA ROSENSTADT
**NATIONAL UNDERGRADUATE
RESEARCH CONFERENCE**

KINESIOLOGY AND PHYSICAL EDUCATION



March 27, 2026 • kpe.utoronto.ca

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WELCOME TO THE 26th ANNUAL BERTHA ROSENSTADT NATIONAL UNDERGRADUATE RESEARCH CONFERENCE

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CONFERENCE HISTORY

Since 1999, the Bertha Rosenstadt National Undergraduate Research Conference has been hosted by the Faculty of Kinesiology and Physical Education at the University of Toronto. This multidisciplinary conference includes topics from exercise physiology, biomechanics, sports medicine, motor learning and control, exercise and sport psychology, philosophy, history, and sociology of sport. This conference gives undergraduate students the opportunity to present literature reviews, critiques, term papers, findings from research projects or works in-progress to peers and faculty. Awards of recognition are granted to the top presenters.

GENERAL INFORMATION

Conference Site

The conference will be held at the University of Toronto's St. George campus. In the morning, registration, welcome remarks, presentations and lunch will be held in the Athletic Centre across various rooms. The [Athletic Centre](#) is located on the west side of the University of Toronto's St. George campus at 55 Harbord St. It is accessible from the Spadina subway station and by streetcar. **Upon arrival, please make your way to the 1st floor Benson Lobby & Lounge for registration. The closest entrance to the Benson Lobby and Lounge, is 320 Huron Street – we recommend entering through the 320 Huron Street doors.**

In the afternoon, presentations will be held in various rooms of the Athletic Centre and on the first floor of the Sidney Smith Building, which is directly across the street off Huron.

Signage will be posted throughout both buildings to help guide attendees.

Parking

Metered, street parking is available around the periphery of the Athletic Centre. There is also an underground parking lot across the street at Graduate House, 60 Harbord Street. This parking lot can be accessed by traveling north on Spadina Ave. or east on Glen Morris Ave.

Bike racks are available in front of the Athletic Centre on Harbord St. and behind on Classic Ave.

WIFI Access

Those from institutions connected to eduroam can access WIFI by using their post secondary sign in credentials. Individual access codes are available for pick-up at the registration desk.



PRESENTATION INSTRUCTIONS

- All sessions will be hosted and presented **in person**.
- **Arrive early so you can register and be at your presentation room a minimum of 10 minutes before your session group starts.**
- Each presenter is allocated **10 minutes** for a verbal presentation and **additional 5 minutes** for questions & answers and transition between presenters. All presenters must answer at least 1 question.
- **Presentation file**
 - **Bring your PowerPoint presentation with you** ideally on a USB memory stick (or ability to download from an email or the cloud). Presenters will not be able to use their own laptop.
 - 10 minutes before your session group starts, **pre-load your presentation on the podium computers**. Your moderators will guide you on how to load your file on the computer for your presentation.
- Each session will have between 5 and 6 presentations and will be facilitated by 2 moderators.
- The moderators will welcome all the attendees, provide session housekeeping details, introduce the speakers, and facilitate questions.
- Please **intend to stay during the full session** to limit the distractions for presenters and to support your fellow colleagues and co-presenters.
- As this is an in-person conference, live in-person presentations will not be available virtually.

Room Assignments

Sessions/Items	Location
Registration	Benson Lobby - 1 st floor at 320 Huron St.
Welcome/ Keynote / Closing Remarks	Benson 307 (BN307)
Lunch & Breaks	2 nd Floor Benson Lounge
Sessions	Warren Stevens 2 nd Floor (WS2007) Warren Stevens Basement (WSB67) Benson 3 rd Floor (BN302, BN307, BN304) Sydney Smith (SS1071, SS1085)
Preparation Space	Sydney Smith (SS2104, SS2116, SS2119)
Multi-faith Room	Benson 2 nd floor, Dance Studio (8 a.m. - 5 p.m.)

SCHEDULE AT A GLANCE

Time		Item/Topic and Location							
8 a.m. -8:30 a.m.		Registration - Benson Lobby - 1st floor at 320 Huron St. Refreshments - 2nd Floor Benson Lounge							
8:30 a.m. – 8:45 a.m.		Welcome Remarks, Dean Gretchen Kerr - BN307							
8:45 a.m. – 8:55 a.m.		Housekeeping and Instructions, Misung Yim – BN307							
8:45 a.m. – 8:55 a.m.		BREAK- 2 nd Floor Benson Lobby & Lounge							
Time	Breakout sessions	Location							
		A - BN302	B - BN304	C - BN307	D – WS2007	E – WSB67	F – SS1071	G – SS1085	
8:55 a.m. – 10:25 a.m.	Breakout Sessions I	Cardiovascular and Muscle Physiology	Biomechanics and Exercise Interventions	Behavioural Studies and Physical Activity	Neurophysiology and Sensorimotor Learning	Skeletal Muscle and Physical Activity	No presentations in the morning		
10:25 a.m. – 10:35 a.m.	BREAK - 2nd Floor Benson Lobby & Lounge								
10:35 a.m. – 11:50 a.m.	Breakout Sessions II	Cardiovascular and Muscle Physiology*	Biomechanics and Exercise Interventions	Behavioural Studies and Physical Activity	Skeletal Muscle and Physical Activity	Neurophysiology and Sensorimotor Learning			
11:50 a.m. – 12:50 p.m.		LUNCH - 2nd Floor Benson Lobby & Lounge							
11:50 a.m. – 12:50 p.m.		Please travel and upload your presentation on the room computer by the following times:							
11:50 a.m. – 12:50 p.m.		By 12:50 p.m.					By 1:05 p.m.		
12:55 p.m. – 2:25 p.m.	Breakout Sessions III	Cardiovascular and Muscle Physiology	Biophysical Studies and Exercise Interventions	Neurophysiology and Sensorimotor Learning	Physical Cultural Studies	Cardio and Exercise Science	Skeletal Muscle and Physical Activity	Injury Rehabilitation and Exercise Interventions	
2:25 p.m. – 2:40 p.m.		BREAK - 2nd Floor Benson Lobby & Lounge							
2:40 p.m. – 3:55 p.m.	Breakout Sessions IV	Cardiovascular and Muscle Physiology	Biomechanics and Exercise Interventions	Behavioural Studies and Physical Activity	Cardio and Exercise Science	Physical Cultural Studies	Skeletal Muscle and Physical Activity	Neurophysiology and Sensorimotor Learning	
3:55 p.m. – 4:10 p.m.		BREAK - 2nd Floor Benson Lobby & Lounge							
4:10 p.m. – 4:50 p.m.		Keynote Presentation: “Research on Inspiration” – Dr. Andrew Ramsook– BN307							
4:50 p.m. – 5 p.m.		Awards Presentation and Closing Remarks – Dr. Catherine Amara - BN307							

Note: Session II-A (BN302): last presentation starts at 11:50 a.m.

List of Topics, Timing and Rooms

Topic	Time	Room	Session
Cardiovascular and Muscle Physiology	8:55 a.m. – 10:25 a.m.	BN302	I-A
Biomechanics and Exercise Interventions	8:55 a.m. – 10:25 a.m.	BN304	I-B
Behavioural Studies and Physical Activity	8:55 a.m. – 10:25 a.m.	BN307	I-C
Neurophysiology and Sensorimotor Learning	8:55 a.m. – 10:25 a.m.	WS2007	I-D
Skeletal Muscle and Physical Activity	8:55 a.m. – 10:25 a.m.	WSB67	I-E
Cardiovascular and Muscle Physiology*	10:35 a.m. – 12:05 p.m.	BN302	II-A
Biomechanics and Exercise Interventions	10:35 a.m. – 11:50 a.m.	BN304	II-B
Behavioural Studies and Physical Activity	10:35 a.m. – 11:50 a.m.	BN307	II-C
Skeletal Muscle and Physical Activity	10:35 a.m. – 11:50 a.m.	WS2007	II-D
Neurophysiology and Sensorimotor Learning	10:35 a.m. – 11:50 a.m.	WSB67	II-E
Cardiovascular and Muscle Physiology	12:55 p.m. – 2:25 p.m.	BN302	III-A
Biophysical Studies and Exercise Interventions	12:55 p.m. – 2:25 p.m.	BN304	III-B
Neurophysiology and Sensorimotor Learning	12:55 p.m. – 2:25 p.m.	BN307	III-C
Physical Cultural Studies	12:55 p.m. – 2:25 p.m.	WS2007	III-D
Cardio and Exercise Science	12:55 p.m. – 2:25 p.m.	WSB67	III-E
Skeletal Muscle and Physical Activity	1:10 p.m. – 2:25 p.m.	SS1071	III-F
Injury Rehabilitation and Exercise Interventions	1:10 p.m. – 2:10 p.m.	SS1085	III-G
Cardiovascular and Muscle Physiology	2:40 p.m. – 3:40 p.m.	BN302	IV-A
Biomechanics and Exercise Interventions	2:40 p.m. – 3:55 p.m.	BN304	IV-B
Behavioural Studies and Physical Activity	2:40 p.m. – 3:55 p.m.	BN307	IV-C
Cardio and Exercise Science	2:40 p.m. – 3:40 p.m.	WS2007	IV-D
Physical Cultural Studies	2:40 p.m. – 3:55 p.m.	WSB67	IV-E
Skeletal Muscle and Physical Activity	2:40 p.m. – 3:40 p.m.	SS1071	IV-F
Neurophysiology and Sensorimotor Learning	2:40 p.m. – 3:40 p.m.	SS1085	IV-G

*, Session II-A: last presentation starts at 11:50 a.m.

2026 KEYNOTE SPEAKER

Research on Inspiration

Dr. Andrew Ramsook

Time: 4:10 p.m. – 4:50 p.m. | Location: BN307

About the Keynote Speaker

[Dr. Ramsook](#) is an assistant professor at the University of Waterloo. He received his PhD at the University of British Columbia before completing a postdoctoral fellowship at Mayo Clinic (Minnesota, USA). His research program focuses on integrative physiology of exercise in humans with an emphasis on respiratory factors that influence exercise performance.



Abstract

The respiratory system's ability to generate sufficient alveolar ventilation is critical to the supply of oxygen to tissue and the elimination of metabolically produced carbon dioxide. During exercise, there is a commensurate increase in ventilation to match the greater metabolic demand. In the untrained and moderately trained healthy human, the capacity of the respiratory system outmatches the demands of maximal exercise. In this sense the respiratory system has been considered “overbuilt” for the demands of exercise. However, the healthy respiratory system may become a limiting factor to oxygen transport in the elite athlete where chronic exercise training results in myriad structural and functional adaptations to the physiological systems involved in oxygen transport with the exception of the respiratory system. On the other end of the spectrum of health, individuals living with chronic respiratory disease experience a devastating loss to the capacity of their respiratory system leading to respiratory limitations to activities of daily living. This talk will discuss how an integrative approach to human physiology has helped us explore respiratory limitations to exercise performance while touching on my own research pathway that started as an undergraduate researcher at the University of Toronto.

ORDER OF THE DAY

Time	Item/Topic and Location
8:00 a.m. - 8:30 a.m.	Registration - 1 st floor at 320 Huron St. Refreshments - 2 nd Floor Benson Lobby & Lounge
8:30 a.m. - 8:45 a.m.	Welcome Remarks - Dean Gretchen Kerr - BN307 Housekeeping and Instructions – Misung Yim – BN307
8:45 a.m. – 8:55 a.m.	BREAK- 2 nd Floor Benson Lobby & Lounge

Session I: 8:55 a.m. - 10:25 a.m.

Session	Room	Topic
Session I - A	BN302	Cardiovascular and Muscle Physiology
Session I - B	BN304	Biomechanics and Exercise Interventions
Session I - C	BN307	Behavioural Studies and Physical Activity
Session I - D	WS2007	Neurophysiology and Sensorimotor Learning
Session I - E	WSB67	Skeletal Muscle and Physical Activity
10:25 a.m. – 10:35 a.m.	BREAK	2nd Floor Benson Lounge

Session I - A: Cardiovascular and Muscle Physiology (BN302)

8:55 a.m.	<p>Session I-A in BN302</p> <p><i>The role of AMPK during age-associated changes in muscle fibre-type composition with MK8722 treatment</i></p> <p>Presenter: Priya Bordoloi Faculty Advisor: Vladimir Ljubcic, PhD McMaster University</p>
9:10 a.m.	<p>Session I-A in BN302</p> <p><i>The Effect of Moderate to High Habitual Physical Activity on Muscle Morphology and Capillarization in Older Adults</i></p> <p>Presenter: Joshua Sidharta Faculty Advisor: Daniel Moore, PhD University of Toronto</p>
9:25 a.m.	<p>Session I-A in BN302</p> <p><i>Investigating the Role of AMPK During Age-Associated Changes in Muscle Cross-sectional Area with MK8722 treatment</i></p> <p>Presenter: Zoe Elumir Faculty Advisor: Vladimir Ljubcic, PhD McMaster University</p>

9:40 a.m.	<p>Session I-A in BN302</p> <p><i>The Effect of Global CARM1 Inhibition on Skeletal Muscle Mitochondrial Morphology in Cancer Cachexia</i></p> <p>Presenter: Tetyana Revchuk Faculty Advisor: Vladimir Ljubcic, PhD McMaster University</p>
9:55 a.m.	<p>Session I-A in BN302</p> <p><i>Association Between Cardiorespiratory Fitness and Carotid Intima-Media Thickness in Endometrial Cancer Survivors</i></p> <p>Presenter: Niki Evini Faculty Advisor: Amy Kirkham, PhD University of Toronto</p>
10:10 a.m.	<p>Session I-A in BN302</p> <p><i>Investigating the retrograde influence of skeletal muscle-specific AMPK on spinal α-motor neurons</i></p> <p>Presenter: Alexandra Siminiuc Faculty Advisor: Vladimir Ljubcic, PhD McMaster University</p>

Session I - B: Biomechanics and Exercise Interventions (BN304)

8:55 a.m.	<p>Session I-B in BN304</p> <p><i>Sex based differences in hip arthroscopy biomechanical and patient reported outcomes: A systematic review</i></p> <p>Presenter: Anna May Faculty Advisor: Timothy Burkhart, PhD University of Toronto</p>
9:10 a.m.	<p>Session I-B in BN304</p> <p><i>Self-Selected vs. Goniometer-Prescribed Joint Angles in Isometric Mid-Thigh Pull Test-Retest Reliability and Net Peak Force Production</i></p> <p>Presenter: Murtaza Jafri Faculty Advisor: Dr. Stuart Phillips McMaster University</p>
9:25 a.m.	<p>Session I-B in BN304</p> <p><i>Comparison of Drop Jump Performance in Varsity Athletes With and Without a History of Concussion</i></p> <p>Presenter: Danaya McCormick Faculty Advisor: Dr. Michael Hutchison University of Toronto</p>

9:40 a.m.	<p>Session I-B in BN304</p> <p><i>Sex-Based Differences in Hip Biomechanics in Response to Dynamic Multiplanar Tasks</i></p> <p>Presenter: Yu Tong Zeng Faculty Advisor: Timothy Burkhart, PhD University of Toronto</p>
9:55 a.m.	<p>Session I-B in BN304</p> <p><i>Optimizing the Number of Cameras Required for Markerless Motion Capture of the Hands</i></p> <p>Presenter: Ryan Hogan Faculty Advisor: Peter Keir, PhD McMaster University</p>
10:10 a.m.	<p>Session I-B in BN304</p> <p><i>The Effectiveness of the Adrenalease Garment for Improving Posture in Cardiac Sonographers</i></p> <p>Presenter: Dorsa Eshaghi Faculty Advisor: Timothy Burkhart, PhD University of Toronto</p>

Session I - C: Behavioural Studies and Physical Activity (BN307)

8:55 a.m.	<p>Session I-C in BN307</p> <p><i>The Relationship Between Interoceptive Ability and Perceptions of Strain During Exercise</i></p> <p>Presenter: Brinly Yuen Faculty Advisor: Ira Jacobs, DMSc University of Toronto</p>
9:10 a.m.	<p>Session I-C in BN307</p> <p><i>Mental Fatigue and Physical Activity: Do Exercise Snacks Support Greater MVPA than Continuous Exercise in Sedentary University Students?</i></p> <p>Presenter: Jake Eddis Faculty Advisor: Steven Bray, PhD McMaster University</p>
9:25 a.m.	<p>Session I-C in BN307</p> <p><i>Weight fluctuation as a moderator of the association between stress and depression following breast cancer treatment</i></p> <p>Presenter: Andrew Hernan Mathias Alvarez Faculty Advisor: Catherine M. Sabiston, PhD University of Toronto</p>

9:40 a.m.	<p>Session I-C in BN307</p> <p><i>Associations Between Mood Disturbance, Hunger, and Metabolic Markers During Intermittent Fasting Protocols</i></p> <p>Presenter: Tiana Castiglione Co-author(s): Kristan Amendola, Jennifer Heisz Faculty Advisor: Jennifer Heisz, PhD McMaster University</p>
9:55 a.m.	<p>Session I-C in BN307</p> <p><i>Effect of prior sprint and endurance running results on tactics during elite 800m personal best performances</i></p> <p>Presenter: Shan Dhanoa Faculty Advisor: Dr. Tim Taha University of Toronto</p>
10:10 a.m.	<p>Session I-C in BN307</p> <p><i>The Effects of Stroke Rate and Drag Factor on Force and Power Profiles During Ergometer Rowing</i></p> <p>Presenter: Areeba Anwer Faculty Advisor: Peter J. Keir, PhD McMaster University</p>

Session I - D: Neurophysiology and Sensorimotor Learning (WS2007)

8:55 a.m.	<p>Session I-D in WS2007</p> <p><i>Are More Trials Always Better? Comparing Acquisition of a Golf-Putting Task With 5- or 10-Second Intertrial Intervals</i></p> <p>Presenter: Julia Kochanski Faculty Advisor: Dr. Luc Tremblay University of Toronto</p>
9:10 a.m.	<p>Session I-D in WS2007</p> <p><i>Investigating the effects of sex and body composition on responses to transcutaneous spinal stimulation</i></p> <p>Presenter: Jermyl Allen Acuzar Faculty Advisor: Dr. Gerome Manson Queen's University</p>
9:25 a.m.	<p>Session I-D in WS2007</p> <p><i>Should I wait or not before my next practice shot? Optimizing the acquisition of golf putts through inter-trial intervals.</i></p> <p>Presenter: Sam Coppa Faculty Advisor: Luc Tremblay, PhD University of Toronto</p>

9:40 a.m.	Session I-D in WS2007 <i>One Brain, One Dose: The Effect of Personalized tDCS Intensity on Motor Learning</i> Presenter: Tianlin Xiong Faculty Advisor: Joyce Chen, PhD University of Toronto
9:55 a.m.	Session I-D in WS2007 <i>I Robot: Upper-Limb Morphology Influences on Self-Other Body Mapping in a Body-Part Compatibility Task</i> Presenter: Zainab Bilal Faculty Advisor: Dr. Timothy Welsh & Aarohi Pathak, PhD University of Toronto
10:10 a.m.	Session I-D in WS2007 <i>Visual Contextual Cues</i> Presenter: Tejiri Inikori Faculty Advisor: Gerome Manson, PhD Queen's University

Session I - E: Skeletal Muscle and Physical Activity ([WSB67](#))

8:55 a.m.	Session I-E in WSB67 <i>Effects of Five Days of Bed Rest on Fasting Insulin Resistance and Postprandial Glycemic Control in Healthy Adults</i> Presenter: Paige Adams Faculty Advisor: Chris McGlory, PhD Queen's University
9:10 a.m.	Session I-E in WSB67 <i>Influence of Physical Activity Guideline Adherence on Insulin Resistance Across Women With Varying Estrogen Status</i> Presenter: Katelyn Wong Faculty Advisor: Amy Kirkham, PhD University of Toronto
9:25 a.m.	Session I-E in WSB67 <i>The Interaction of Low-Load Resistance Exercise and Protein Quality on Skeletal Muscle Adaptations and Glycemic Regulation in Older Adults</i> Presenter: Avesta Alizadeh Faculty Advisor: Dr. Stuart Phillips McMaster University

Session II: 10:35 a.m. – 11:50 a.m.

Session	Room	Topic
Session II - A	BN302	Cardiovascular and Muscle Physiology
Session II - B	BN304	Biomechanics and Exercise Interventions
Session II - C	BN307	Behavioural Studies and Physical Activity
Session II - D	WS2007	Skeletal Muscle and Physical Activity
Session II - E	WSB67	Neurophysiology and Sensorimotor Learning
11:50 a.m. – 12:50 p.m.		LUNCH
		2 nd Floor Benson Lounge

Session II - A: Cardiovascular and Muscle Physiology (BN302)

10:35 a.m.	<p>Session II-A in BN302</p> <p><i>Examining the Feasibility of a 14-Day Exogenous Ketone Supplementation Intervention in Adults with Subjective Cognitive Decline</i></p> <p>Presenter: Zena Manna Faculty Advisor: Jeremy Walsh, PhD McMaster University</p>
10:50 a.m.	<p>Session II-A in BN302</p> <p><i>Exploring the relationship between maximal and submaximal cardiovascular physiology</i></p> <p>Presenter: Youna Uehara Faculty Advisor: Dr. Robert F. Bentley University of Toronto</p>
11:05 a.m.	<p>Session II-A in BN302</p> <p><i>The Effects of Prior Night Sleep Duration and Quality on Resting Circulating BDNF</i></p> <p>Presenter: Katelynn Ambrose Faculty Advisor: Jeremy J. Walsh, PhD McMaster University</p>
11:20 a.m.	<p>Session II-A in BN302</p> <p><i>Repeatability of Vascular Assessments in Young Hormonal Contraceptive Users</i></p> <p>Presenter: Jake Procaccini Faculty Advisor: Maureen MacDonald, PhD McMaster University</p>
11:35 a.m.	<p>Session II-A in BN302</p> <p><i>The Effect of Microvascular Function on the Efficacy of Ischemic Preconditioning</i></p> <p>Presenter: Kim Malvin Sales Faculty Advisor: Dr. Robert F. Bentley University of Toronto</p>

11:50 a.m.	<p>Session II-A in BN302</p> <p><i>Middle Cerebral Artery Pulsatility Index During and After Rowing vs. Intensity-Matched Cycling in Healthy Young Adults</i></p> <p>Presenter: Makye Wilkinson Faculty Advisor: Baara Al-Khazraji, PhD McMaster University</p>
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Session II - B: Biomechanics and Exercise Interventions (BN304)

10:35 a.m.	<p>Session II-B in BN304</p> <p><i>Comparison of Suture Techniques for Subscapularis Tendon Repair</i></p> <p>Presenter: Abdul Jalil Amina Faculty Advisor: Timothy Burkhart, PhD University of Toronto</p>
10:50 a.m.	<p>Session II-B in BN304</p> <p><i>Age- and Sex- Related Differences in Mechanical Fatigue Behaviour of Human Tendons</i></p> <p>Presenter: Wesley Carson Faculty Advisor: Jackie Zehr, PhD University of Toronto</p>
11:05 a.m.	<p>Session II-B in BN304</p> <p><i>Fatigue-Related Changes in Knee Joint Angle Reproduction Accuracy After Anterior Cruciate Ligament Reconstruction</i></p> <p>Presenter: Jodh Gill Faculty Advisor: Timothy Burkhart, PhD University of Toronto</p>
11:20 a.m.	<p>Session II-B in BN304</p> <p><i>Evaluating the Short-Term Impact of the FIFA 11+ on the Biomechanical Responses and Jump-Landing Mechanics in Youth Female Soccer Players</i></p> <p>Presenter: Lauren Henriksson Faculty Advisor: Paolo Sanzo, DSc Lakehead University</p>
11:35 a.m.	<p>Session II-B in BN304</p> <p><i>Development and validation of an in-vitro cadaveric model of the Chronic Anterior Cruciate Ligament Deficient ("CAD") knee</i></p> <p>Presenter: Lara El-Darazi Faculty Advisor: Timothy A. Burkhart, PhD University of Toronto</p>

Session II - C: Behavioural Studies and Physical Activity (BN307)

10:35 a.m.	Session II-C in BN307 <i>The Secrecy of Grooming in Sport: An Analysis of a Gymnastics Canada Case</i> Presenter: Alaina Tsimicalis Faculty Advisor: Gretchen Kerr, PhD University of Toronto
10:50 a.m.	Session II-C in BN307 <i>Daily Movement Matters: Identifying Latent Activity Profiles and Psychosocial Correlates in Prostate Cancer Survivors</i> Presenter: Andy Yip Faculty Advisor: Dr. Linda Trinh University of Toronto
11:05 a.m.	Session II-C in BN307 <i>Mental Health Screening in Canadian Pre-participation Evaluations: A National Mixed-Methods Content Analysis</i> Presenter: Abby Wang Faculty Advisor: Catherine Sabiston, PhD University of Toronto
11:20 a.m.	Session II-C in BN307 <i>Standardized Safety: A Content Analysis of Concussion Education in Ontario Under Rowan's Law</i> Presenter: Mathusiga Sivakumar Faculty Advisor: Kaleigh Pennock, PhD University of Waterloo
11:35 a.m.	Session II-C in BN307 <i>The Effects of a Combined Cognitive-Physical Warm-Up on Psychological Readiness in Older Adults</i> Presenter: Carmen McKay Faculty Advisor: Steven Bray, PhD McMaster University

Session II - D: Skeletal Muscle Health and Physical Activity (WS2007)

10:35 a.m.	Session II-D in WS2007 <i>The Role Of Ampk In The Skeletal Muscle Response to Neuromuscular Stress</i> Presenter: Atta Yazdy Faculty Advisor: Vladimir Ljubcic, PhD McMaster University
10:50 a.m.	Session II-D in WS2007 <i>A Comparison of Muscle Protein Synthesis in Response to Single Bolus or Split Feeding Following Whole-Body Resistance Exercise</i> Presenter: Elizabeth Baker Faculty Advisor: Stuart Phillips, PhD McMaster University
11:05 a.m.	Session II-D in WS2007 <i>Urinary Marker of Muscle Protein Breakdown is Unaffected by Dietary Protein Intake or Sex in Endurance-trained Males and Females During Post-exercise Recovery</i> Presenter: Hania Eskandarinezhad Faculty Advisor: Dr. Daniel Moore University of Toronto
11:20 a.m.	Session II-D in WS2007 <i>Differences in Plasma Amino Acid Kinetics and Appetite Regulation Following Single-Bolus vs Split Protein Feeding Patterns After Whole Body Resistance Exercise</i> Presenter: Luke Mathew Faculty Advisor: Dr. Stuart Phillips McMaster University
11:35 a.m.	Session II-D in WS2007 <i>Effects of Feeding Patterns on mTORC1 and Lysosome Trafficking in Human Skeletal Muscle</i> Presenter: Michael Sampaio Faculty Advisor: Stuart Phillips, Ph.D., FACSM, FCAHS, FCSEP, FRSC McMaster University

Session II - E: Neurophysiology & Sensorimotor Learning (WSB67)

10:35 a.m.	Session II-E in WSB67 <i>Standardizing Exercise-Induced Muscle Damage: High-Load Eccentrics Reliably Reduce Elbow Flexor Maximum Voluntary Contraction at 24h Post-Exercise</i> Presenter: Jonathan Stringer Faculty Advisor: Dr. Gerome Manson Queen's University
10:50 a.m.	Session II-E in WSB67 <i>Investigating the effects of lorazepam and baclofen on interhemispheric inhibition</i> Presenter: Krystal Kwok Faculty Advisor: Aimee Nelson, PhD McMaster University
11:05 a.m.	Session II-E in WSB67 <i>Vestibular Contributions to Reaching Accuracy Across Sensory Modalities</i> Presenter: Matthew Pesce Faculty Advisor: Dr. Gerome Manson Queen's University
11:20 a.m.	Session II-E in WSB67 <i>Should we prioritize error detection mechanisms or memory consolidation during early practice? The case of golf putts</i> Presenter: Mehar Lekhi Faculty Advisor: Luc Tremblay, PhD University of Toronto
11:35 a.m.	Session II-E in WSB67 <i>Implicit Motor Sequence Learning in Novice Participants Performing a Piano Based Task</i> Presenter: Rony Lee Faculty Advisor: Gerome Manson, PhD Queen's University

11:50 a.m. – 12:50 p.m.

LUNCH

2nd Floor Benson Lounge

Session III: 12:55 p.m. - 2:25 p.m.

Session	Room	Topic
Session III - A	BN302	Cardiovascular and Muscle Physiology
Session III - B	BN304	Biophysical Studies and Exercise Interventions
Session III - C	BN307	Neurophysiology and Sensorimotor Learning
Session III - D	WS2007	Physical Cultural Studies
Session III - E	WSB67	Cardio and Exercise Science
Session III - F	SS1071	Skeletal Muscle and Physical Activity
Session III - G	SS1085	Injury Rehabilitation and Exercise Interventions
2:25 p.m. – 2:40 p.m.		BREAK
		2 nd Floor Benson Lounge

Session III - A: Cardiovascular and Muscle Physiology (BN302)

12:55 p.m.	<p>Session III-A in BN302</p> <p><i>Oxidative Stress-Biomarker Interactions and the Role of Exercise Training in Early Vascular Dysfunction in Young Adults with Type 1 Diabetes</i></p> <p>Presenter: Hiya Shah Faculty Advisor: Maureen MacDonald, PhD McMaster University</p>
1:10 p.m.	<p>Session III-A in BN302</p> <p><i>Effects of 12 Weeks of Exercise Training on Carotid Distensibility in Young Adults with Type 1 Diabetes</i></p> <p>Presenter: Jonathan Rzepka Faculty Advisor: Dr. Maureen MacDonald McMaster University</p>
1:25 p.m.	<p>Session III-A in BN302</p> <p><i>Time-dependent effects of ADHD stimulants medications on arterial stiffness and hemodynamics in adults</i></p> <p>Presenter: Hayley So Faculty Advisor: Jason Au, PhD University of Waterloo</p>
1:40 p.m.	<p>Session III-A in BN302</p> <p><i>Assessing the Repeatability of Global Cerebral Blood Flow Within a Given Menstrual Cycle or Oral Contraceptive Pill Phase</i></p> <p>Presenter: Karina Bhargava Faculty Advisor: Baraa Al-Khazraji, PhD McMaster University</p>

1:55 p.m.	<p>Session III-A in BN302</p> <p><i>Hormonal-Metabolic Signatures of Cognitive Aging in Health and Neurodegeneration: Associations of Estradiol, FSH, and Glucose in Females Aged 65+</i></p> <p>Presenter: Emma Kalapun Faculty Advisor: Laura Fitzgibbon-Collins, PhD Western University</p>
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Session III - B: Biophysical Studies and Exercise Interventions (BN304)

12:55 p.m.	<p>Session III-B in BN304</p> <p><i>The effect of six hours of continuous hypoxemia on appetite in fasted adult females: preliminary findings from a randomized crossover trial</i></p> <p>Presenter: Alice Bohlen Faculty Advisor: Pascal Imbeault, PhD University of Ottawa</p>
1:10 p.m.	<p>Session III-B in BN304</p> <p><i>Changes in exercise oxygen uptake during low volume sprint interval training</i></p> <p>Presenter: Sofia Grossi Faculty Advisor: Martin J. Gibala, PhD McMaster University</p>
1:25 p.m.	<p>Session III-B in BN304</p> <p><i>The effects of high-intensity interval training versus moderate-intensity continuous training on cardiometabolic health in perimenopausal females</i></p> <p>Presenter: Roya Rahmani Faculty Advisor: Dr. Jenna Gillen University of Toronto</p>
1:40 p.m.	<p>Session III-B in BN304</p> <p><i>Endothelial Function in Women During a Ten Week, Low Load Resistance Training Intervention</i></p> <p>Presenter: Lily D. Bauman Faculty Advisor: Baraa Al-Khazraji, PhD McMaster University</p>
1:55 p.m.	<p>Session III-B in BN304</p> <p><i>Nine-Month Treatment of Senolytics, Aerobic Exercise, or Both Combined Improve Myocardial Performance</i></p> <p>Presenter: Kieronne Rodrigues Faculty Advisor: Ryan Bevington, PhD & Dr. Gianni Parise McMaster University</p>
2:10 p.m.	<p>Session III-B in BN304</p> <p><i>The Effects of Menstrual Cycle Phase-Based Sprint Interval Training on Performance, Aerobic, and Anaerobic Capacity</i></p> <p>Presenter: Jonathan Huang</p>

Faculty Advisor: Dr. Jenna Gillen
University of Toronto

Session III - C: Neurophysiology and Sensorimotor Learning (BN307)

12:55 p.m.	Session III-C in BN307 <i>Evaluating Alternative Electromyography Normalization Methods</i> Presenter: Claire McLaughlin Faculty Advisor: Timothy Burkhart, PhD University of Toronto
1:10 p.m.	Session III-C in BN307 <i>Golfers' Perception of the Application of Motor Learning Principles</i> Presenter: Paramjyot Singh Kainth Faculty Advisor: Luc Tremblay, PhD University of Toronto
1:25 p.m.	Session III-C in BN307 <i>Lower Limb Control and Foot Dominance in Elite and Non-Elite Athletes: A Comparative Study</i> Presenter: Jacob Snelgrove Faculty Advisor: Dr. Gerome Manson Queen's University
1:40 p.m.	Session III-C in BN307 <i>Investigating the Role of Gradual Motor Adaptation in Interference Between Competing Visuomotor Rotations</i> Presenter: Nathan Castanheiro Faculty Advisor: Dr. Timothy Welsh University of Toronto
1:55 p.m.	Session III-C in BN307 <i>The Influence of Intertrial Interval on Error Estimation during Golf Putts</i> Presenter: Rafael Rodrigues Simoes Faculty Advisor: Luc Tremblay, PhD University of Toronto
2:10 p.m.	Session III-C in BN307 <i>Golf Coaches Perception on the Application of Motor Learning Principles</i> Presenter: Arya Poorchavoshzadeh Faculty Advisor: Luc Tremblay, PhD University of Toronto

Session III - D: Physical Cultural Studies (WS2007)

12:55 p.m.	<p>Session III-D in WS2007</p> <p><i>Rewriting Hazing: Media Narratives, Sexual Violence, and Shifting Social Values in Canadian Sport</i> Presenter: Xavier D'silva Faculty Advisor: Dr. Daniel Sailofsky University of Toronto</p>
1:10 p.m.	<p>Session III-D in WS2007</p> <p><i>Navigating inequities between healthcare practitioners and disabled clients: a multi-perspective approach</i> Presenter: Gerard Reginio Faculty Advisor: Dr. Kyoung June Yi McMaster University</p>
1:25 p.m.	<p>Session III-D in WS2007</p> <p><i>Athletes from Racialized Communities in Canada: Using Sport as a Space for Identity Formation, Community Connection, and Belonging.</i> Presenter: Jhanvi Panchal Faculty Advisor: Kyoung June Yi, PhD McMaster University</p>
1:40 p.m.	<p>Session III-D in WS2007</p> <p><i>Exploring the Experiences of Culturally-Relevant Wellness Initiatives for Diverse Canadian University Student-Athletes Through an Arts-Based Representative Collage Task</i> Presenter: Kayla Marie Chow Faculty Advisor: Simon Darnell, PhD University of Toronto</p>
1:55 p.m.	<p>Session III-D in WS2007</p> <p><i>The Collective and Distinct Influences of Culture, Access, and Belonging on Physical Activity Among First- and Second-Generation Immigrant Families</i> Presenter: Kristen Yee Faculty Advisor: Kyoung June Yi, PhD McMaster University</p>
2:10 p.m.	<p>Session III-D in WS2007</p> <p><i>Beyond Visibility: Indigenous Disability Narratives and Community Practice in Maskwacis Nations</i> Presenter: Zicheng Yao Faculty Advisor: Tricia McGuire-Adams, PhD University of Toronto</p>

Session III - E: Cardio and Exercise Science (WSB67)

12:55 p.m.	<p>Session III-E in WSB67</p> <p><i>The Role of Aerobic Fitness on Middle Cerebral Artery Blood Velocity Fluctuations During Prolonged Rowing</i> Presenter: Bahar Alasti</p>
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	Faculty Advisor: Baraa Al-Khazraji, PhD McMaster University
1:10 p.m.	Session III-E in WSB67 Central and Peripheral Hemodynamic Implications of Body Position During Submaximal Cycling Presenter: Nathaniel Wolfs Faculty Advisor: Dr. Robert F. Bentley University of Toronto
1:25 p.m.	Session III-E in WSB67 The Influence of Cardiorespiratory Fitness and Sex on Arterial Stiffness Responses to Acute Rowing Exercise Presenter: Shazmeen Shakeel Faculty Advisor: Baraa Al-Khazraji, PhD McMaster University
1:40 p.m.	Session III-E in WSB67 Impact of Aromatase Inhibitors on Cerebrovascular Function in Breast Cancer Survivors Presenter: Celine Safati Faculty Advisor: Amy Kirkham, PhD University of Toronto
1:55 p.m.	Session III-E in WSB67 Consistency in Cardiovascular Responses Across Exercise Type and Position Presenter: Sicheng Hong Faculty Advisor: Dr. Robert F. Bentley University of Toronto
2:10 p.m.	Session III-E in WSB67 Cardiovascular Disease Event Risk Among Patients Undergoing Non-Cardiac Surgery Presenter: Sebeena Seby Faculty Advisor: Dr. Daniel Santa Mina University of Toronto

Session III - F: Skeletal Muscle and Physical Activity (SS1071)

1:10 p.m.	Session III-F in SS1071 Changes in Strength Endurance Following A-Type Proanthocyanidin Supplementation in Rock Climbers Presenter: Natasha Fedorsen Faculty Advisor: Andreas Bergdahl, PhD Concordia University
1:25 p.m.	Session III-F in SS1071 Investigating the Effects of Progesterone on Muscular Fatigue in Healthy Premenopausal Females Presenter: Hafsa Ali

	Faculty Advisor: Dr. Stuart Phillips McMaster University
1:40 p.m.	Session III-F in SS1071 <i>The Effect of an A-Type Proanthocyanidin-Rich Cranberry Supplement on Lactate Accumulation in Rock Climbers</i> Presenter: Kate Kraemer Faculty Advisor: Dr. Andreas Bergdahl Concordia University
1:55 p.m.	Session III-F in SS1071 <i>Effects of Polyphenol Supplementation and Exercise on Physical Performance in Older Adults: A Randomized Controlled Pilot Feasibility Trial</i> Presenter: Mathews Antony Faculty Advisor: Chris McGlory, PhD Queen's University
2:10 p.m.	Session III-F in SS1071 <i>Comparing Fatigue Measures to an Aerobic, Isometric, and Aerobic-Anaerobic Fatigue Protocol</i> Presenter: Ayden Sendeki Faculty Advisor: Timothy Burkhart, PhD University of Toronto

Session III - G: Injury Rehabilitation and Exercise Interventions (SS1085)

1:10 p.m.	Session III-G in SS1085 <i>Neuroimaging Correlates of Exertional Test Performance Following Sport-Related Concussion</i> Presenter: Katie Stanojlovic Faculty Advisor: Dr. Michael Hutchison University of Toronto
1:25 p.m.	Session III-G in SS1085 <i>Prehabilitation among Frail and Non-Frail Patients undergoing Elective Surgery</i> Presenter: Lauren Amanda Lee Faculty Advisor: Santa Mina, PhD & Daniel Sibley ,RKin, PhD University of Toronto
1:40 p.m.	Session III-G in SS1085 <i>Evaluating Recovery and Meaningful Change After ACL Reconstruction Using the Knees Numeric-Entity Scale (KNEES-ACL) Questionnaire</i> Presenter: Layne Jessup Faculty Advisor: Dianne Bryant, PhD Western University
1:55 p.m.	Session III-G in SS1085 <i>Exploring Concussion Symptom Profiles and Patterns Among Canadian Special Olympics Athletes</i> Presenter: Dylan Silver

Faculty Advisor: Kelly Arbour-Nicitopoulos, PhD
University of Toronto

2:25 p.m. – 2:40 p.m.

BREAK

2nd Floor Benson Lounge

Session IV: 2:40 p.m. - 3:55 p.m.

Session	Room	Topic
Session IV - A	BN302	Cardiovascular and Muscle Physiology
Session IV - B	BN304	Biomechanics and Exercise Interventions
Session IV - C	BN307	Behavioural Studies and Physical Activity
Session IV - D	WS2007	Cardio and Exercise Science
Session IV - E	WSB67	Physical Cultural Studies
Session III - F	SS1071	Skeletal Muscle and Physical Activity
Session III - G	SS1085	Neurophysiology and Sensorimotor Learning
3:55 p.m. – 4:10 p.m.		BREAK
		2nd Floor Benson Lounge

Session IV - A: Cardiovascular and Muscle Physiology ([BN302](#))

2:40 p.m.	<p>Session IV-A in BN302</p> <p><i>The Influence of Emergency Contraception on D-dimer Concentrations in Healthy Premenopausal Females.</i></p> <p>Presenter: Ava Forbes-Schnick Faculty Advisor: Maureen MacDonald, PhD McMaster University</p>
2:55 p.m.	<p>Session IV-A in BN302</p> <p><i>The effects of short-term bed rest on mitochondrial content and respiration</i></p> <p>Presenter: Yasmin Asadi Faculty Advisor: Chris McGlory, PhD Queen's University</p>
3:10 p.m.	<p>Session IV-A in BN302</p> <p><i>The Effect of Limb and Biological Sex on Macro and Micro -Vascular Function</i></p> <p>Presenter: Aisha Khan Faculty Advisor: Dr. Robert Bentley University of Toronto</p>
3:25 p.m.	<p>Session IV-A in BN302</p> <p><i>The Effect of Physical Limb Characteristics on Blood Flow and Muscle Oxygenation</i></p> <p>Presenter: Heeva Ramezankhani Faculty Advisor: Dr. Robert F. Bentley University of Toronto</p>

Session IV - B: Biomechanics and Exercise Interventions (BN304)

2:40 p.m.	Session IV-B in BN304 <i>The Effects of No Tape Compared to Kinesio Tape® on Knee Valgus Mechanics in Basketball Players</i> Presenter: Alana Zawadski Faculty Advisor: Paolo Sanzo, DSc Lakehead University
2:55 p.m.	Session IV-B in BN304 <i>Epidemiology of Proximal Adductor and Trunk Musculoskeletal Injuries: A Retrospective Review at the David L. MacIntosh Sport Medicine Clinic</i> Presenter: Fatima Zahra Faculty Advisor: Timothy Burkhart, PhD University of Toronto
3:10 p.m.	Session IV-B in BN304 <i>Pose-Based Kinematic Archetypes in Elite Soccer: A Proof-of-Concept Framework for Role-Specific Movement Profiling</i> Presenter: Kal Kiswani Faculty Advisor: Joseph Baker, PhD University of Toronto
3:25 p.m.	Session IV-B in BN304 <i>The Effect of Wrist Guards on Radial and Ulnar Load Distribution in Adolescent Gymnasts: Implications for Preventing Distal Radius Physeal Stress Syndrome</i> Presenter: Kristy Chow Faculty Advisor: Timothy Burkhart, PhD University of Toronto
3:40 p.m.	Session IV-B in BN304 <i>Nature of Unilateral Reactive Strength and Force Absorption in Youth Baseball Players</i> Presenter: Nolan Height Faculty Advisor: Dr. Eryk Przysucha Lakehead University

Session IV - C: Behavioural Studies and Physical Activity (BN307)

2:40 p.m.	Session IV-C in BN307 <i>Policies on Heat Stress and Human Limits in Motor Sport: Implications for Occupational Exposure and Cognitive Function</i> Presenter: Amina Abdul Jalil Faculty Advisor: Madeleine Orr, PhD University of Toronto
2:55 p.m.	Session IV-C in BN307 <i>Strengths-Based Dyadic Coping and Physical Activity Engagement Among Spousal Care Partners of Individuals with Parkinson's Disease</i> Presenter: Asmi Khanna Faculty Advisor: Tuoyo Awani, MBBS, FRCPsych, CCT (UK), PG Cert HCL, CINP University of Toronto
3:10 p.m.	Session IV-C in BN307 <i>Past to Present: Canadian University of Toronto Students' Experiences with Screen Usage and Its Impact on Social Development</i> Presenter: Michelle Miao Pang Faculty Advisor: Sabrina Razack, PhD University of Toronto
3:25 p.m.	Session IV-C in BN307 <i>University Students' and Student Athletes' Perceptions of Concussion Recovery: Comparing Views on "Rest" with Current Guidelines Protocols</i> Presenter: Tina He Faculty Advisor: Dr. Lynda Mainwaring & Dr. Michael Jorgensen University of Toronto
3:40 p.m.	Session IV-C in BN307 <i>The Evolving Narrative of Media Coverage on Women's Concussion and Sports Stories</i> Presenter: Kelly Dao Faculty Advisor: McKenzieKaleigh Pennock, PhD & Braeden McKenzie, PhD University of Waterloo

Session IV - D: Cardio and Exercise Science (WS2007)

2:40 p.m.	Session IV-D in WS2007 <i>Exploring associations between reproductive timing and later-life cardiovascular and cognitive health outcomes in postmenopausal women</i> Presenter: Jaclyn Baggley Faculty Advisor: Laura Fitzgibbon-Collins, PhD Western University
2:55 p.m.	Session IV-D in WS2007 <i>Menopausal Status and Vascular Health Markers in Women with Increased Cardiovascular Risk</i> Presenter: Ruolan Cao Faculty Advisor: Amy Kirkham, PhD University of Toronto
3:10 p.m.	Session IV-D in WS2007 <i>Using Blood Flow Restriction in a Yoga Program to Improve Flexibility for Older Adults</i> Presenter: Mefrige Mikaela Faculty Advisor: Andreas Bergdahl, PhD Concordia University
3:25 p.m.	Session IV-D in WS2007 <i>Dual-Task Mobility in Older Women Following a 10-week Line Dancing Program with Blood Flow Restriction</i> Presenter: Rudy Grief Faculty Advisor: Andreas Bergdahl, PhD Concordia University

Session IV - E: Physical Cultural Studies (WSB67)

2:40 p.m.	Session IV-E in WSB67 <i>Collaborative Reflection and Co-learning: How Student Staff, Placement Student, and Volunteers Navigate Inclusive Practice Together</i> Presenter: Sophia Nakamura Faculty Advisor: Dr. Kyoung June Ki. & Dr. Yi Uk Kim McMaster University
2:55 p.m.	Session III-D in WSB67 <i>Photovoice as Resistance and Growth: Supporting Autonomy, Self-Determination, and Self-Advocacy Towards Active Living Among Older Adults with Disabilities</i> Presenter: Kennedy Penney Faculty Advisor: Dr. Kyoung June Ki. & Dr. Yi Uk Kim McMaster University
3:10 p.m.	Session IV-E in WSB67 <i>Constructing Physical Disability in Canadian K-8 Physical Education: A Critical Disability Theory Analysis of Curriculum Policy</i> Presenter: Monika K. Girn Faculty Advisor: Kelly Arbour-Nicitopoulos, PhD University of Toronto
3:25 p.m.	Session IV-E in WSB67 <i>An Analysis of Sport for Development and Peace Programs in East Asia: Current Landscape and Barriers to Growth</i> Presenter: Alice Cheng Faculty Advisor: Simon Darnell, PhD University of Toronto
3:40 p.m.	Session IV-E in WSB67 <i>Revising a Mental Health Educational Resource for Para Sport Coaches: A Qualitative Focus Group Study</i> Presenter: Nicole Tzanetakis Faculty Advisor: Kelly Arbour-Nicitopoulos, PhD University of Toronto

Session IV - F: Skeletal Muscle and Physical Activity (SS1071)

2:40 p.m.	Session IV-F in SS1071 <i>The Effects of Higher versus Lower Load Resistance Training on Body Composition in Young, Healthy Females</i> Presenter: Yunjia Yang Faculty Advisor: Dr. Stuart Phillips McMaster University
2:55 p.m.	Session IV-F in SS1071 <i>Lighter Weights, Big Gains: Investigating the Effects of Higher Versus Lower Load Resistance Training on Hypertrophy and Strength in Young Females</i> Presenter: Colter Naphin Faculty Advisor: Stuart Phillips, PhD McMaster University
3:10 p.m.	Session IV-F in SS1071 <i>Assessing Knee Extensor Strength and Power During Short-Term Bedrest in Young Adults</i> Presenter: Anna Robertson Faculty Advisor: Chris McGlory, PhD Queen's University
3:25 p.m.	Session IV-F in SS1071 <i>MRI-derived changes in quadriceps muscle volume following 5 days of bedrest and a comparison of semi-automated and fully automated segmentation methods</i> Presenter: Leor Cohen Faculty Advisor: Chris McGlory, PhD Queen's University

Session IV - G: Neurophysiology and Sensorimotor Learning (SS1085)

2:40 p.m.	<p>Session IV-G in SS1085</p> <p><i>Did you hear that? The Implications on Action-Effect Coupling on a Serial Movement Task</i></p> <p>Presenter: Martina Kacan Faculty Advisor: Tim Welsh, PhD University of Toronto</p>
2:55 p.m.	<p>Session IV-G in SS1085</p> <p><i>The Effect of Musical Pleasure and Groove on Motor Skill Learning</i></p> <p>Presenter: Angel Leong Faculty Advisor: Joyce Chen, BSc PT, PhD University of Toronto</p>
3:10 p.m.	<p>Session IV-G in SS1085</p> <p><i>Investigating Conscious Access to Motor Characteristics during Reaching Movements</i></p> <p>Presenter: Mackenzie Mrazik Faculty Advisor: Craig Chapman, PhD University of Alberta</p>
3:25 p.m.	<p>Session IV-G in SS1085</p> <p><i>A Tale of Two Realities: Distinct Sensorimotor Adaptation Process for Immersive Virtual Reality and Video-Passthrough Mixed Reality</i></p> <p>Presenter: Grant Monahan Faculty Advisor: Timothy Welsh, PhD University of Toronto</p>

Time	Item/Topic and Location
3:55 p.m. - 4:10 p.m.	BREAK- 2 nd Floor Benson Lobby & Lounge
4:10p.m. – 4:50 p.m.	Keynote – Dr. Dr. Andrew Ramsook - BN307
4:50 p.m. – 5:00 p.m.	Award Presentation and Closing Remarks – Dr. Catherine Amara – BN307

ABSTRACTS

(By session)

Session: I-A
Time: 8:55 a.m.
Location: BN302

The role of AMPK during age-associated changes in muscle fibre-type composition with MK8722 treatment

Presenter: Priya Bordoloi

Co-author(s): Cora E Jornacion, Andrew I Mikhail, Stephanie R Mattina, Magda A Lesinski, Vladimir Ljubicic

Faculty Advisor: Vladimir Ljubicic, PhD
McMaster University

BACKGROUND: Aging skeletal muscle demonstrates increased degeneration and atrophy risks. This is exacerbated by mitochondrial dysfunction through age-associated reactive oxygen species accumulation and oxidative stress. AMP-activated protein kinase (AMPK) mediates metabolism by upregulating oxidative procedures including autophagy, mitochondrial fission, and mitochondrial biogenesis when activated by high AMP:ATP ratios. Previous studies identified several associations with aging, including declining AMPK expression in skeletal muscle and changes in muscle-fibre composition, with fewer fast-twitch glycolytic fibres and increased slow-twitch oxidative fibre counts. While this suggests possible links between AMPK expression, age, and skeletal muscle function, there is a literature gap regarding relationships between AMPK and skeletal muscle health using aged inducible AMPK-knockout methods. This study aims to explore effects of muscle-specific AMPK on muscle-fibre composition with a broader goal of investigating its role in overall muscle function. **METHODS:** mice aged 16-18 months were either wild-type (WT) or treated with tamoxifen to induce AMPK $\beta 1\beta 2$ muscle-specific knockout (imKO). At 18-20 months, groups were randomly assigned to receive either vehicle (Veh) treatment or an AMPK chemical activator MK8722 (n=10). Tissues were collected at 20-22 months old, and underwent fiber-type specific myosin heavy chain (MHC) staining on gastrocnemius cross-sections. Immunohistochemical staining with antibodies for MHC variants expressed by fibre types allows visualization of muscle composition. Images were analyzed on NIS-Elements. **RESULTS:** In both treatment groups, type 2B fibres were increased in imKO mice compared to WT. In imKO mice, MK8722-treated mice had fewer type 1 fibres than Veh. Between Veh groups, imKO type 2A fibre counts were lower relative to WT. Type 2X fibre counts were less in imKO compared to WT in MK8722-treated groups. **SIGNIFICANCE:** Findings suggest possible associations between AMPK knockout and increased glycolytic fibre type. Future directions include repeating analysis in younger WT and AMPK-imKO cohorts to further observe age factors.

The Effect of Moderate to High Habitual Physical Activity on Muscle Morphology and Capillarization in Older Adults

Presenter: Joshua Sidharta

Co-author(s): Paul Babits, Cassidy T. Tinline-Goodfellow, Hugo J.W. Fung, Nigel LeGood, Stephanie Estafanos, Dinesh Khumbare, Jenna B. Gillen, Daniel R. Moore

Faculty Advisor: Daniel Moore, PhD
University of Toronto

Introduction: Aging is characterised by pathological changes in muscle morphology such as myofibre atrophy, obscured myofibre morphology, and capillary refraction. One such morphological metric, shape factor index (SFI), which measures the degree of uniform circularity in muscle cross sections pathologically increases during aging. Interestingly, previous literature has demonstrated that heavy resistance training (RT) reverses this phenotype, by reducing SFI, thereby increasing uniform myofibre circularity. In comparison to heavy RT, increasing habitual physical activity through walking may be a more feasible intervention for an older population; whether habitual physical activity could also attenuate age-related morphological changes in muscle, has yet to be examined. Therefore, this project will aim to evaluate if differing levels of habitual physical activity in older adults influence fibre-type-specific morphology and capillarization. **Methods:** Using resting skeletal muscle biopsy samples from the vastus lateralis of an older adult cohort (69y±5y; 10M, 10F), participants will be stratified into active (<13,000 steps/d; N=10) and highly active (>13,000 steps/d; N=10) habitual physical activity groups. Myofibre borders, fibre type, and capillaries will be visualized by immunofluorescence staining for laminin, myosin heavy chain I, and CD31, respectively. Digital image analysis will be employed to quantify fibre-type specific cross-sectional area and perimeter to calculate SFI, capillary-to-fibre ratio (C:Fi), and CFPE. CFPE will also be adjusted for SFI to account for differences in fibre shape. **Hypothesis and Significance:** We hypothesize that the highly active group will exhibit lower SFI and preserve C:Fi, and CFPE, particularly in type I fibres. This research will clarify whether high habitual physical activity mitigates age-related myofiber morphological and capillarization changes.

Investigating the Role of AMPK During Age-Associated Changes in Muscle Cross-sectional Area with MK8722 treatment

Presenter: Zoe Elumir

Co-author(s): Cora E. Jornacion, Andrew I. Mikhail, Stephanie R. Mattina, Magda A. Lesinski
Faculty Advisor: Vladimir Ljubcic, PhD
McMaster University

Skeletal muscle is a highly adaptable tissue, capable of altering its composition and metabolic properties in response to several physiologic conditions including exercise. During aging, skeletal muscle undergoes sarcopenia, characterized by decreased muscle mass, strength, and function. This has been attributed to fiber type-specific decreases in cross sectional area (CSA). AMP-activated protein kinase (AMPK), a heterotrimeric energy-sensing protein, influences determination, maintenance, and adaptability of skeletal muscle. Age-related decline of AMPK activation capacity may contribute to sarcopenia. Previous research on muscle remodelling using AMPK knockout models has primarily focused on exercise-induced adaptations and disease contexts in young mice, often using constitutive knockouts. Studies on the $\beta1\beta2$ inducible muscle-specific knockout (imKO) model are rare, particularly in older mice. This study aims to investigate the role of skeletal muscle-specific AMPK and its direct pharmacological activator, MK-8722 (MK), on muscle fiber morphology during aging. AMPK $\beta1\beta2$ imKO mice, induced via tamoxifen injections, and wildtype controls were studied across two age cohorts. Older mice received MK treatment for 6-8 weeks to assess the potential rescue of age-related deficits. Gastrocnemius muscles were harvested at 6-8 months or 20-22 months and stained for myosin heavy chain isoforms to distinguish fiber types, and CSA and minimum Feret diameter (MFD) were quantified in glycolytic and oxidative regions. No significant differences were observed within the glycolytic region of older mice. Analysis of oxidative regions revealed a significant interaction effect between drug treatment and genotype for both CSA and MFD. The limited differences amongst the older mice may be related to age-associated impairments in AMPK activation, potentially attenuating responsiveness to both genetic manipulation and pharmacological activation. Data analysis on the younger mice is ongoing and will help further observe age factors. Given AMPK's role stimulating both oxidative and glycolytic pathways, greater effects are anticipated in the younger mice.

The Effect of Global CARM1 Inhibition on Skeletal Muscle Mitochondrial Morphology in Cancer Cachexia

Presenter: Tetyana Revchuk

Co-author(s): Magda A Lesinski, Andrew I Mikhail, Stephanie R Mattina, Irena A Rebalka, Vladimir Ljubicic

Faculty Advisor: Vladimir Ljubicic, PhD
McMaster University

Introduction: Cancer cachexia is a muscle wasting syndrome that affects up to 80% of cancer patients, and contributes to progressive functional impairment, reduced survival rates and lower quality of life. Coactivator-associated arginine methyltransferase 1 (CARM1) is a protein involved in skeletal muscle autophagy and mitochondrial dynamics. While it has been implicated in cancers that co-occur with cachexia, its role in this syndrome remains largely unexplored. Methods: Wildtype C57BL/6 mice were subcutaneously injected with either Lewis Lung Carcinoma cells (LLC; 1×10^5) or a PBS control. 11 days post cancer inoculation, LLC mice were orally administered global CARM1 inhibitor, EZM2302 (LLCEZM; 150mg/kg), or a vehicle (LLCVeh) twice per day. Mice were sacrificed and quadriceps collected 37 days later. Intermyofibrillar (IMF) and subsarcolemmal (SS) mitochondria were imaged via transmission electron microscopy at 15,000x and 20,000x magnification, respectively. Analysis of mitochondrial area, min Feret diameter, and mitochondrial count were conducted with ImageJ, from which mitochondrial density, aspect ratio (AR), form factor (FF), and circularity were calculated. Results: IMF mitochondrial area was larger in LLCVeh ($p=0.0541$) and LLCEZM ($p=0.0007$) than in PBS. Compared to controls, LLCVeh and LLCEZM displayed significantly higher FF and lower circularity, and only LLCEZM had significantly elevated AR. These measures did not differ between the LLC groups. IMF density was lower in LLCVeh relative to both LLCEZM and PBS ($p<0.0001$). LLCEZM had significantly lower SS mitochondrial area than PBS, with no difference between the LLC groups. Mitochondrial AR and FF were larger, while circularity was smaller in LLCVeh compared to controls ($p<0.0001$), but all three returned to PBS levels with EZM. Both cancer groups had lower SS mitochondrial density than controls ($p<0.0001$). Conclusion: These findings suggest that the inhibition of CARM1 may alter mitochondrial dysmorphia induced by the LLC model, potentially through downregulating autophagy and mitochondrial fission and upregulating mitochondrial biogenesis.

Association Between Cardiorespiratory Fitness and Carotid Intima-Media Thickness in Endometrial Cancer Survivors

Presenter: Niki Evini

Co-author(s): Bárbara de Barros Gonze, Fréyja Spence, Camila Orsso, Zoe Bumanis, Teresita Gormaz, Carla M. Prado, Amy A. Kirkham
Faculty Advisor: Amy Kirkham, PhD
University of Toronto

Introduction: Endometrial cancer (EC) survivors have one of the highest cardiovascular disease (CVD) mortality rates across cancer populations. Carotid intima-media thickness (CIMT) is a non-invasive marker of subclinical atherosclerosis, while cardiorespiratory fitness (CRF) is an independent predictor of cardiovascular disease mortality, and can be improved through exercise. However, the relationship between CRF and CIMT has not been examined in EC survivors. This study aims to investigate whether higher CRF is associated with lower CIMT in EC survivors, when adjusted for potential confounders. Methods: This was a cross-sectional analysis using baseline data from a two-site (University of Toronto and University of Alberta) RCT (NCT#06038032). We recruited 30 (60.5±8.7 years) EC survivors (stages IA: n=20 (69.0%), IB: n=3 (10.3%), II: n=6 (20.7%); grades 1: n=16 (55.2%), 2: n=13 (44.8%)) with obesity (BMI 35.0±5.2 kg/m²). All participants were non-smokers and self-reported <90 min/week of moderate-intensity aerobic physical activity. CRF was measured by peak oxygen uptake (VO₂peak) during cardiopulmonary exercise testing on a cycle ergometer. CIMT was measured in the left common carotid artery using a B-mode ultrasound. Associations between VO₂peak and CIMT were assessed using correlation and multiple linear regression, adjusting for age and HOMA-IR. Results: Participants had a mean CIMT of 0.61±0.15 mm and VO₂peak of 16.0±5.4 mL/kg/min. VO₂peak was not significantly correlated with CIMT (r=0.15, p=0.46), even after adjusting for age and HOMA-IR (β=0.011 mm per 1 mL/kg/min, p=0.38, R²=0.096). Conclusion: There was no statistically or clinically significant association between CRF and CIMT in EC survivors with obesity in this preliminary analysis of the ongoing RESILIENCE study. These results could change as recruitment continues toward the planned 144 participants. Strengths include two-site recruitment and objective measurement of CRF and CIMT in a population of cancer survivors with high CVD mortality risk that is often understudied.

Investigating the retrograde influence of skeletal muscle-specific AMPK on spinal α -motor neurons

Presenter: Alexandra Siminiuc

Co-author(s): Andrew I Mikhail, Cora Jornacion, Stephanie R Mattina, Magda A Lesinski, Vladimir Ljubcic

Faculty Advisor: Vladimir Ljubcic, PhD
McMaster University

Background: The neuromuscular system relies on the neuromuscular junction (NMJ) for effective communication between α -motor neurons (α -MNs) and skeletal muscle fibers. Aging causes NMJ denervation and fragmentation, impairing function, and neuromuscular performance. AMP-activated protein kinase (AMPK) is a ubiquitously expressed energy-sensing protein that regulates key metabolic processes and whose expression declines with aging. Previous studies have established AMPK's restorative effects on the NMJ; however, it is unclear whether its effects extend back to α -MNs in the spinal cord. **Purpose:** This study aims to (1) test whether skeletal muscle-specific AMPK deletion elicits maladaptive retrograde signaling to spinal α -MNs, and (2) evaluate the effects of global AMPK activation on α -MN health. **Methods:** Aged (16-18-month-old) C57BL/6J wild-type (WT) and tamoxifen (TMX)-inducible skeletal muscle-specific AMPKb1b2 knockout (imKO) mice ($n = 8$) received 5 doses of TMX (75 mg/kg). After 8 weeks, WT and imKO mice were randomized to receive either MK8722 (MK; 10 mg/kg), a global AMPK activator, or a vehicle (Veh) on alternating days for 8 weeks. Lumbar spinal cord sections were collected at 20-22-months-old and stained for ChAT using immunofluorescence microscopy to quantify the number and size of α -MNs. Exercise capacity and cage hang performance were measured at baseline, and every 2 months. **Results:** MK administration augmented ($P < 0.05$) maximal exercise capacity and cage hang performance in WT animals only. These effects were completely abolished in AMPK imKO mice. At the spinal cord, we found that neither muscle-specific AMPK knockout nor MK treatment significantly affected the number of α -MNs found in the ventral horn of the spinal cord or their soma size. **Conclusion:** These findings indicate that AMPK functions locally within skeletal muscle and the NMJ to support motor performance and exercise capacity, without eliciting retrograde signaling or extending its effects to α -MNs in the spinal cord.

Sex based differences in hip arthroscopy biomechanical and patient reported outcomes: A systematic review

Presenter: Anna May

Co-author(s): Quinn Mulligan
Faculty Advisor: Timothy Burkhart, PhD
University of Toronto

Background: Femoroacetabular impingement syndrome (FAIS) is a leading cause of hip pain and dysfunction in young and middle-aged adults. Although earlier studies suggested FAIS predominates in males, recent evidence indicates that females presenting with hip or groin pain may have a higher incidence. A systematic review and meta-analysis by Owen et al. found that 62% of patients undergoing hip arthroscopy for FAIS were female. While females frequently achieve superior short-term patient-reported outcomes, they also demonstrate higher complication rates and an increased risk of conversion to total hip arthroplasty. Despite these findings, existing reviews have largely overlooked sex-specific differences in postoperative biomechanical outcomes and patient-reported outcomes measured by the International Hip Outcome Tool-33 (iHOT-33), leaving a critical gap in understanding how sex influences recovery and function following hip arthroscopy. **Purpose:** To evaluate sex-based differences in biomechanical and patient-reported outcomes following hip arthroscopy for FAIS, with a primary focus on iHOT-33 scores and a secondary focus on movement and functional biomechanics. **Methods:** A systematic review will be conducted utilizing MEDLINE, EMBASE, and CINAHL, searched from inception to September 1st, 2025. Studies reporting postoperative iHOT-33 and/or biomechanical outcomes in FAIS patients undergoing hip arthroscopy and providing sex-stratified data or sufficient information for sex-based comparison will be included. Study selection, data extraction, and risk of bias assessment will be performed independently by two reviewers. When appropriate, data will be pooled to quantify differences between males and females. **Expected Results:** This review will synthesize information to clarify whether clinically meaningful sex-based differences exist in biomechanical and patient-reported outcomes after hip arthroscopy for FAIS. Differences may be observed in postoperative iHOT-33 scores and hip kinematics between males and females and their impacts on recovery trajectory. Findings may guide surgical decision-making, and rehabilitation strategies, while highlighting gaps in the literature regarding sex-specific recovery and long-term outcomes.

Self-Selected vs. Goniometer-Prescribed Joint Angles in Isometric Mid-Thigh Pull Test-Retest Reliability and Net Peak Force Production

Presenter: Murtaza Jafri

Co-author(s): Brandan Wilson MSc
Faculty Advisor: Dr. Stuart Phillips
McMaster University

BACKGROUND: The isometric mid-thigh pull (IMTP) is a reliable and practical method for assessing whole-body force production in athletes. However, variability in hip and knee positioning, particularly between self-selected and goniometer-prescribed joint angles, may influence test-retest reliability and peak force production. Standardized positioning may improve consistency, while self-selected positioning may enhance comfort and ecological validity. **OBJECTIVE:** This study aimed to compare the test-retest reliability and net peak force production during a standardized IMTP protocol between self-selected and goniometer-prescribed joint angle conditions in varsity football athletes. **METHODS:** Male varsity football athletes ($n = 18$; age 18-26) completed a repeated-measures crossover design consisting of one familiarization session followed by four testing sessions with one-week washout periods. Participants performed IMTP trials under two conditions: a "self-selected" condition where the participant was encouraged to choose a preferred posture with minimal corrective cueing, and a goniometer-prescribed condition where specific hip and knee ($125-145^\circ$) angles were met in advance of initiating the pull: $140-150^\circ$, and $125-145^\circ$, respectively. Two maximal effort trials were completed per condition per session, and the average net peak force was recorded. **HYPOTHESIS:** We hypothesized that self-selected positioning would demonstrate greater test-retest reliability and higher net peak force production than goniometer-prescribed positioning. **STATISTICAL ANALYSIS:** Test-retest reliability was assessed using two-way mixed-effects intraclass correlation coefficients (ICC). Peak force differences between conditions were evaluated using paired-samples t-tests, with $p < 0.05$ as the criterion for statistical significance. **RESULTS/CONCLUSION:** Data collection/analysis are ongoing; full results, including data visualization, will be prepared for the conference date.

Comparison of Drop Jump Performance in Varsity Athletes With and Without a History of Concussion

Presenter: Danaya McCormick

Co-author(s): Matthew Loenhardt, Kyla Pyndiura
Faculty Advisor: Dr. Michael Hutchison
University of Toronto

Background: Although return-to-play protocols commonly report recovery from a concussion within weeks, growing evidence suggests that subtle residual neuromuscular deficits may persist beyond symptom resolution. These lingering deficits may affect movement control and contribute to an increased risk of subsequent musculoskeletal injury. Purpose: To compare reactive strength index (RSI), ground contact time (GCT), and jump height between those with and without a history of concussion. Methods: Forty varsity athletes (n=20 concussion history, n=20 no concussion history; 15 males, 25 females) from the University of Toronto Varsity Blues basketball, hockey, and volleyball teams participated in preseason movement screening. As part of the pre-season evaluation, six trials of a drop jump task were performed, from which mean reactive strength index, ground contact time, and jump height were calculated. Independent sample t-tests were conducted between the groups to examine differences. Results: No significant differences were observed between those with and without previous concussion in RSI (1.93 ± 0.59 vs 2.13 ± 0.68 ; $p = 0.331$), GCT (0.261 ± 0.041 vs 0.245 ± 0.036 ; $p = 0.186$), or jump height (0.482 ± 0.109 vs 0.493 ± 0.111 ; $p = 0.772$). Conclusion: A history of concussion was not associated with differences in RSI, GCT, and jump height. Further work is needed to examine whether more subtle biomechanical changes, such as alterations in joint kinematics, may contribute to the increased risk of musculoskeletal injuries following concussion.

Sex-Based Differences in Hip Biomechanics in Response to Dynamic Multiplanar Tasks

Presenter: Yu Tong Zeng

Co-author(s): Margerat Harrington
Faculty Advisor: Timothy Burkhart, PhD
University of Toronto

INTRODUCTION: Male and females tend to exhibit distinct kinetic and kinematic movement patterns which manifests in differing incidence rates of common hip pathologies between sexes. Because several hip conditions have been linked with abnormal hip loading and biomechanics, understanding hip contact forces (HCF) between males and females provides important insights into the development and treatment of hip disorders. Traditionally, biomechanics data is collected as continuous signals and analyzed using discrete point analysis. This summarizes continuous data into individual values that may overlook important temporal fluctuations in the continuous signal. Statistical parametric mapping (SPM) has been proposed as an alternative for biomechanical analysis. SPM considers the full signal and allows for each continuous datapoint to be analyzed which provides information on potential biomechanical differences across the entire movement. **PURPOSE:** To quantify and compare HCF between healthy males and females in response to dynamic multiplanar body weight movement tasks using SPM. **METHODS:** Thirty healthy participants (15 males, 15 females) without hip disorders or lower limb injuries were recruited. The participants were instructed to complete a randomized series of movements tasks: deep squat, forward lunge, gait, side-cut, and countermovement jump. Kinematic measures and ground reaction forces were collected using an eight camera markerless motion capture system and bilateral force plates respectively. Biomechanical models were created in Visual3D to calculate hip contact forces. **EXPECTED RESULTS:** It is expected that female and male participants will experience difference hip contact forces which will change depending on the movement task. There will most likely be most significant sex differences between male and female participants for the side-cut movement and countermovement jump compared to gait, forward lunge, and deep squat. These results will provide a better understanding of the influence of sex in hip conditions and musculoskeletal loading during a variety of activities.

Optimizing the Number of Cameras Required for Markerless Motion Capture of the Hands

Presenter: Ryan Hogan

Co-author(s): Daanish Mulla, PhD

Faculty Advisor: Peter Keir, PhD
McMaster University

BACKGROUND: Movement and postures of the hands and fingers are important in the development of hand-related musculoskeletal disorders. Recently, we developed a markerless system for tracking hand and finger motion as marker-based motion capture interferes with natural finger motion and commercial markerless motion capture systems do not track fingers. Previous work in our lab revealed that 2-cameras may be as good as 4 cameras for simple finger flexion tasks. It is important to determine the optimal number of cameras and their orientations required for effective tracking of more complex hand movements. **OBJECTIVE:** The purpose of the study was to optimize the number of cameras and their orientations to assess functional tasks involving the hands. **METHODS:** Eighteen participants (age: 21 ± 1 years) with no history of upper extremity injuries performed 6 functional tasks: 1) typing, 2) lid unscrewing, 3) manual drill winding, 4) Rubik's cube manipulation, 5) individual finger flexion, 6) whole-hand finger flexion (Note: tasks 2 and 3 repeated with both hands; tasks 5 and 6: prone, neutral, and supine forearm). Four Logitech C920e webcams were oriented at 90° , 45° to the left, 0° and 45° to the right of the participants hands, with each camera raised to 62 cm above the table surface and pointed 45° downward. Videos were processed using ATHENA to extract 3D coordinates for joint angle calculation. **RESULTS:** Preliminary results suggest that 2-camera combinations with an unobstructed view of the palm or dorsal surface of the hand perform similarly to a 4-camera setup for functional tasks. However, more complex functional tasks were recorded best with more cameras. **CONCLUSION:** This study makes a strong contribution to markerless motion capture by including the hands and fingers to provide a new assessment tool for work-related hand motion.

The Effectiveness of the Adrenalease Garment for Improving Posture in Cardiac Sonographers

Presenter: Dorsa Eshaghi

Co-author(s): Evan Curd

Faculty Advisor: Timothy Burkhart, PhD
University of Toronto

Background Work related musculoskeletal disorders (WRMSDs) pose a significant hazard to cardiac sonographers and vascular technologists, who maintain prolonged static postures and perform repetitive motions during patient scans. Although ergonomic workstation designs and posture-training strategies have aimed to reduce exposure to high-risk "danger zone" joint angles, effectiveness is often limited by poor adherence and external workplace constraints. As a result, sonographers remain exposed to excessive trunk flexion and rotation, shoulder elevation, and other awkward postures associated with increased risk of low back and shoulder pain. **Objective** To investigate the Adrenalease Posture Correction Shirt (PCS) as a passive solution for reducing the risk of WRMSDs. **Methods** Participants will complete a simulated cardiac sonography task involving standard ultrasound movements. Upon arrival, participants will complete baseline assessments: a back pain and function questionnaire, a visual analogue scale (VAS) for pain, and a Physical Activity Readiness Questionnaire (PAR-Q). Baseline kinematic data will be collected with Xsens Analyze Software. Participants will then be randomized to a PCS or no-PCS condition. Following a baseline assessment, participants will perform the standardized sonography routine, then repeat the protocol using the alternate condition. Extremity joint and segment angles, trunk segment angle and head/neck angles will be calculated and averaged across both conditions. Baseline back pain/function and VAS questionnaires will be averaged across both conditions to evaluate the PCS's effectiveness at task-related functional improvements. **Expected Results** The PCS condition is anticipated to result in reduced trunk flexion and rotation angles, decreased shoulder elevation, and improved scapular retraction during the simulated cardiac sonography task. These changes are expected to reduce time spent in previously identified "danger zone" postures associated with increased risk of WRMSDs. Additionally, it is anticipated that subjective measures of discomfort will be lower in the PCS condition, indicated by reduced VAS pain scores following task completion.

The Relationship Between Interoceptive Ability and Perceptions of Strain During Exercise

Presenter: Brinly Yuen

Co-author(s): Liam O'Brien
Faculty Advisor: Ira Jacobs, DMSc
University of Toronto

Individuals differ markedly in how intensely they experience exercise strain perceptions (ESPs) such as effort, fatigue, discomfort, or dyspnea, despite exercising at similar relative workloads or objective magnitudes of physiological strain. So-called "augmenters" are said to amplify the perceptual salience of sensory stimuli, whereas "reducers" correspondingly dampen such stimuli. ESPs are well-known to limit exercise participation, adherence, performance, and long-term physical activity. However, the role of interoception, i.e., the ability to perceive internal bodily sensations, in shaping ESPs is still unclear. This study examines the relationship between inter-individual differences in interoceptive ability and distinct ESPs during submaximal cycling exercise at increasing magnitudes of objective physiological strain. We hypothesize that greater interoceptive ability will be inversely correlated with how intensely ESPs are rated during exercise. In this cross-sectional study, 20 healthy adults (n=10 male; 10 female) aged 18-40 yrs will complete an initial laboratory visit involving a validated heartbeat detection task to assess interoceptive ability and an incremental cycling test to exhaustion to determine aerobic fitness ($\dot{V}O_2\text{max}$). During a second visit, participants will complete four 5-min submaximal cycling intervals at work rates eliciting systemic $\dot{V}O_2$ corresponding to 35%, 50%, 65%, and 80% of their $\dot{V}O_2\text{max}$. At each stage, physiological measures ($\dot{V}O_2$, heart rate, blood lactate, SpO_2) and ESPs (effort, fatigue, respiratory effort, breathlessness, discomfort, and limb discomfort) will be assessed using rating-of-fatigue (ROF) and modified 10-point Borg scales. Data collection is ongoing. Multiple linear regression and Pearson correlation analyses will examine whether interoceptive ability is inversely associated with strain perceptions across submaximal exercise intensities while controlling for select personality traits, sex, training history, and physical fitness. These findings will clarify whether interoceptive ability contributes to the augmenter-reducer phenomenon in perceived physiological strain during exercise and may inform individualized interoception-based interventions to ameliorate ESP intensity to support long-term physical activity adherence.

Mental Fatigue and Physical Activity: Do Exercise Snacks Support Greater MVPA than Continuous Exercise in Sedentary University Students?

Presenter: Jake Eddis

Co-author(s): Caleb Zigby, Steven R. Bray
Faculty Advisor: Steven Bray, PhD
McMaster University

Background: Despite well-established health benefits, fewer than half of Canadian adults meet the recommended 150 minutes of moderate-to-vigorous physical activity (MVPA) per week. Mental fatigue has negative effects on intentions, engagement, and performance of longer-duration MVPA (e.g., 30 min), but its effects on other modes of MVPA have not been explored. Exercise snacks are brief, intermittent bouts of MVPA performed throughout the day that provide comparable health benefits to longer, continuous bouts of MVPA. We examined sedentary university students' engagement in exercise snacks versus continuous MVPA and within-day associations between mental fatigue and MVPA. We hypothesize that mental fatigue will be negatively associated with MVPA and that students attempting to engage in exercise snacks will accumulate more MVPA than those attempting continuous MVPA. **Methods:** Participants self-allocated to either a five-day exercise snack or continuous exercise program after completing a separate study assessing their preferences for snacks vs. continuous MVPA. MVPA was measured using ActiGraph accelerometers, and mental fatigue was assessed four times daily using ecological momentary assessment (EMA) prompts. Within-day mental fatigue and MVPA were linked to the four-hour epoch following each EMA prompt. **Results:** Data have been collected from 16 of the anticipated 20 participants (n=8 female; 7 snacks, 9 continuous). Accelerometer data will be converted into metabolic equivalent minutes (MET-mins), and independent t-tests will be used to compare values between the two groups. Mixed-effects modelling will be used to test associations between mental fatigue and MET-mins. **Discussion:** Findings will produce novel insight into how different approaches to MVPA engagement interact with mental fatigue. Given university students are subject to high and fluctuating levels of mental fatigue, exercise snacks may provide an effective strategy to adopt and maintain MVPA. Future studies should employ longer durations and randomize participants to strengthen internal validity.

Weight fluctuation as a moderator of the association between stress and depression following breast cancer treatment

Presenter: Andrew Hernan Mathias Alvarez

Co-author(s): Ross Murray, Delaney E. Thibodeau
Faculty Advisor: Catherine M. Sabiston, PhD
University of Toronto

Depression is a common concern following breast cancer (BC) treatment and psychological stress is a well-established risk factor. However, less is known about whether individual differences in weight history shape vulnerability to stress-related depressive symptoms over time. Weight fluctuation may reflect long-term instability in behavioral and physiological regulation, and instability in regulation is closely tied to stress and mood-related processes. As such, in the context of BC survivorship, a history of weight fluctuation may reflect reduced resilience of regulatory systems, making individuals more susceptible to stress-related depressive symptoms. This study examined the longitudinal association between stress and depressive symptoms across five time points and tested whether pre-BC propensity for weight fluctuation moderates this relationship. Data were collected every 3 months during the first year after women completed systemic treatment for BC (T1-T5). Women (N=199) completed repeated measures of stress and depressive symptoms within 3 months of completing treatment for BC, along with assessments of history of weight fluctuation prior to diagnosis of BC. Multilevel modeling was used to account for the nested structure of repeated observations, capturing both within-person and between-person differences. Time since diagnosis and average daily moderate-to-vigorous physical activity were included as covariates. Results indicated that higher stress was strongly associated with higher depressive symptoms ($p < .01$). Importantly, weight fluctuation significantly moderated the association between stress and depressive symptoms ($p < .01$), such that the relationship was stronger among individuals with greater weight fluctuation histories. Greater physical activity was associated with lower depressive symptoms ($p < .01$). These findings suggest that weight history may represent an important vulnerability factor in psychological adjustment following BC treatment and highlights weight history as a potential marker for identifying individuals at greater risk of stress-related depressive symptoms.

Associations Between Mood Disturbance, Hunger, and Metabolic Markers During Intermittent Fasting Protocols

Presenter: Tiana Castiglione

Co-author(s): Kristan Amendola, Jennifer Heisz
Faculty Advisor: Jennifer Heisz, PhD
McMaster University

INTRODUCTION: Short-term fasting has been shown to influence mood, yet whether these effects are driven by subjective hunger or metabolic changes remains unclear. Although mood alterations during fasting are often attributed to hunger, few studies have directly examined whether metabolic markers better explain these psychological responses. This study aims to determine whether mood disturbance during time-restricted feeding (TRF) and alternate day fasting (ADF) is more strongly associated with hunger or metabolic markers. **METHODS:** Twenty-three female participants (M age = 18.3 years, SD = 0.5) completed a within-subject crossover study in which they underwent three days of TRF and three days of ADF in a counterbalanced order, separated by a four-day washout period. On the day prior to fasting and on each fasting day at noon, participants measured glucose and ketone levels using a FreeStyle Precision Neo portable device and completed an online questionnaire assessing total mood disturbance (TMD) and hunger. Fasting days 2 and 4 were averaged within each protocol, and Pearson and Spearman correlations (two-tailed) were conducted to examine associations between mood disturbance, hunger, and metabolic markers. **RESULTS:** In TRF, greater average total mood disturbance was significantly associated with higher average glucose levels ($r_s(21) = .47, p = .02$). Mood disturbance was not significantly associated with hunger or ketone levels. In ADF, no significant associations were observed between mood disturbance and hunger, glucose, or ketone levels. **DISCUSSION:** These findings suggest that mood disturbance during time-restricted feeding is more strongly associated with glucose levels than with subjective hunger or ketone concentrations. The absence of similar associations during alternate day fasting indicates that mood-metabolic relationships may be protocol-specific. Further research with larger samples and more frequent measurements is needed to clarify the direction and mechanisms underlying these associations.

Effect of prior sprint and endurance running results on tactics during elite 800m personal best performances

Presenter: Shan Dhanoa

Faculty Advisor: Dr. Tim Taha
University of Toronto

The 800 m is a hybrid middle-distance event requiring both sprint speed and aerobic endurance, and tactical pacing plays a critical role in performance. Athletes enter the event with different competitive backgrounds, ranging from sprint-dominant to endurance-dominant profiles, which may influence how they distribute effort across the race. The purpose of this study was to examine whether an athlete's relative sprint-endurance profile is associated with 100 m pacing distribution in elite male 800 m personal best (PB) performances. All-time top-list male 800 m PB performances faster than 1:44.0 were analyzed. Using publicly available race footage and race analysis documents, 100 m split times were extracted and expressed as a proportion of total race time, where an even pacing strategy equals 12.5% per segment. World Athletics ranking points were used to classify athletes as sprint or endurance-dominant. For each athlete, the highest-ranking sprint performance (<800 m) and endurance performance (>800 m) were identified, excluding 800 m results, and the difference between these rankings was calculated. Only athletes with both sprint and endurance performances were included (n = 44). A generalized linear model was conducted to determine relationships between sprint-endurance ranking differences and relative 100 m segment times. A significant association was observed at the 600 m segment only ($p = 0.048$). Sprint-dominant athletes demonstrated a proportionally longer duration in the 600 m split, and the more sprint-dominant the athlete, the greater this proportional slowing. No other race segments were significant. These findings suggest that athlete background influences pacing during a critical late-race segment in elite 800 m performance and may have implications for tactical training and race strategy.

The Effects of Stroke Rate and Drag Factor on Force and Power Profiles During Ergometer Rowing

Presenter: Areeba Anwer

Faculty Advisor: Peter J. Keir, PhD
McMaster University

Background: Rowing performance is highly dependent on how effectively rowers generate and coordinate force throughout the rowing stroke cycle. However, the mechanical parameters of the stroke influence this force production, especially stroke rate (SR) and drag factor (DF). There is extensive literature regarding rowing technique, force profiles, and other performance metrics that examine these factors individually and under stable conditions. Thus, there remains a limited understanding of how rowers adapt force-time characteristics when both temporal demand (SR) and mechanical load (DF) change. The purpose of this study is to determine how modifying drag factor (handle load) and SR alter force and power profiles. It is hypothesized that higher stroke rates will be associated with lower peak force per stroke but higher average power, due to mechanical work being distributed across more frequent strokes; while increasing drag factor will elevate the overall force output and alter the force-time profile across the stroke cycle. Methods: Fifteen experienced varsity rowers (18-35 years) were recruited from the McMaster University Rowing team. Each participant completed a series of 90-second rowing bouts of block randomized combinations of three stroke rates (28, 32, 36 strokes per minute) and three drag factors (-5%, typical, +5% of individual baseline DF) for a total of 9 trials. Force and performance metrics were collected across all conditions to assess changes in force and power profiles. Results: Data analysis is underway, and findings will be shared during the presentation. Significance: This study addresses gaps in understanding of how rowers adapt technique under varying stroke rate and drag factor conditions and offers a meaningful way to evaluate the technical and biomechanical consequences of these manipulations. Additionally, these parameters may help better match rower with equipment characteristics such as oar configuration.

Are More Trials Always Better? Comparing Acquisition of a Golf-Putting Task With 5- or 10-Second Intertrial Intervals

Presenter: Julia Kochanski

Faculty Advisor: Dr. Luc Tremblay
University of Toronto

The number of trials of practice is deemed primordial for skill acquisition. Yet, the ideal time between task repetitions to optimize motor learning is unknown. Indeed, even increasing the number of trials should yield more performance improvements; another skill consolidation mechanism pertains to neural "replays" that take place between trials. Thus, we aimed to test if maximizing the number of trials (with a 5 s inter-trial interval [ITI]) would yield better or worse skill retention than an interval known to yield neural "replays" (i.e., 10 s ITI). We recruited 20 right-handed novice golf-putting participants (10 male, 10 female) aged 18-45 years, who were assigned to a 5 s or 10 s ITI group. During an acquisition phase, the 5-s ITI group completed 20 blocks of 12 putts, and the 10-s ITI group completed 10 blocks of 10 putts. We discuss the extent to which a longer ITI provides more sensorimotor acquisition and processing for increased error detection, planning, and consolidating information opportunity within the longer ITI group, and how this may influence acquisition performance. This research aims to provide insight into a learner's ability to perceive and correct their errors (perceptual awareness), and which ITI optimization can help improve performance accuracy. Determining optimal ITI may allow coaches to develop optimal programs for learning and execution for reflective processing and accuracy of error detection, as well as allow rehabilitation patients to (re)learn, transfer, and determine their perceived error off target through enhanced sensorimotor skills for performance accuracy improvement.

Investigating the effects of sex and body composition on responses to transcutaneous spinal stimulation

Presenter: Jermyl Allen Acuzar

Faculty Advisor: Dr. Gerome Manson
Queen's University

Transcutaneous spinal stimulation (TSS) is a non-invasive neuromodulation technique that activates spinal sensorimotor pathways to support functional motor recovery in individuals with neurological disorders. Despite its clinical promise, how sex and body composition influence TSS-evoked muscle responses remains poorly understood. This study examined the effects of sex and body composition on TSS responses and assessed test-retest reliability in neurologically intact adults. Fifty participants (25F, 25M; 20.6 ± 1.1 years) underwent a TSS protocol in which increasing stimulation intensities were delivered with the cathode positioned at the L1-L2 vertebrae. Electromyography (EMG) was used to record responses from five lower-limb muscles bilaterally: rectus femoris, biceps femoris, tibialis anterior, medial gastrocnemius, and soleus. The primary dependent variable was the common motor threshold (CMT), defined as the lowest stimulation intensity that elicited a response in all recorded muscles. Body composition was assessed using bioimpedance analysis. The TSS protocol and body composition measures were repeated across three visits (Day 1, Day 2, and Day 7) to evaluate test-retest reliability. Males exhibited significantly higher CMT (78.4 ± 26.3 mA) than females (62.9 ± 18.9 mA; $p < 0.05$). CMT demonstrated good test-retest reliability across visits (intraclass correlation coefficient, ICC (2,1) = 0.84; 95% CI [0.75, 0.90]). Across all participants, CMT was positively correlated with body mass index (BMI, $r = 0.63$) and L1-L2 skinfold thickness ($r = 0.45$; both $p < 0.05$). These associations were stronger in males (BMI: $r = 0.79$; skinfold: $r = 0.60$) than in females (BMI: $r = 0.44$; skinfold: $r = 0.45$; all $p < 0.05$). These results demonstrate that TSS responses are reliable across sessions and reveal that sex and body composition differentially influence TSS responses. Optimal TSS protocols should therefore account for biological sex and individual body composition to improve stimulation precision.

Should I wait or not before my next practice shot? Optimizing the acquisition of golf putts through inter-trial intervals.

Presenter: Sam Coppa

Faculty Advisor: Luc Tremblay, PhD
University of Toronto

The field of motor learning has repeatedly reported the benefits of distributed practice over massed practice for skill acquisition. However, considerably less research has specifically studied the time between practice trials (i.e., inter-trial interval [ITI]) within distributed practice. Critically, recent neurophysiological evidence has revealed that longer rest periods may promote waking hippocampal-neocortical replay that is temporally compressed by 20-fold relative to behaviour. In contrast, shorter intervals may facilitate better skill acquisition for discrete skills such as golf putting. Thus, while controlling for the number of practice trials, the current study investigated the acquisition and retention of a golf putting task with a 5-s vs. a 10-s ITI. Because waking hippocampal-neocortical replay was presumed to be more important for motor learning than acquisition performance, it was hypothesized that superior performance and retention should be observed with the 10-second ITI group. Twenty novice golfers were randomly assigned to a 5-s or a 10-s ITI group (n=10 per group). All completed an acquisition phase of 12 blocks of 12 trials (144 trials). Participants then returned for a second day to complete retention and transfer tests. The main dependent variables were constant and variable endpoint error in the primary movement axis. During acquisition, only the 5 s ITI group exhibited significant reductions in variable error. However, there were no significant differences in variable or constant error during the retention and transfer tests. These findings suggest that for the acquisition of a golf put, waiting longer between trials does not yield significant short-term benefits.

One Brain, One Dose: The Effect of Personalized tDCS Intensity on Motor Learning

Presenter: Tianlin Xiong

Co-author(s): Joyce Chen
Faculty Advisor: Joyce Chen, PhD
University of Toronto

Transcranial direct current stimulation (tDCS) applied over the primary motor cortex (M1) may enhance motor learning; however, behavioral findings are inconsistent. Some variability may arise from fixed stimulation parameters despite inter-individual anatomical differences that affect the amount of current delivered to the cortex. Magnetic resonance imaging (MRI)-based current flow modeling (CFM) enables personalized adjustment of stimulation intensity, but its impact on motor performance remains unknown. This study aims to determine whether anatomically tailored tDCS enhances motor learning. We hypothesize that personalized tDCS intensity will produce greater improvements in performance during skill acquisition and retention, compared with fixed-dose and sham stimulation. In a single-blind study, 120 healthy right-handed adults (18-40 years; sex-balanced) will be randomized to: personalized tDCS, fixed-dose 2mA tDCS, or sham stimulation (n=40 per group). The personalized group will undergo MRI to generate individualized CFM for tailored stimulation. For all participants, left M1 motor hotspot will be localized using single-pulse transcranial magnetic stimulation. On Day1, participants will complete six blocks of the Sequential Visual Isometric Pinch Task, receiving group-specific tDCS during Blocks 2-5. A 24-hour retention test will be conducted on Day2 without stimulation. The outcome measure is Skill, a composite of movement time and accuracy. Skill acquisition performance will be analyzed using a 3 (Between Group: personalized, fixed-dose, sham) x 6 (Within-subject factor Block:1-6) mixed-design repeated-measures ANOVA. Baseline performance and skill retention will be analyzed separately using one-way between-subject ANOVA with Groups as the independent variable. We expect the personalized group to show greater improvements across acquisition blocks than the fixed-dose and sham groups. Additionally, we anticipate larger offline gains from Day1 Block6 to Day2 Block1 in the personalized group. Determining the behavioral impact of personalized tDCS could advance our understanding of how targeted neuromodulation influences skill learning. These findings could inform applications in neurorehabilitation and performance enhancement.

I Robot: Upper-Limb Morphology Influences on Self-Other Body Mapping in a Body-Part Compatibility Task

Presenter: Zainab Bilal

Faculty Advisor: Dr. Timothy Welsh Aarohi Pathak PhD
University of Toronto

Humans often map observed bodies onto their own motor system, but it is not fully understood to what extent this depends on the biological similarity of the observed body. Interactions with robots and other non-human agents raise the question of which structural features support this mapping. The present study examined whether differences in upper-limb morphology influence body-part compatibility effects and whether a continuum of self-other mapping can be established from most to least human-like forms. Participants completed a body-part compatibility task in which they responded to the colour of targets appearing on five avatars that varied in upper-limb structure (human, humanoid robot with mechanical arms, humanoid robot with pincer arms, humanoid robot with tentacle arms, and an octopus). Targets appeared on upper or lower limbs and on the left or right side of the body. Responses were made with the hands, and reaction time differences between body-compatible and body-incompatible trials were used to quantify compatibility effects for each morphology. Preliminary analyses of reaction time (ms) indicate a reliable body-part compatibility effect, with faster responses on body-compatible relative to body-incompatible trials across avatars. The magnitude of this effect was strongest for the human and humanoid robot conditions and progressively reduced for less anthropomorphic morphologies, suggesting that structural limb similarity modulates self-other body mapping. Statistical analyses are ongoing to formally evaluate the strength and reliability of this continuum. Overall, these findings suggest that upper-limb structure contributes to embodied mapping in a graded manner, providing behavioural evidence for a morphological continuum in anthropomorphic perception.

Visual Contextual Cues

Presenter: Tejiri Inikori

Co-author(s): Gerome Manson

Faculty Advisor: Gerome Manson, MSc, PhD
Queen's University

When reaching for an object on a crowded table, visual information about the position of other objects provides important contextual information to help avoid bumps and spills. Although the addition of visual context has been shown to increase accuracy for movements to visual targets, it is unclear if this information is important when making movements to non-visual targets, such as positions on the body. When making movements to body positions, also known as somatosensory targets, vision is hypothesized to play less of a role than non-visual sources of sensory information (i.e., touch or proprioception). The goal of this study was to examine the influence of visual context on movements to body positions. Sixteen participants reached to visual and somatosensory targets in the presence of contextual cues or in a dark environment while maintaining eye fixation on a central location. Reaction time and error in both the movement direction and movement amplitude axes were compared across context and target conditions. Although there were no differences in reaching errors, reaction times were longer for visual targets when visual contextual cues were present. In addition, reaction times for movements to somatosensory targets were significantly shorter in the presence of visual context compared to the dark environment. The differential effect of context on reaction time suggests that visual information is processed more when planning movement to visual targets than somatosensory targets. This dissociation highlights differences in how the brain processes contextual information when planning movements to external space compared with movements directed toward the body.

Effects of Five Days of Bed Rest on Fasting Insulin Resistance and Postprandial Glycemic Control in Healthy Adults

Presenter: Paige Adams

Co-author(s): Sebastian Camagros, Thomas R. Tripp
Faculty Advisor: Chris McGlory, PhD
Queen's University

Background: Short periods of physical inactivity, such as 3-7 days of bed rest, rapidly impair metabolic health. Few studies have assessed fasting and postprandial glycemic control concurrently during brief bed rest. This study examined the effects of 5 days of bed rest on fasting insulin resistance (HOMA-IR) and postprandial glycemic control using a mixed-meal tolerance test (MMTT). **Methods:** Healthy young adults (21.4 ± 2.5 yrs, $n=5$) completed a 5-day lead-in period, followed by 5 consecutive days of strict bed rest. Fasting plasma glucose and insulin were collected on days -5, 0, 1, 3 and 5 (relative to the start of bed rest), to calculate HOMA-IR. MMTTs (3-hour duration, standardized caloric content and macronutrient composition) were performed on days -5, 0 and 5. Changes across time were analyzed using one-way repeated-measures ANOVAs with Tukey's HSD post hoc tests ($\alpha = 0.05$). **Results:** HOMA-IR did not significantly change across bed rest ($p = .477$; $\eta^2p = .187$), although mean values peaked on day 0 [mean \pm standard deviation]; (1.84 ± 1.22) vs. (1.28 ± 0.72 on day -5). Postprandial insulin AUC increased significantly across time ($p = 0.033$; $\eta^2p = .575$), with higher insulin AUC on day 5 compared with day -5 ($81\ 104 \pm 63\ 842$ vs. $47\ 324 \pm 48\ 730$ pmol \cdot min \cdot L $^{-1}$; $p = .027$). Glucose AUC did not significantly differ across days ($p = .214$; $\eta^2p = .320$). **Significance:** Five days of bed rest elicited early impairments in postprandial glucose handling in response to a MMTT. Our findings suggest postprandial metabolic measures may be more sensitive indicators of early inactivity-induced metabolic dysfunction than static, fasting measures, and support the use of mixed-macronutrient challenges to detect early metabolic impairment during short-term physical activity.

Influence of Physical Activity Guideline Adherence on Insulin Resistance Across Women With Varying Estrogen Status

Presenter: Katelyn Wong

Co-author(s): Alfred Min
Faculty Advisor: Amy Kirkham, PhD
University of Toronto

Introduction: Estrogen availability underpins insulin resistance and cardiometabolic risk in women. Physical activity improves insulin resistance, but how adherence to guidelines of 150 minutes/week moderate-to-vigorous aerobic physical activity (MVPA) influences insulin resistance across women with varying estrogen levels is unclear. **Purpose:** This study examined the association between exercise adherence and change in insulin resistance in premenopausal women, postmenopausal women, and breast cancer survivors (BCS) in response to a 6-month exercise intervention. **Hypotheses:** Greater adherence will be associated with greater reductions in insulin resistance, with this association more apparent in premenopausal women than their low-estrogen counterparts. **Methods:** Pre- and postmenopausal women and BCS completing identical exercise arms in two ongoing randomized control trials were included. Participants were sedentary (≤ 30 minutes/week MVPA) with BMI ≥ 25 kg/m² and one of abdominal obesity, hypertension, pre-diabetes, or dyslipidemia. Participants completed a 6-month guidelines-based intervention (i.e., 150 minutes/week MVPA). Change in Homeostatic Model Assessment of Insulin Resistance (Δ HOMA-IR) was derived from fasting glucose and insulin drawn pre- and post-intervention. Adherence was quantified as mean percentage of weekly prescribed physical activity performed. Linear regressions were employed to assess the association between adherence and Δ HOMA-IR collectively and each group individually. **Results:** Thus far, 18 premenopausal (42.74 \pm 8.11 years, BMI 30.14 \pm 4.56 kg/m²), 17 postmenopausal (61.20 \pm 8.37 years, BMI 31.02 \pm 5.43 kg/m²), and 5 BCS (59.21 \pm 12.17 years, BMI 29.85 \pm 4.39 kg/m²) completed the intervention, with 78.93 \pm 18.26%, 82.56 \pm 20.06%, and 95.72 \pm 5.93% adherence and Δ HOMA-IR of 1.25 \pm 3.12, -1.02 \pm 4.14, and 0.05 \pm 1.37, respectively. Adherence did not significantly predict Δ HOMA-IR ($\beta=0.009$, SE=0.036, $p=0.807$). No significant association between adherence and Δ HOMA-IR was observed when stratified by estrogen status groups (p 's >0.05). **Conclusion:** There was no significant association between adherence and insulin resistance in response to 6 months of following physical activity guidelines. However, continuing recruitment will likely enable a robust reflection of the effect of exercise on insulin resistance in women.

The Interaction of Low-Load Resistance Exercise and Protein Quality on Skeletal Muscle Adaptations and Glycemic Regulation in Older Adults

Presenter: Avesta Alizadeh

Co-author(s): Caroline V. Lowisz, Tom A. H. Janssen, Matthew J Lees, James McKendry, Changhyun Lim, Sarah E. Lyons, Stuart M. Phillips
Faculty Advisor: Dr. Stuart Phillips
McMaster University

Background: Aging is associated with progressive declines in skeletal muscle mass, contributing to an increased risk of frailty, impaired mobility, and metabolic dysfunction. Muscle loss is driven by anabolic resistance, reduced sensitivity to exercise, and reduced dietary protein intake, contributing to type II muscle fibre atrophy. Resistance exercise training (RET) is the most effective nonpharmacological stimulus for muscle hypertrophy; however, traditional higher-load RET may be impractical for older adults. Lower-load RET (LL-RET) has emerged as a feasible alternative capable of inducing hypertrophy. Older adults require greater protein intake to support RET induced muscle gains, yet whether protein quality influences adaptations to LL-RET remains unclear. We examined the combined effects of LL-RET and protein quality on skeletal muscle adaptations and glycemic regulation in older adults with overweight/obesity. Hypothesis: We hypothesized that LL-RET with protein supplementation would increase muscle fibre CSA, with greater increases in type II fibres, and decrease fasting glucose. Additionally, lean mass would increase, and whey (WHEY) but not collagen (COLL) supplementation would promote greater lean mass gains. Methods: Sixty-seven sedentary, older adults (60-85yrs) with overweight/obesity (BMI: 25-40 kg/m²) were randomized to consume (WHEY) or collagen (COLL) protein supplementation (2 x 25 g/day) during a 12-week progressive LL-RET program. Exercises were performed three times weekly at 30-50% 1-RM to volitional fatigue. Muscle biopsies were obtained to quantify fibre type and cross-sectional area via immunohistochemistry. Whole-body composition was assessed using DXA, and fasting blood glucose was measured. Linear mixed modelling will assess group and time effects. Results: Data analysis is ongoing; final results will be available for the conference. Significance: This study will provide evidence on whether protein quality influences LL-RET adaptations and glycemic regulation in metabolically at-risk older adults. Findings may inform targeted exercise and nutrition strategies to preserve muscle and reduce type 2 diabetes risk in aging.

Session: I-E
Time: 9:40 a.m.
Location: WSB67

Running against the rush: The influence of cardiorespiratory fitness on vascular responses to acute hyperglycemia in premenopausal females

Presenter: Maya Robinson

Co-author(s): Christian M. Miranda, Nicholas D. Papa, Alexa A. Robertson, Jennifer S. Williams
Faculty Advisor: Jennifer Williams, PhD
Wilfrid Laurier University

Background: Acute hyperglycemia impairs endothelial cell function, involved in maintaining vascular homeostasis, and causes arterial stiffening and reduced structural integrity. A higher level of cardiorespiratory fitness is widely understood to have vascular benefits, serving as protection against acute hyperglycemia. The influence of acute hyperglycemia in individuals of varying fitness levels is under-researched, specifically in females when considering contraceptive status. The purpose of this study is to investigate the effects of cardiorespiratory fitness on the vascular responses to acute hyperglycemia in females who are naturally cycling (NAT) or 2nd-generation oral contraceptive pill (OCP) users. **Methods:** Forty healthy premenopausal females aged 18-35, who are either NAT or OCP users, will participate in a graded treadmill exercise test to determine VO_2 peak. They will then undergo two oral glucose tolerance tests (OGTT), in both low (early follicular/placebo) and high (mid-luteal/active) hormonal phases. In these OGTT trials, measurements of arterial stiffness via pulse wave velocity of the central (carotid-femoral arteries), arm (carotid-radial arteries), and leg (femoral-dorsalis pedis arteries) segments, along with endothelial function via flow-mediated dilation (FMD) of the brachial artery, will be assessed every 30 minutes throughout acute hyperglycemia. **Anticipated Results:** A combination of low cardiorespiratory fitness and OCP use is hypothesized to exacerbate the negative vascular effects of acute hyperglycemia. Therefore, we hypothesize that females with a low level of cardiorespiratory fitness and those using 2nd-generation OCPs will see a greater impairment in endothelial function during acute hyperglycemia. **Significance:** Given the historical underrepresentation of premenopausal females in physiological research and the widespread use of 2nd-generation OCPs in Canada, this study aims to address this knowledge gap by examining how cardiorespiratory fitness offers protection against acute hyperglycemia in diverse female populations.

Impact of Time-Restricted Eating Window Timing on Glycemic Control and Adherence in Adults With and Without Type 2 Diabetes

Presenter: Pin-Yu (Sharon) Chen

Faculty Advisor: Amy Kirkham, PhD
University of Toronto

Time-restricted eating (TRE) involves consuming food ad libitum within a specific daily window (e.g. 8-10 h) followed by fasting for the remainder of the day. Previous studies suggest that TRE is safe and feasible in adults with type 2 diabetes (T2D). While TRE has shown improvements in glycemic control, improved body composition, and improved insulin sensitivity in individuals with T2D or obesity, the optimal TRE window timing and long-term acceptability is unknown. Few studies have directly compared early and late eating windows, but none have compared TRE timing in individuals with or at risk for developing T2D. This is a critical gap given that T2D alters diurnal glucose regulation, leading to higher morning glucose peaks (known as the 'dawn phenomenon'). (Include something about adherence here, since I don't see anything about adherence to TRE and its effects on glycemic control). This randomized crossover trial will be conducted over 6 weeks to assess the impact of three 7-day free-living TRE conditions on glycemic outcomes, and T2D status. Adults with obesity [n = 120; BMI: 30-50 kg/m²; age: 45+], either diagnosed with T2D (n = 60) or at risk (n = 60), will first complete a 7-day baseline period to establish dietary habits and outcome measures. Following baseline, three 7-day TRE conditions will be completed in a random order (early 7am-4pm, midday 9:30am-6:30pm and delayed 12pm-9pm), with a 7-day washout period between conditions. Outcomes will be assessed using continuous glucose monitoring for 24-h glucose patterns, glucose variability, nocturnal glucose, and time-in or out-of-range. Adherence and acceptability will be evaluated using daily text logs, satisfaction surveys, and questionnaires. It is hypothesized that early TRE will yield the most favorable glycemic outcomes but lowest acceptability and that effects will differ by T2D status.

Effects of Low-load Resistance Training on Muscle Capillarization and Glycaemic Control in Older Adults

Presenter: Sarah Lyons

Co-author(s): Sarah E. Lyons, Caroline V. Lowisz, Tom A.H. Janssen, Matthew J. Lees, James McKendry, Changhyun Lim, Avesta Alizadeh, and Stuart M. Phillips

Faculty Advisor: Stuart Phillips, PhD
McMaster University

Introduction: Glucose intolerance is adversely affected by both advancing age and excess adiposity, which places older adults with overweight/obesity at a heightened risk for the development of type 2 diabetes mellitus (T2DM). Age-related reductions in skeletal muscle microvasculature supply and skeletal muscle mass impair insulin signalling and contribute to poor glycaemic control. Lower-load resistance training (LL-RT) has been shown to increase skeletal muscle capillarization in older adults, and may be a safer alternative to traditional higher-load resistance training. However, it is unclear if increased capillarization translates to improved glycaemic control in older adults with overweight/obesity. **Objectives:** The purpose of this study was to determine whether LL-RT increases skeletal muscle capillarization in older adults with overweight/obesity, and additionally leads to improvements in glycaemic control. We hypothesized that 12-weeks of LL-RT would increase muscle fibre capillarization in type 1 and type 2 muscle fibres and improve glycaemic control in older adults with overweight/obesity. **Methods:** Sixty-seven sedentary, older adults (60-85yrs) with overweight/obesity (body mass index: 25-40 kg·m⁻²) performed 12-weeks of a supervised progressive LL-RT program (30-50%1RM; 3x/wk) combined with daily protein supplementation (2x25g). Training consisted of alternating upper and lower body sessions, with the last set of each exercise performed until volitional fatigue. Muscle biopsies and oral glucose tolerance tests (OGTT) were collected pre- and post-intervention. Primary outcomes include capillary density, capillary-to-fibre ratio, and capillary-to-fibre perimeter exchange index. A linear mixed model will be performed to assess group and time effects. **Results:** Data analysis is currently ongoing, but final data will be available at the conference. **Significance:** This study will contribute to our understanding of accessible exercise interventions for improving skeletal muscle microvascular supply and glycaemic regulation for aging populations at elevated risk of developing T2DM.

Examining the Feasibility of a 14-Day Exogenous Ketone Supplementation Intervention in Adults with Subjective Cognitive Decline

Presenter: Zena Manna

Co-author(s): Ethan Danielli, Aedan Rourke, Ben Arhen, Jeremy Walsh
Faculty Advisor: Jeremy Walsh, PhD
McMaster University

BACKGROUND: Individuals with subjective cognitive decline (SCD) are at a higher risk of developing dementia and may respond to early intervention. Ketone supplementation may serve as a potential therapeutic strategy for cerebral blood flow and metabolism to mitigate further cognitive changes. However, the feasibility of ketone supplementation for those with SCD remains unknown as its bitter taste and potential gastrointestinal symptoms may lead to adherence issues, thereby obscuring a true examination of efficacy. Therefore, the purpose of this study is to evaluate the hypothesis that adherence will be high ($\geq 80\%$) to the three time daily for two weeks supplementation intervention in individuals with SCD, also in comparison to a taste-matched placebo. **METHODS:** This randomized placebo-controlled crossover double-blinded trial is in the active recruitment and data collection phase ($n=9$ completed, $n=5$ active). A total of 46 middle-to-older adults between the ages of 55 to 75 years old with SCD (50% female) will be recruited. Participants will attend two sets of study visits before and after two weeks of thrice daily supplementation (randomized order), undergoing MRI brain scans, cognitive testing, and hemodynamic measures during visits. A minimum 14-day washout period will occur between intervention periods. Adherence will be monitored via returned empty bottle count and will be verified by logbook entries. **RESULTS:** Preliminary blinded analyses included descriptive statistics and a paired-samples t-test. Adherence was high in both Condition A ($97.6\% \pm 3.07$) and Condition B ($98.5\% \pm 2.67$) with no significant difference between conditions ($p > 0.05$); one participant dropped out during Condition B. **SIGNIFICANCE:** Adherence to clinical trial interventions is often poor and under-reported. A better understanding of adherence to ketone supplementation ensures that study outcomes accurately reflect cognitive and metabolic effects, while providing critical insight into the feasibility of real-world uptake as a potential clinical strategy to address dementia progression.

Session: II-A
Time: 10:50 a.m.
Location: BN302

Exploring the relationship between maximal and submaximal cardiovascular physiology

Presenter: Youna Uehara

Co-author(s): Sinan Osman, Heeva Ramezankhani, Nathaniel Wolfs, Sicheng Hong, Robert F. Bentley

Faculty Advisor: Dr. Robert F. Bentley
University of Toronto

Background: The cardiovascular system helps facilitate oxygen delivery (O₂D) towards skeletal muscle during exercise. The cardiovascular response may be unique to the exercise intensity; however, there is considerable variability between people with respect to how the heart and blood vessels may respond to the perturbation of exertion. How the submaximal cardiovascular response may relate to maximal physiological responses is poorly described. **Purpose:** To explore how an individual's cardiovascular response aligns during different intensities of exercise. **Methods:** Healthy young adults (age 18-35; 50% female) will complete two experimental sessions involving progressive cycling to volitional exhaustion and single/two-legged knee extensions at 40% and 80% maximum voluntary contraction. Peak rate of oxygen consumption ($\dot{V}O_2$; indirect calorimetry), leg maximum voluntary contraction (isometric impulse), maximum cardiac output (transthoracic echocardiography), and the slope of the cardiac output to oxygen consumption (Q- $\dot{V}O_2$) relationship will be assessed. **Expected Results:** We hypothesize that submaximal cardiovascular responses will not align with maximal physiological responses such that individuals with a lower submaximal stroke volume, cardiac output, or $\dot{V}O_2$ will not have lower maximal responses. **Significance:** Submaximal exercise assessments are more accessible and readily completed compared to maximal counterparts. Advancing the understanding of their relationship will aid in the use and interpretation of exercise testing across the health spectrum. Future research may explore whether additional physiological measures, such as blood flow, vasodilation capacity, and hemoglobin concentration, better explains the submaximal to maximal physiological relationships.

The Effects of Prior Night Sleep Duration and Quality on Resting Circulating BDNF

Presenter: Katelynn Ambrose

Co-author(s): Stuart P. S. Mladen, Aedan J. Rourke
Faculty Advisor: Jeremy J. Walsh, PhD
McMaster University

BACKGROUND: Brain-derived neurotrophic factor (BDNF), a growth factor within the neurotrophin family, plays a role in neuroplasticity and brain health. Acute sleep deprivation has been reported to elevate resting BDNF, potentially reflecting a compensatory response to stress. Greater cardiorespiratory fitness (VO₂peak) has also been associated with reduced BDNF at rest. However, it remains unclear whether sex differences exist in the relationships between sleep, fitness and resting BDNF. Therefore, we sought to investigate how sleep duration, sleep quality and VO₂peak relate to resting serum and plasma BDNF in young adults, and whether these associations are influenced by sex. We hypothesized that sleep duration, sleep quality and cardiorespiratory fitness would be inversely associated with resting plasma and serum BDNF, and that these relationships would be moderated by sex. **METHODS:** Data from 20 young adults (10 females; 23 ± 3 years) collected from a previous study were used for secondary, cross-sectional analysis. VO₂peak was determined via a graded exercise test on a cycle ergometer. During 3 experimental visits, sleep duration and sleep quality from the preceding night were assessed with the Consensus Sleep Diary. Resting venous blood samples were obtained and plasma and serum BDNF were quantified via ELISA. **RESULTS:** Two separate ANCOVAs examined the associations of sex, average sleep duration, average sleep quality, and VO₂peak with average plasma and serum BDNF across 3 visits. There were no significant main effects of any predictor in either model (all P > .05). **CONCLUSION:** Resting plasma and serum BDNF were not associated with sleep duration, sleep quality, VO₂peak or sex. These findings suggest that sleep and cardiorespiratory fitness may not influence circulating BDNF at rest, however, further research with larger samples and more comprehensive sleep assessment is needed.

Repeatability of Vascular Assessments in Young Hormonal Contraceptive Users

Presenter: Jake Procaccini

Co-author(s): Jenna C. Stone, Joshua M. Cherubini, Matthew I. Badour, Lindsay G. Wilson, Alison K. Shea, Maureen J. MacDonald
Faculty Advisor: Maureen MacDonald, PhD
McMaster University

INTRODUCTION: Arterial stiffness is an early marker of cardiovascular disease risk, with carotid-femoral pulse wave velocity (cfPWV) as the gold-standard measure of central arterial stiffness in humans. Local arterial stiffness can also be measured by using carotid distensibility, compliance, and β -stiffness derived from ultrasound imaging. Sex hormones influence vascular function through endothelial and smooth muscle pathways, and hormonal contraceptives alter endogenous hormones. Although prior studies report inconsistent short-term changes in cfPWV and carotid stiffness, the magnitude of differences is small. Characterizing the short-term repeatability of vascular measures in young hormonal contraceptive users is necessary to determine whether changes reflect physiological change or expected within-subject variability. The purpose of this study is to evaluate the repeatability of cfPWV and local carotid measures across two visits in young females using hormonal contraception. **METHODS:** Using archival data, six healthy premenopausal participants were included: three second-generation combined OCP users and three intrauterine device (IUD) users. Participants were assessed during two consecutive visits under standardized conditions (two active-pill weeks for OCP users and matched timepoints for IUD users). Participants arrived following overnight fasting and abstained from caffeine, alcohol, and vigorous exercise prior to testing. After 10 minutes of supine rest with electrocardiogram monitoring, cfPWV was assessed using applanation tonometry. Carotid artery distensibility, compliance, β -stiffness, and intima-media thickness were derived from high-resolution B-mode ultrasound calibrated to blood pressure. Data were analyzed using a linear mixed effects model ($\alpha = 0.05$). **EXPECTED RESULTS:** Within-subject differences in cfPWV and local carotid stiffness across two active-pill visits are expected to be small and not exceed short-term repeatability thresholds. Any visit-to-visit differences are anticipated to reflect within-subject variability rather than physiological change. **SIGNIFICANCE:** These findings will clarify the short-term repeatability of central and carotid arterial stiffness measures in young hormonal contraceptive users and inform the interpretation of small between-visit differences

The Effect of Microvascular Function on the Efficacy of Ischemic Preconditioning

Presenter: Kim Malvin Sales

Faculty Advisor: Dr. Robert F. Bentley
University of Toronto

Introduction: Ischemic preconditioning (IPC) is a potential ergogenic aid that involves repeated cycles of blood flow occlusion and reperfusion prior to exercise. However, effects of IPC on aerobic exercise performance remain equivocal due to the variability in IPC protocol application alongside a 38% non-responder prevalence rate. The microvasculature plays an important role in oxygen delivery during exercise, yet the impact of microvascular function on IPC efficacy is unknown. The purpose of this study is to investigate whether resting microvascular function predicts ergogenicity of IPC during progressive cycling, and to assess the repeatability of IPC on exercise performance. Methods: Healthy, recreationally active adults (18-35 years) will complete 4 experimental sessions involving progressive cycling to volitional exhaustion either without (control) or with IPC consisting of 4, 5-minute cycles of bi-lateral occlusion at limb occlusion pressure (3 repeated sessions separated by 72 hours). Resting microvascular function will be assessed using a vascular occlusion test. Skeletal muscle oxygenation (SmO₂; frequency domain near-infrared spectroscopy) and muscle blood flow (BFi; diffuse correlation spectroscopy) will be measured at the right vastus lateralis throughout the vascular occlusion test and progressive cycling. Gas exchange, ventilation, heart rate and systemic blood pressure will be assessed throughout. Results: Data collection is currently ongoing. We hypothesize that: 1) IPC will improve maximal exercise performance in similar proportion as previous literature; 2) IPC will enhance microvascular blood flow and muscle oxygen delivery; 3) Individuals with greater resting microvascular function will show a greater performance enhancement following IPC; and 4) The magnitude of the IPC effect on performance will be consistent across multiple testing sessions. Conclusion: This study will provide insights into IPC responsiveness and repeatability of IPC effects across multiple sessions. Identifying physiological predictors for IPC response may improve individualization of IPC application to improve performance and health.

Middle Cerebral Artery Pulsatility Index During and After Rowing vs. Intensity-Matched Cycling in Healthy Young Adults

Presenter: Makye Wilkinson

Co-author(s): Matin Borhani
Faculty Advisor: Baara Al-Khazraji, PhD
McMaster University

Background: The brain requires precise regulation of cerebral blood flow (CBF) to maintain oxygen delivery and protect neural tissue from damage. Cerebral autoregulation (CA) buffers changes in CBF; however, certain exercise modalities may challenge this system through repetitive pulsatile pressure swings. Rowing is one such modality, combining sustained aerobic demand with rhythmic, high-force contractions and Valsalva-like manoeuvres. These features produce cyclical oscillations in blood pressure, potentially imposing a greater pulsatile load on the cerebral vasculature than traditional aerobic exercise. The pulsatility index (Pi), derived from middle cerebral artery (MCA) velocity waveforms, quantifies pulsatile load and indicates CA effectiveness. Despite this, the cerebrovascular profile of rowing remains poorly characterized, and no studies have compared rowing to an intensity-matched aerobic control while tracking MCA Pi. Thus, this study aims to compare MCA Pi during and following rowing and cycling at matched intensities in healthy adults.

Methods: Recreationally active adults (18-35 years) with no history of neurological or cardiovascular disease will complete a within-subject crossover design across three visits: familiarization and VO_2 peak assessment, a cycling visit, and a rowing visit. Participants will perform 20 minutes of continuous exercise at 65-75% VO_2 peak. MCA Pi will be recorded continuously via transcranial Doppler ultrasonography (TCD), with blood pressure, heart rate, and expired gases collected throughout baseline, exercise, and supine recovery. A two-way ANCOVA will be used for primary analysis.

Results: Data collection is ongoing; complete results will be presented at the NURC.

Significance: This study addresses a gap in cerebrovascular research by characterizing pulsatile hemodynamic demands of rowing relative to an intensity-matched aerobic control. The crossover design is a key strength, isolating the effect of exercise modality. Limitations include movement artifacts in TCD recordings and exclusion of participants lacking adequate temporal acoustic windows. Future work should examine responses in trained rowers and clinical populations.

Comparison of Suture Techniques for Subscapularis Tendon Repair

Presenter: Abdul Jalil Amina

Co-author(s): Stefania Di Leo, PhD Candidate
Faculty Advisor: Timothy Burkhart, PhD
University of Toronto

BACKGROUND: Subscapularis tendon tears represent a substantial portion of rotator cuff injuries and are commonly treated through surgical reattachment of the tendon using sutures. Despite technical advances in both open and arthroscopic repair, clinical failure rates remain notable, often due to gap formation, suture cut-through, or loss of fixation under physiological loading. Existing biomechanical research has predominantly focused on the tendon-bone interface, with limited attention given to the tendon-suture interface, where mechanical failure frequently initiates. This gap in research limits the ability to optimize suture techniques that enhance repair stability and support successful tendon healing. **OBJECTIVE:** The objective of this study is to quantify and compare the biomechanical performance of the tendon-suture interface in subscapularis tendon repair using two commonly employed suture techniques: the modified Mason-Allen and the Krackow stitch. **METHODS:** This cadaveric biomechanical study will compare a modified Mason-Allen (MMA; n = 4 cadavers) and a Krackow repair (n = 4 cadavers), both performed using #2 FiberWire. Intact cadaveric shoulder specimens will be dissected, with the subscapularis tendon detached from the humeral head and prepared for repair. Specimens will undergo cyclic loading for 1000 cycles between 50-250 N, followed by a pull-to-failure test. Optical tracking will quantify gapping between the tendon and bone footprint and measure tissue strain. **EXPECTED RESULTS:** It is expected that suture technique will significantly influence gap formation, strain, and failure properties. The modified Mason-Allen repair is anticipated to demonstrate reduced gapping and higher resistance to cyclic loading compared to the Krackow technique, with differences observed in cycles to failure and ultimate failure strength.

Age- and Sex- Related Differences in Mechanical Fatigue Behaviour of Human Tendons

Presenter: Wesley Carson

Faculty Advisor: Jackie Zehr, PhD
University of Toronto

Background: Mechanical fatigue refers to the progressive development of microdamage in tissue subjected to prolonged and/or repetitive loading. Tendons are particularly prone to fatigue-induced injury given their role in transmitting and storing large forces during movement. Emerging evidence suggests that age- and sex-related differences in tendon structure and mechanical properties may modulate susceptibility to fatigue-related damage; however, findings remain inconsistent. Thus, this study aimed to systematically review the existing literature to evaluate the effects of age and sex effects on tendon mechanical properties relevant to fatigue. Methods: A structured review of 23 peer-reviewed articles was performed. Eligible studies included in vivo investigations of tendon mechanical properties using ultrasound and dynamometry, shear wave elastography (SWE), or tendotonometry. Measured outcome parameters included tendon stiffness, elastic modulus, strain, and cross-sectional area (CSA). Results: Older adults had decreased tendon stiffness (-43%) and elastic modulus (-59%) compared to young adults, despite a larger CSA (+34%); however, these results were primarily observed in ultrasound-dynamometry studies with less prevalence in SWE. Females had lower stiffness and elastic modulus than males, but peak tendon strain was similar between sexes. SWE revealed an interaction where a decrease ($\beta = -0.350$, $p = 0.030$) in shear modulus was observed between older and young adult females, but not in males. Repetitive loading resulted in a temporary decrease in tendon stiffness in both sexes, with stiffness returning to baseline after 60 minutes with no sex-related recovery differences. Conclusion: Based on the results, it appears that aging is associated with altered tendon material properties that may increase fatigue susceptibility. Sex-related differences in baseline tendon stiffness, elastic modulus and CSA might influence strain distribution during repetitive loading; however, experiments performed to fatigue failure are few. Future longitudinal study designs, including high-cycle fatigue models, are warranted to more distinctly clarify age-by-sex effects on tendon fatigue.

Fatigue-Related Changes in Knee Joint Angle Reproduction Accuracy After Anterior Cruciate Ligament Reconstruction

Presenter: Jodh Gill

Co-author(s): Quinn Mulligan
Faculty Advisor: Timothy Burkhart, PhD
University of Toronto

BACKGROUND: Anterior cruciate ligament (ACL) rupture is a common, clinically significant knee injury, with approximately 120,000-250,000 injuries occurring annually in North America. Although nearly 80% of individuals return to sport following ACL reconstruction (ACLR), many continue to display impaired neuromuscular control and proprioceptive deficits. Neuromuscular fatigue has been shown to alter sensorimotor function and joint position awareness, factors associated with increased ACL injury. However, the influence of fatigue on proprioceptive accuracy following ACLR remains unclear. **OBJECTIVE:** Quantify fatigue-induced changes in knee joint position in individuals 8-12 months post-ACLR compared with healthy controls, and examine whether neuromuscular fatigue is associated with increased joint angle reproduction error. **METHODS:** 36 physically active adults (18 ACLR; 18 control), aged 18-30 years, will be recruited and matched for age, sex, and activity. Surface electromyography (EMG) will quantify quadriceps fatigue using mean power frequency analysis, with fatigue defined as a $\geq 10\%$ reduction with ratings of perceived exertion (Borg scale). Knee joint position sense will be assessed using an active joint-angle reproduction task in which participants replicate target knee flexion angles of 15° and 75° at baseline and following a standardized fatigue protocol comprising repeated isometric contractions, vertical jumps, and high-knee running. Absolute and relative angular error will be calculated to quantify proprioceptive accuracy across fatigue conditions. Outcomes will be analyzed using mixed-model repeated-measures ANOVA. **EXPECTED RESULTS:** The ACLR group is expected to demonstrate greater increases in joint-angle reproduction error following fatigue than controls, indicating reduced proprioceptive accuracy. Fatigue is anticipated to produce larger sensorimotor deficits in the ACLR group, reflecting attenuated neuromuscular control. Given that 1 in 5 athletes who sustain ACLR experience reinjury after return to sport, these findings may inform return-to-sport decision-making strategies.

Evaluating the Short-Term Impact of the FIFA 11+ on the Biomechanical Responses and Jump-Landing Mechanics in Youth Female Soccer Players

Presenter: Lauren Henriksson

Faculty Advisor: Paolo Sanzo, DSc
Lakehead University

Background: Anterior cruciate ligament (ACL) injuries are common among female soccer players and frequently occur during landing and cutting maneuvers. Excessive knee valgus during landing is a key biomechanical risk factor associated with increased ACL injury risk. Neuromuscular warm-up programs such as the FIFA 11+ reduce ACL injury incidence in athletes; however, limited research has examined their immediate effects on knee valgus during landing tasks in youth female soccer players. Understanding these biomechanical changes may help explain the injury-prevention benefits of neuromuscular warm-up programs. **Objective:** To evaluate the short-term effects of an adapted FIFA 11+ warm-up on knee valgus angle during drop landing in youth female soccer players. It was hypothesized that knee valgus angle would decrease following completion of the warm-up protocol. **Method:** Seven female soccer players aged 16-21 years participated in this study. Participants completed drop landing trials from a 20 cm platform before and after performing a standardized warm-up protocol based on the FIFA 11+. All trials were recorded using a smartphone camera positioned in the frontal plane. Knee valgus angles at peak landing were measured using Kinovea motion analysis software. Pre- and post-warm-up knee valgus angles were compared within participants to evaluate changes in landing mechanics. **Results:** Preliminary descriptive analysis from six participants showed a mean knee angle of 171.3° pre-warm-up and 173.0° post-warm-up. Individual responses varied, with most participants demonstrating improved frontal-plane knee alignment following the warm-up. These values are based on initial video measurements, and formal statistical analysis has not yet been performed. **Recruitment and data collection is ongoing.** **Conclusion:** These preliminary findings suggest that a structured neuromuscular warm-up may affect landing mechanics associated with ACL injury risk in youth female soccer players.

Development and validation of an in-vitro cadaveric model of the Chronic Anterior Cruciate Ligament Deficient ("CAD") knee

Presenter: Lara El-Darazi

Co-author(s): Kosaran Gumarathas, Dr. David Wasserstein
Faculty Advisor: Timothy A. Burkhart, PhD
University of Toronto

Background: Chronic Anterior Cruciate Ligament (ACL) deficiency (CAD) occurs in individuals with prior failed ACL reconstruction, delayed diagnosis, or non-surgical care. Over time, CAD knee results in increased anterior tibial translation (ATT), altered tibiofemoral contact mechanics, and lesions of the posterior horn of the medial meniscus (ramp lesion). Patient reported outcomes include instability, giving away, and pain. In-vitro cadaveric models are often utilized to investigate acute ACL injuries and surgical reconstructions; however, there exists no validated model for CAD knee. **Purpose:** The purpose of this study is to develop a biomechanical cadaveric model that simulates the anatomical changes of a CAD knee. **Methods:** Ten fresh-frozen cadaveric knee specimens will undergo a within-specimen testing protocol, including intact, ACL-deficient, and progressively increased cyclic loading conditions to simulate CAD knee. Cyclic compressive loading with controlled ATT will be applied in a stepwise manner, to reproduce clinically relevant stresses. At defined intervals, tibial plateau contact pressures, and arthroscopic assessment of the medial meniscus and cartilage will be performed. Primary outcomes include ATT, development of ramp lesions and contact pressures (average contact pressure, change in center of pressure, and contact area). CAD will be defined as ATT 30% greater than the ACL-transected condition, under a 750N load. **Expected Findings:** To date, a single 64-year-old male specimen has been tested. The specimen tested positive for a ramp lesion, after the third phase of loading. With additional specimens we expect that progressive cyclic induce CAD knee during higher loading conditions. Anatomical changes characterized by CAD pathology include ramp lesion formation, increased ATT, and altered contact pressure distribution. Establishing the first in-vitro model of CAD knee may help inform surgical reconstruction strategies.

The Secrecy of Grooming in Sport: An Analysis of a Gymnastics Canada Case

Presenter: Alaina Tsimicalis

Faculty Advisor: Gretchen Kerr, PhD
University of Toronto

Although sport is often associated with enhanced physical and psychological development, sport can be a precursor to violence against athletes. Violence in interpersonal relationships, including neglect, sexual, physical, and psychological violence has garnered significant public and academic attention recently, with most attention devoted to understanding sexual violence. Sexual violence is any sexual act, attempt to obtain a sexual act, or other act directed against a person's sexuality using coercion, committed without freely given consent. It is a broad term encompassing physical and non-contact acts-including assault, harassment, and exploitation-that can occur in person or online. While sexual violence can occur between various interest groups within sport, this presentation will focus on sexual violence within the coach-athlete relationship. Researchers have noted that the complex nature of the coach-athlete relationship can disguise harmful acts including grooming behaviours that can lead to sexual violence. The Brubaker case of Gymnastics Canada will be analyzed according to documented grooming processes and policy documents including the Canadian Universal Code of Conduct to Prevent and Address Maltreatment in Sport (UCCMS) and the International Olympic Committee (IOC) Consensus Statement on Interpersonal Violence in Sport. Specifically, safe sport-related policies including definitions of conduct, bystander intervention, and reporting were reviewed. It was concluded that sexual violence in this case occurred through a gradual process and calculated steps to groom the surrounding community, those closest to the victims and the victims themselves. The secrecy of the grooming was facilitated by a lack of bystander intervention and the notoriety of the coach. This analysis demonstrates that while policies and codes of conduct are essential, they form only one part of a broader violence prevention strategy.

Daily Movement Matters: Identifying Latent Activity Profiles and Psychosocial Correlates in Prostate Cancer Survivors

Presenter: Andy Yip

Co-author(s): Hui Xiao, Linda Trinh
Faculty Advisor: Dr. Linda Trinh
University of Toronto

Background: Prostate cancer survivors (PCS) commonly experience treatment-related side effects, including fatigue and reduced quality of life (QoL). Few studies have used person-centered approaches to examine heterogeneity in movement behaviours beyond structured exercise among PCS. Understanding daily movement patterns may inform tailored supportive care interventions. **Purpose:** To identify distinct movement-behaviour profiles among PCS based on light-intensity physical activity (PA) minutes and daily steps, and examine psychosocial correlates of profile membership. **Methods:** A cross-sectional analysis of baseline Fitbit (Fitbit Inspire 2) data from a larger randomized controlled trial was conducted. Sedentary (>8 h/day) PCS (stage I-IV) aged ≥ 18 years in Canada were recruited through community and genitourinary clinics. Latent profile analysis was conducted using average daily steps and light-intensity PA minutes as continuous indicators. Multinomial logistic regression examined psychosocial correlates (e.g., Leisure Score Index (LSI) [Godin Leisure-Time Exercise Questionnaire], QoL [Functional Assessment of Cancer Therapy-General], fatigue [Functional Assessment of Chronic Illness Therapy-Fatigue scale], anxiety and depression [Hospital Anxiety and Depression Scale]). **Results:** PCS (N=114; Mage = 69.4 ± 10.0 years) were primarily diagnosed with localized cancer (85.0%) treated with surgery (66.7%), radiation therapy (36.6%), and/or androgen deprivation therapy (26.4%). Three latent subtypes were identified which demonstrated optimal fit (entropy=0.845; smallest profile=14.4%). Profiles were characterized as Low Activity (39.7%; N=45; 4,719 steps/day; 141.8 light-intensity PA mins/day), Moderate Activity (45.9%; N=52; 8,891 steps/day; 229.3 light-intensity PA mins/day), and High Activity (14.4%; N=17; 16,312 steps/day; 300.5 light-intensity PA mins/day). Compared to Low Activity profile, lower LSI was associated with greater odds of Moderate Activity profile (RRR=0.98, 95% CI:0.96-1.00, p=.025). Higher FACT-G score (RRR=1.06, 95% CI:1.00-1.12, p=.013) was associated with greater odds of High Activity profile. **Conclusion:** Distinct movement-behaviour profiles exist among PCS based on steps and light-intensity PA minutes. Higher activity profiles were associated with better QoL, which may be important intervention targets.

Mental Health Screening in Canadian Pre-participation Evaluations: A National Mixed-Methods Content Analysis

Presenter: Abby Wang

Co-author(s): Catherine Sabiston, PhD, Delaney Thibodeau, PhD, and Dr. Suzanne Leclerc
Faculty Advisor: Catherine Sabiston, PhD
University of Toronto

Background Pre-participation evaluations (PPEs) are foundational to athlete health screening in elite sport, identifying risks, guiding clinical decisions, and protecting well-being before training and competition. PPEs have traditionally focused on physical health, injury risk, and cardiopulmonary safety; however, growing evidence shows that mental health is a critical determinant of athlete performance and safety. Mental health concerns, including depression and anxiety, are prevalent in high-performance sport. It remains unclear whether mental health is systematically assessed within Canadian PPEs, and inconsistent inclusion may limit prevention and support. This study examined mental health screening practices within Canadian high-performance PPEs and identified gaps in current screening approaches. **Methods** A mixed-methods descriptive study analyzed PPE documents from Canadian Sport Institutes representing multiple provinces. Descriptive statistics characterized the inclusion of mental health content. An inductive content analysis examined how mental health was defined, presented, and assessed within PPE documents. **Results** Three PPEs used in five Canadian provinces were analyzed. In one PPE, 0 of 285 total items across 28 sections pertained to mental health. Another PPE had 1 item for mental health out of 91 total items (1.10%) across 7 sections. The third PPE had 8 mental health items out of 140 total items (5.71%) across 41 sections. Mental health items were situated within a dedicated section. All mental health items were yes/no, and none directly assessed the severity or current symptom burden of depression, anxiety, or other mental health concerns. Overall, mental health screening was narrowly defined and limited to binary, history-based questions rather than a multidimensional assessment of current psychological well-being. **Interpretation** Mental health screening within Canadian PPEs appears inconsistent and limited. Strengthening systematic mental health assessment may support earlier identification, clearer referral pathways, and athlete support, contributing to safer sport environments and more comprehensive, athlete-centred care within Canadian sport systems.

Standardized Safety: A Content Analysis of Concussion Education in Ontario Under Rowan's Law

Presenter: Matusiga Sivakumar

Faculty Advisor: Kaleigh Pennock, PhD
University of Waterloo

The implementation of Rowan's Law in Ontario mandates concussion education in youth sports, and education materials have subsequently been relied on as an injury prevention strategy. However, there are ongoing concerns that standardized concussion educational materials may not sufficiently engage diverse athlete populations or address existing inequities related to concussions and gender, race, and disability, and thus may be ineffective. This study investigates the representation of diverse athletes in concussion education materials produced by Provincial Sport Organizations (PSOs) in Ontario, and the impact of Rowan's Law on these materials. Concussion education materials were obtained from the public-facing websites of six PSOs (including rugby, soccer, hockey, alpine skiing, judo, and Parasport Ontario). Using a qualitative content analysis, materials were critically analyzed for athlete representation and demographics, sport-specific considerations, language, athlete responsibility framing, and alignments with Rowan's Law. Attention was also paid to whether materials acknowledged gender, race, and marginalized identities within the educational content. Results indicate that the majority of PSOs rely heavily on government-supplied, standardized Rowan's Law resources to provide concussion information. Across most sport organizations, concussion education resources demonstrate a high degree of similarity, with minimal sport-specific vocabulary, static and unengaging materials, and limited to no representation for equity-deserving groups. Although Rowan's Law clearly defines the responsibilities of organizations and requires athletes, coaches, and parents to follow mandated reporting processes, the PSOs often focus on athlete responsibility, obscuring organizational accountability regarding concussion management. These findings suggest that Rowan's Law has successfully institutionalized concussion education requirements across PSOs in Ontario. However, implementation appears driven by legislative compliance rather than engagement. Ultimately, the absence of sport-specific considerations, emphasis on athlete responsibility, and limited representation of diverse athlete identities raises questions about whether concussion educational approaches are meaningfully engaging youth athletes or addressing broader cultural and equity considerations within sports.

The Effects of a Combined Cognitive-Physical Warm-Up on Psychological Readiness in Older Adults

Presenter: Carmen McKay

Co-author(s): Steven R. Bray
Faculty Advisor: Steven Bray, PhD
McMaster University

Background: Older adults are encouraged to engage in at least 150 minutes of moderate-to-vigorous physical activity weekly. Engaging, enjoyable exercise promotes better adherence. Research with competitive athletes and recreational exercisers shows that completing a mental warm-up prior to exercising enhances psychological readiness and motivation. However, no studies have examined the effects of pre-exercise mental warm-ups in older adults. This study examined whether incorporating brief, mildly challenging cognitive tasks into a pre-exercise warm-up enhances psychological and affective readiness in older adults. Methods: Sixteen older adults (72.8 ± 6.6 years; 6 men, 10 women) from McMaster's Physical Activity Centre of Excellence completed a familiarization session and two exercise sessions separated by one week. Using a counterbalanced, within-subject design, participants completed both a combined warm-up and a physical-only warm-up. Both conditions were performed on a recumbent cycle ergometer at a moderate intensity (RPE of 3; CR-10) for ten minutes. For the combined warm-up, participants completed a sequence of three cognitive tasks (Stroop, Tachistoscope, Switched-Attention) while cycling. Measures of self-efficacy, motivation, mental fatigue, arousal, mood, and enjoyment were assessed pre- and post-warm-up. The combined cognitive-physical warm-up was associated with greater increases in confidence and motivation, as well as higher arousal, mood, and enjoyment compared to the physical-only condition. Inferential statistical testing is ongoing. Significance: Enhancing early-session self-efficacy and enjoyment, without increasing perceived strain during pre-exercise warm-ups, may strengthen the affective and motivational processes that support continued exercise participation in older adults. Ongoing analyses will further clarify the associated neurophysiological processes underlying these responses.

THE ROLE OF AMPK IN THE SKELETAL MUSCLE RESPONSE TO NEUROMUSCULAR STRESS

Presenter: Atta Yazdy

Co-author(s): Stephanie R Mattina, Andrew I Mikhail
Faculty Advisor: Vladimir Ljubcic, PhD
McMaster University

Introduction: The neuromuscular junction (NMJ) is the synapse between an α -motor neuron (α MN) and an innervated skeletal muscle fiber. It is a highly plastic apparatus that undergoes morphological and molecular adaptations within both the pre- and post-synaptic compartments in response to various stimuli. AMP-activated protein kinase (AMPK) is an exercise sensitive protein that modulates a variety of intracellular signalling cascades and is a key regulator of the neuromuscular phenotype. While previous research has emphasized the importance of skeletal muscle-specific AMPK at the NMJ, the relative importance of AMPK within both the α -MN and skeletal muscle in response to neuromuscular injury remains unknown. Methods: To investigate the effect of motor neuron and skeletal muscle-specific AMPK in response to nerve injury, three genotypes of mice: wild type, motor neuron-specific AMPK knockout (mnKO), and skeletal muscle-specific AMPK knockout (mKO), were assessed ($n = 12$). Each mouse underwent a unilateral sciatic nerve crush injury in one limb, while the other limb served as the control. After 35 days, the tibialis anterior (TA) muscle was collected and immunostained for muscle fiber analysis. Results: Preliminary results ($n = 2-3$) show an effect of injury, with a significant decrease in TA mass and fiber cross-sectional area in crushed limbs ($p < 0.05$). Across genotypes, the mKO mice saw a significant reduction in the percentage of TA mass lost compared to the WT. Additionally, crushed limbs exhibit a larger distribution of smaller muscle fibers with a significant decrease in % Type IIx fibers in the crushed limbs of mKO mice compared to the control. Conclusion: This study highlights the importance of AMPK in response to nerve injury, with preliminary data showing a trend towards smaller muscle fibers in the mKO mice compared to WT mice. Further work will collect a full data set to appropriately define this relationship.

A Comparison of Muscle Protein Synthesis in Response to Single Bolus or Split Feeding Following Whole-Body Resistance Exercise

Presenter: Elizabeth Baker

Co-author(s): Dominique Greyvenstein, James P. Newbold, Matthew J. Lees, Daniel R. Moore, Nicholas A. Burd, Daniel W. D. West, Andrea Vilorio Medina, Michael Sampaio, Ethan Chan, Luke Mathew

Faculty Advisor: Stuart Phillips, PhD
McMaster University

BACKGROUND: Resistance exercise training (RET) and protein consumption stimulate muscle protein synthesis (MPS), which, over time, can promote skeletal muscle hypertrophy. While large boluses of protein following RET result in irreversible amino acid oxidation, it has been suggested that there is 'no upper limit' of per-meal protein intake. We hypothesized that a multiple-feeding model where protein is consumed in smaller, even doses of protein would be more effective for stimulating MPS. We aimed to compare bolus versus split feeding patterns on MPS and whole-body leucine oxidation following RET. **METHODS:** Young, healthy males and females ($n = 24$) were randomized to consume 1.6 g/kg per day of protein in one dose (BOLUS) or spread across three meals (SPLIT) following RET. MPS was measured over a 17-h period with a primed constant infusion of D5-phenylalanine and the collection of muscle biopsies and plasma samples. Whole-body leucine oxidation was measured with a primed constant infusion of ^{13}C -leucine and the collection of plasma, breath, and VCO₂ samples. **RESULTS:** MPS did not differ between groups over the entire 17-hour period (BOLUS = 0.037 ± 0.009 %/h; SPLIT = 0.035 ± 0.009 %/h) ($P = 0.573$), and there was no group \times time interaction ($P = 0.678$). A main effect of time was observed ($P < 0.01$), with MPS highest at 17 hours compared to the earlier timepoints ($P < 0.05$). We noted no sex differences. Analysis is underway, and leucine oxidation data will be presented at the conference. **CONCLUSION:** Both BOLUS and SPLIT feeding patterns elicited similar MPS rates following RET. This suggests that total daily protein intake may be more critical than protein feeding patterns throughout the day. The leucine oxidation data will offer a more comprehensive understanding of the catabolic fates of large doses of protein.

Urinary Marker of Muscle Protein Breakdown is Unaffected by Dietary Protein Intake or Sex in Endurance-trained Males and Females During Post-exercise Recovery

Presenter: Hania Eskandarinezhad

Co-author(s): Eric Williamson, Sabrina Barsky
Faculty Advisor: Dr. Daniel Moore
University of Toronto

Endurance exercise stimulates skeletal muscle protein breakdown (MPB) due to mechanical stress and fuel utilization, requiring adequate dietary protein to support post-exercise recovery and subsequent protein synthesis. To date, most research has focused on dietary protein effects on whole-body and muscle protein synthesis, despite early research demonstrating attenuation of the acute exercise-induced increase in breakdown with exogenous amino acids. Therefore, this study aims to investigate the influence of varying protein intakes on urinary 3-methylhistidine (3MH), a by-product of contractile (myofibrillar) protein breakdown, in endurance-trained males and females. We hypothesize that 3MH would be similarly minimized at higher protein intakes in both sexes, with no significant sex differences. Eight males (30 ± 3 yrs; 78.6 ± 10.5 kg; 180.4 ± 2.7 cm; 75.6 ± 7.5 mL·kgFFM⁻¹·min⁻¹; mean \pm SD) and seven females (30 ± 4 yrs; 57.7 ± 5.0 kg; 163.6 ± 4 cm; 77.5 ± 7.1 mL·kgFFM⁻¹·min⁻¹) in the mid-luteal phase completed three randomized controlled trials following a 2-day controlled diet. Each metabolic trial consisted of a 20-km outdoor run at $80\% \pm 5$ and $81\% \pm 5$ of maximum heart rate for males and females, respectively. Subsequently, participants consumed hourly meals containing a complete amino acid mixture modelled after egg protein at low, moderate, or high doses (0.2, 1.2, 2.0 g·kg⁻¹·d⁻¹, respectively) and carbohydrate (9 g·kg⁻¹·d⁻¹) to meet post-exercise energy requirements. Urine samples obtained 7.5h into recovery were analyzed using competitive ELISA to determine 3MH normalized to creatinine excretion (3MH:Cr). Mean 3MH:Cr values were 604 ± 284 , 585 ± 262 , and 581 ± 221 nmol/mg for 0.2, 1.2 and 2 g·kg⁻¹·d⁻¹ intakes, respectively, across both sexes. There was no effect of sex ($P=0.205$) or protein intake ($P=0.953$) on 3MH:Cr. Despite the known effect of increasing dietary protein on muscle and whole-body protein synthesis, our findings suggest that dietary protein does not alter urinary 3MH appearance during recovery from endurance exercise when adequate energy and carbohydrate are consumed. Thus, dietary strategies to optimize post-exercise recovery in female and male endurance athletes should focus on outcomes other than MPB attenuation.

Differences in Plasma Amino Acid Kinetics and Appetite Regulation Following Single-Bolus vs Split Protein Feeding Patterns After Whole Body Resistance Exercise

Presenter: Luke Mathew

Co-author(s): Dominique Greyvenstein, James P. Newbold, Matthew J. Lees, Andrea Vilorio Medina, Michael Sampaio, Ethan Chan
Faculty Advisor: Dr. Stuart Phillips
McMaster University

Background: Protein ingestion after resistance exercise (RE) elevates circulating amino acids (AA) and their combination stimulates muscle protein synthesis. While protein dose and distribution influence AA kinetics, the effect on post-exercise appetite regulation remains unclear. Clarifying this relationship may help optimize feeding strategies to support anabolic processes in muscle. Purpose: We compared plasma AA kinetics and subjective appetite responses following single-bolus vs. split-protein feeding patterns after whole-body RE in healthy young adults. Methods: Twenty-four healthy young adults (n=12 males, n=12 females) were randomized to consume either a single meal (BOLUS) of protein (1.6 g/kg) or three smaller meals (SPLIT) of protein (3 x 0.53 g/kg) following whole-body RE. Over 17 hours, venous blood samples were collected repeatedly to measure plasma AA concentrations, while appetite was assessed using a visual analogue scale (VAS) questionnaire evaluating satiety, hunger, and cravings. Results: Significant group-time interactions were observed for VAS questionnaires. One hour following the first meal, BOLUS reported significantly different levels of hunger ($p < 0.05$), fullness ($p < 0.001$), desire to eat ($p < 0.01$), and prospective consumption ($p < 0.001$) than SPLIT, while no further significant differences were observed in reported appetite between groups 6 hours or 10.5 hours after the first meal. A significant group-time interaction was found for total and essential AA kinetics ($p < 0.001$). BOLUS produced an early hyperaminoacidemia, whereas SPLIT elicited delayed, repeated peaks aligned with meal timings. However, overall AA exposure and peak concentration did not differ between conditions ($p > 0.05$). Conclusion: BOLUS and SPLIT feeding patterns produced comparable anabolic exposure to amino acids; however, BOLUS induced greater early appetite suppression. Therefore, these findings suggest that SPLIT may represent a more sustainable strategy for maintaining protein intake across the day without compromising anabolic potential.

Effects of Feeding Patterns on mTORC1 and Lysosome Trafficking in Human Skeletal Muscle

Presenter: Michael Sampaio

Co-author(s): James Newbold, Dominique Greyvenstein, Matthew Lees, Everson Nunes, Fulvia Da Costa, Andrea Vilorio, Elizabeth Baker, Ethan Chan, Stuart M. Phillips
Faculty Advisor: Stuart Phillips, Ph.D., FACSM, FCAHS, FCSEP, FRSC
McMaster University

BACKGROUND: Following anabolic stimuli such as resistance exercise (RE) and/or protein ingestion, the mechanistic target of rapamycin complex 1 (mTORC1) binds to the lysosome and translocates to the muscle fibre periphery to regulate muscle protein synthesis. Research has shown transient increases in mTORC1-lysosome cellular colocalization in response to anabolic stimuli; however, this work has been only done over acute time frames (≤ 5 hr), and has not manipulated feeding patterns, which have been shown to influence skeletal muscle protein synthesis. **PURPOSE:** We aimed to investigate the effects of different feeding patterns on colocalization between mTORC1, the lysosome, and the muscle fibre periphery following whole-body RE and ingested protein over a 24-hour period. **METHODS:** Healthy young males and females ($n = 12$ ea) performed whole-body RE and consumed either a single meal containing 1.6 g/kg of protein (BOLUS) or 3 equally spaced meals containing ~ 0.53 g/kg of protein (SPLIT). Skeletal muscle biopsies of the vastus lateralis were taken at 5 timepoints across a 24-hour period. Samples were stained for mTORC1, lysosomal associated membrane protein 2 (LAMP2), and laminin to measure colocalization using immunofluorescence microscopy. **RESULTS:** No significant group-time interactions were identified for mTORC1-laminin colocalization ($p = 0.23$) or mTORC1-LAMP2 colocalization ($p = 0.37$). A significant group-time interaction was observed, where LAMP2-laminin colocalization was $\sim 24\%$ higher in the SPLIT group 14.5 hours post-RE ($p < 0.01$). At this timepoint, LAMP2-laminin colocalization significantly decreased from baseline in the BOLUS group ($p < 0.01$) and was maintained in the SPLIT group ($p = 0.99$). **CONCLUSION:** A split feeding pattern appeared to maintain lysosomal positioning at the periphery better than a bolus feeding pattern, likely through prolonged amino acid availability. As mTORC1-laminin and mTORC1-lysosome colocalization did not differ significantly between BOLUS and SPLIT, feeding pattern may not substantially impact mTORC1 localization and interactions.

Standardizing Exercise-Induced Muscle Damage: High-Load Eccentrics Reliably Reduce Elbow Flexor Maximum Voluntary Contraction at 24h Post-Exercise

Presenter: Jonathan Stringer

Faculty Advisor: Dr. Gerome Manson
Queen's University

Exercise-induced muscle damage (EIMD) is commonly used to investigate how altered muscle function affects sensorimotor processes, including online movement control. However, existing exercise protocols have produced inconsistent reductions in maximal voluntary isometric contraction (MVC) torque at 24 h post-exercise, making it difficult to ensure that participants are tested under a reliable state of muscle damage. This inconsistency limits the utility of EIMD for studying disrupted sensory-motor integration during reaching. The objective of this study was therefore to develop an elbow flexor eccentric exercise protocol that reliably induces EIMD, defined as a significant reduction in MVC torque at 24 h post-exercise. We hypothesized that a protocol using higher loads for fewer repetitions per set would produce consistent torque decrements across a wide range of participants. 12 healthy adults (8 males, 5 females; aged 21 ± 2 years) performed sets of 6 eccentric elbow flexor contractions at 75% of MVC on a HUMAC-Norm isokinetic dynamometer. Between sets, a single-repetition MVC was assessed following a 2-min rest, with an additional minute of rest before the next set. Participants continued this cycle until their between-set MVC fell below 50% of baseline, after which they performed one additional set. Elbow flexor MVC torque (average of the best of 5 maximal efforts) was assessed at baseline, 10 min post-exercise (simulating recovery periods used in prior reaching task protocols), and 24 h post-exercise. Participants demonstrated a 30% reduction in MVC from baseline to 10 min post-exercise and a 16% reduction from baseline to 24 h post-exercise. A paired-samples t-test confirmed significantly lower MVC at 24 h relative to baseline. These results indicate that this heavy-load, low-repetition eccentric protocol reliably induces sustained EIMD in the elbow flexors, providing a standardized paradigm for future investigations of how muscle damage affects proprioceptive contributions to the online control of goal-directed actions.

Investigating the effects of lorazepam and baclofen on interhemispheric inhibition

Presenter: Krystal Kwok

Co-author(s): Faith Adams

Faculty Advisor: Aimee Nelson, PhD
McMaster University

Communication between the two primary motor cortices is mediated by transcallosal projections within the corpus callosum. Transcranial magnetic stimulation (TMS) can be used to probe the transcallosal connections through interhemispheric inhibition (IHI). IHI occurs when a conditioning stimulus (CS) is applied to one primary motor cortex (M1) before a test stimulus (TS) is applied to the contralateral M1 approximately 8-50 ms after, which reduces the motor evoked potential (MEP) recorded in the muscle of interest. IHI is categorized into short-latency IHI (SIHI) with an interstimulus interval of ~8-10 ms and long-latency IHI (LIHI) with an interstimulus interval of ~40-50 ms. IHI is said to be mediated through local GABA-ergic neurons, however, the receptor-specific modulation remains unclear. This study aimed to further understand the modulation of IHI in a double-blinded, placebo-controlled study. Twenty-four healthy right-handed adults from the McMaster University community completed three sessions separated by a minimum of one week, receiving an oral dosage of 50 mg baclofen, 2.5 mg of lorazepam or placebo. Resting motor threshold (RMT) and IHI were measured at baseline (T0) and 90 minutes post-drug ingestion (T1). IHI was quantified as the conditioned to unconditioned motor evoked potential. Preliminary findings indicate that both SIHI and LIHI were reduced following baclofen administration, whereas lorazepam did not modulate either. This suggests that GABAB mediated mechanisms contribute to transcallosal inhibitory processes.

Vestibular Contributions to Reaching Accuracy Across Sensory Modalities

Presenter: Matthew Pesce

Co-author(s): Matthew Pesce, Dr. Gerome Manson
Faculty Advisor: Dr. Gerome Manson
Queen's University

Vestibular information is critical for eye movement control, balance, and spatial orientation. When reaching to external targets, vestibular signals help determine and update body position throughout movement. However, vestibular-evoked arm corrections appear absent when targets are fixed relative to the body during whole-body rotation, suggesting that the motor system disengages vestibular compensation when body-target spatial relationships are preserved. Whether vestibular signals influence body-directed reaching through their effects on body schema and proprioceptive encoding, rather than online spatial updating, remains untested. This study examined the influence of vestibular perturbation on reaching to the body and whether this influence differs across sensory modalities. Participants reached to their nose while viewing themselves through a webcam. Nose position was defined by either a brief vibrotactile stimulus (somatosensory condition) or a brief LED flash (visual condition). On select trials, galvanic vestibular stimulation (GVS) was applied to induce illusory self-motion of tilt to the right or left. Radial and directional error were significantly higher with GVS, with left and right GVS producing opposing shifts in reach endpoints across both modalities. This suggests vestibular signals alter the estimated position of the target, regardless of sensory modality, likely through modulation of body perception, rather than through the spatial updating mechanisms engaged during external reaching. Directional error variability was greater in the somatosensory modality, indicating visual localization provides a more precise spatial reference, consistent with modality-dependent differences in target encoding. These findings demonstrate that vestibular signals contribute to body-directed reaching through representational rather than compensatory mechanisms, extending vestibular-motor integration models beyond externally directed actions.

Should we prioritize error detection mechanisms or memory consolidation during early practice? The case of golf putts

Presenter: Mehar Lekhi

Co-author(s): Sam M. Coppa, Julia Kochanski, & Rafael R. Simoes
Faculty Advisor: Luc Tremblay, PhD
University of Toronto

The structure of practice is a strong determinant of motor skill acquisition. Moderate spacing between trials has been shown to enhance retention by engaging slower, more stable learning processes through forgetting-reconstruction mechanisms (Kim et al., 2015). Conversely, shorter inter-trial intervals (ITIs) may preserve working memory activation and strengthen immediate memory traces by potentially enhancing consolidation via memory contrast mechanisms (Panchuk et al., 2013). Despite these competing mechanisms, the research manipulating ITIs has largely employed fixed ITIs, and little is known about the influence of progressively manipulated ITIs within sessions. From a Challenge-Point perspective (Guadagnoli & Lee, 2004), progressively decreasing ITIs may increase functional task difficulty, potentially moving learners toward an optimal challenge point for retention. Therefore, this study examines how increasing versus decreasing ITIs influence acquisition and retention of a discrete golf putting task. Participants (n=20) will be randomly assigned to one of two conditions: (1) increasing ITIs (5 s to 10 s) or (2) decreasing ITIs (10 s to 5 s). Both groups will complete 12 blocks of 12 acquisition trials on Day 1. On Day 2, participants will perform retention and transfer tests using both 5 s and 10 s ITIs, with the order counterbalanced across participants. Performance will be assessed using constant error, variable error, root mean squared error, and absolute error of ball endpoint location relative to the target. Data collection and analyses are ongoing. It is hypothesized that the decreasing ITI group will demonstrate better retention and transfer performance, supporting the Challenge-Point framework by suggesting that progressively increasing temporal demands strengthens long-term learning through greater functional difficulty. Alternatively, if increasing ITIs produce superior retention, this would provide further support for forgetting-reconstruction mechanisms underlying the spacing effect. Practically, these findings may inform how to structure rest intervals within practice sessions to optimize motor skill acquisition.

Implicit Motor Sequence Learning in Novice Participants Performing a Piano Based Task

Presenter: Rony Lee

Co-author(s): Kate Moses

Faculty Advisor: Gerome Manson, PhD
Queen's University

Implicit motor learning, the acquisition of motor skills with no or minimal increase in verbal knowledge of movement performance, has been extensively studied using simple paradigms such as the Serial Reaction Time Task. However, these tasks involve single-finger key presses, leaving open whether practice structures designed to promote implicit learning can support the acquisition of complex, multi-effector motor sequences. Several paradigms have been developed to promote implicit learning by minimizing conscious awareness during practice, including dual-task, errorless, and analogy-learning approaches. Growing evidence also suggests that practice variability and contextual interference may similarly support implicit learning by directing attention toward movement outcomes. Yet these principles have rarely been applied to complex motor sequence tasks. This study investigated whether a practice structure designed to promote implicit learning could support the acquisition of a piano-sequence task. Nineteen novice participants completed a two-day protocol comprising 150 practice trials, in which a repeating target sequence was embedded among distractor and free-play exploration trials in a randomized order. The distractor and free-play trials were intended to generate motor variability while minimizing explicit sequence detection. Performance accuracy (percent of correctly completed sequences) and asynchrony (the stimulus - response timing) were assessed immediately and 24 h after practice. In addition, participants performed a transfer test where they played a novel sequence. Participants significantly ($p < 0.05$) improved in both accuracy and asynchrony from practice to immediate and delayed retention, indicating successful sequence acquisition. Accuracy and synchrony in the transfer test were significantly ($p < 0.05$) decreased compared to both retention tests. These findings indicate that complex motor sequences can be acquired through practice structures designed to promote implicit learning, extending the implicit sequence learning literature to more complex multimodal motor tasks. Future research should compare implicit and explicit learning conditions to test the influence of different practice structures.

Oxidative Stress-Biomarker Interactions and the Role of Exercise Training in Early Vascular Dysfunction in Young Adults with Type 1 Diabetes

Presenter: Hiya Shah

Co-author(s): AUTHORS: Hiya Shah⁽¹⁾, Matthew Badour⁽¹⁾, Irena Rebalka⁽²⁾, Thomas Hawke⁽²⁾,
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Faculty Advisor: Maureen MacDonald, PhD
McMaster University

BACKGROUND: Young adults with Type 1 Diabetes (T1D) face a 2-4 times greater risk of early cardiovascular disease, largely due to chronic hyperglycemia driving oxidative stress and endothelial dysfunction. Exercise improves vascular health in healthy populations, but whether the Diabetes Canada guidelines for exercise produce meaningful vascular and molecular benefits in young adults with T1D remains poorly understood. **OBJECTIVES:** This study examines how a 12-week combined exercise intervention affects circulating biomarkers of vascular remodeling and function, and whether these changes align with improvements in flow-mediated dilation (FMD) and carotid-femoral pulse wave velocity (cfPWV). **METHODS:** Young adults aged 18-35 with T1D and age-, sex-, and BMI-matched healthy controls who do not currently meet recommended physical activity guidelines (≥ 150 min/week of moderate-to-vigorous activity) were recruited as part of the Healthy Outcomes for Muscle with Exercise in T1D (HOMET1D) study at McMaster University. Participants completed baseline and post-intervention assessments including brachial FMD via Doppler ultrasound, cfPWV via applanation tonometry, and fasting blood measures of PRO-C3, a marker of structural collagen synthesis, and endothelin-1 (ET-1), a marker of endothelial function. The 12-week intervention followed Diabetes Canada guidelines: ≥ 150 minutes per week of moderate-to-vigorous aerobic exercise and 2-3 days per week of resistance training. **EXPECTED RESULTS:** We expect young adults with T1D to show lower FMD at baseline and a smaller improvement after training compared to healthy controls, with persistently higher ET-1 reflecting ongoing endothelial dysfunction. PRO-C3 is expected to be elevated at baseline in T1D, suggesting greater arterial remodeling, with blunted reductions following training. **SIGNIFICANCE:** This study addresses a critical knowledge gap in how exercise-induced molecular adaptations relate to vascular function in young adults with T1D, with findings intended to inform targeted exercise prescriptions to reduce early cardiovascular risk. **FUNDING:** CIHR

Effects of 12 Weeks of Exercise Training on Carotid Distensibility in Young Adults with Type 1 Diabetes

Presenter: Jonathan Rzepka

Co-author(s): Matthew Badour¹, Irena Rebalka², Thomas Hawke², Maureen MacDonald¹
Faculty Advisor: Dr. Maureen MacDonald
McMaster University

BACKGROUND: Individuals with type 1 diabetes (T1D) are at a heightened risk of developing cardiovascular disease due to chronic exposure to hyperglycemia and associated vascular dysfunction. Reduced arterial elasticity is an independent predictor of adverse cardiovascular events. Carotid distensibility (CD), a measure of carotid artery elasticity, provides insight in early macrovascular dysfunction and may detect subclinical vascular impairment in T1D. However, it remains unclear whether structured exercise training improves CD in young adults with T1D. **OBJECTIVES:** This study examines the effects of 12-weeks of exercise training on CD in individuals with T1D, compared to healthy matched controls. We hypothesize that individuals with T1D will demonstrate reduced CD compared to controls, indicative of early central arterial stiffening and increased cardiovascular disease risk. We further hypothesize that 12 weeks of exercise training, will enhance CD in both groups, with a proportionally greater improvement observed in the T1D cohort due to a larger capacity for vascular adaptation. **METHODS:** Participants included 72 inactive adults (36 T1D vs. 36 age-matched healthy controls; 18 females and 18 males per group) aged 18-35 years who participated in a 12-week unsupervised, home-based, exercise intervention. The program consisted of at least 150 minutes of moderate-to-vigorous-intensity aerobic exercise per week and resistance exercise two to three times per week. CD was assessed at rest using simultaneous B-mode ultrasound of the right common carotid artery and applanation tonometry of the contralateral carotid artery over 10 cardiac cycles. **EXPECTED RESULTS:** Data analysis is currently ongoing, we predict that individuals with T1D will have reduced CD at baseline and smaller changes with training. **SIGNIFICANCE:** This study will further our understanding of effective, evidence-based exercise prescriptions for individuals with T1D. Given the early onset and progressive nature of vascular dysfunction in T1D, establishing exercise strategies that preserve arterial health is essential. **FUNDING:** CIHR

Time-dependent effects of ADHD stimulants medications on arterial stiffness and hemodynamics in adults

Presenter: Hayley So

Co-author(s): Skye H.T Ling, Jessica N. Jasiak, Jason S. Au
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University of Waterloo

INTRODUCTION: Attention-Deficit/Hyperactivity Disorder (ADHD) affects ~2.6% of adults worldwide, with psychostimulant pharmacotherapy representing the first-line treatment approach. Although stimulants modulate cardiovascular function through enhanced catecholaminergic activity, their acute effects on arterial function remain inadequately characterized in adult populations. Arterial stiffness, measured via pulse wave velocity (PWV), constitutes an established independent predictor of cardiovascular morbidity and is highly influenced by sympathetic activity. This study examined the temporal dynamics of arterial stiffness and hemodynamic outcomes following acute administration of prescribed ADHD stimulant medication in ADHD adults. **METHODS:** Adults with ADHD (n=19; 10 females aged 24±5 years) maintaining stable stimulant regimens participated in this within-subjects design. Participants abstained from alcohol, exercise, and large meals for 12 hours and caffeine for 4 hours before testing. Following 10 minutes of supine rest, baseline assessments were obtained. Participants ingested their prescribed medication and remained in the laboratory for measurements at 30 minutes and 1 hour, then engaged in free-living activities before returning for the 5-hour assessment. Heart rate, blood pressure (BP), carotid-femoral PWV, carotid-brachial PWV, and carotid-radial PWV were assessed at all timepoints. Repeated measures ANOVA with Bonferroni-corrected post hoc comparisons were used to compare time points. **RESULTS:** Heart rate ($p < 0.01$, $\eta^2 p = 0.377$) and systolic BP ($p < 0.01$, $\eta^2 p = 0.211$) increased 6 ± 10 bpm and 6 ± 9 mmHg at 5 hours relative to baseline ($p < 0.01$ and $p = 0.02$, respectively; 5-hour range: 60-101 bpm, 99-130 mmHg). Conversely, no significant time effects were observed for arterial outcomes: carotid-femoral PWV ($p = 0.72$, $\eta^2 p = 0.031$), carotid-brachial PWV ($p = 0.14$, $\eta^2 p = 0.131$), carotid-radial PWV ($p = 0.95$, $\eta^2 p = 0.008$), or augmentation index ($p = 0.71$, $\eta^2 p = 0.025$). **CONCLUSION:** Acute psychostimulant administration increased heart rate and brachial BP without concurrent arterial stiffness changes. This dissociation may reflect differential peripheral versus central hemodynamic effects, as brachial BP may inadequately capture central arterial responses to sympathomimetic stimulation. Future research should assess central BP and individual vascular reactivity variation.

Assessing the Repeatability of Global Cerebral Blood Flow Within a Given Menstrual Cycle or Oral Contraceptive Pill Phase

Presenter: Karina Bhargava

Co-author(s): Emily Ledgerwood, Michelle Mei, Baraa Al-Khazraji
Faculty Advisor: Baraa Al-Khazraji, PhD
McMaster University

Background: Cerebral blood flow (CBF) is essential for meeting the brain's high metabolic demands, yet its measurement is inherently complicated by sex hormones that act as potent modulators of vascular function. Specifically, fluctuating levels of estrogen and progesterone influence vascular tone, causing global CBF to vary throughout the menstrual cycle or during the exogenous hormonal manipulation provided by oral contraceptive pills. Despite this known influence, it remains poorly defined how these distinct hormonal environments impact the day-to-day reliability of global CBF measurements. Establishing within-phase repeatability is critical as it determines whether a single assessment is truly representative of a specific hormonal state or if inherent daily variability necessitates multiple sessions to capture an accurate baseline. **Purpose:** This study aims to investigate the within-phase repeatability of global CBF in young, healthy women who are either naturally cycling or using second-generation oral contraceptive pills. **Methods:** Data were collected at two points within two distinct phases: the early follicular and mid-luteal phases for naturally cycling women, and the placebo and active phases for oral contraceptive pill users. Global CBF was quantified using Duplex Ultrasound. **Expected Results:** Based on existing literature, it is anticipated that greater stability in the hormonal environment will be associated with higher repeatability. Therefore, it is expected that oral contraceptive pill users will demonstrate high repeatability, while naturally cycling women will demonstrate lower consistency across repeated global CBF measures. **Significance:** The findings are expected to address a critical methodological uncertainty regarding the representative nature of global CBF data and potentially inform standardized protocols for future clinical and research assessments of cerebrovascular function in women.

Hormonal-Metabolic Signatures of Cognitive Aging in Health and Neurodegeneration: Associations of Estradiol, FSH, and Glucose in Females Aged 65+

Presenter: Emma Kalapun

Co-author(s): Tania Pereira, Jaspreet Bhangu, Michael Borrie, Laura K Fitzgibbon-Collins
Faculty Advisor: Laura Fitzgibbon-Collins, PhD
Western University

Background: Orthostatic hypotension and poor blood pressure (BP) regulation are related to cognitive impairment. Estradiol is considered cardio-protective and may relate to BP regulation with implications on cognition. Follicle-stimulating hormone (FSH) increases post-menopause and may impact cognition. Glucose, a key metabolic substrate, may offer insight into cognitive status in aging females. Hormonal and metabolic influences on BP regulation and cognition remain underexplored in older females with varying cognitive abilities. **Objective:** To examine associations between cognitive function, indicated by the Montreal Cognitive Assessment (MoCA), and circulating levels of estradiol, FSH, and glucose in females 65+ years old with various cognitive abilities. **Methods:** Data from 152 females (71.5±6.6 years, n=40 cognitively intact controls, n=25 subjective cognitive impairment, n=57 mild cognitive impairment, and n=30 dementia diagnosis) from the Canadian Consortium on Neurodegeneration in Aging were analyzed for this sub-study. Participants rested in the supine position for 10-min, stood for 3-min, then rested seated for 10-min. BP was collected in each position. Blood samples were analyzed for estradiol, FSH, and glucose. Partial correlations controlling for age assessed associations among estradiol, FSH, and glucose, with BP and MoCA scores. Significance was set to $p \leq 0.05$. **Results:** Negative correlations between FSH and MoCA scores ($r = -0.233$, $p = 0.004$), FSH and estradiol ($r = -0.184$, $p = 0.024$), and FSH and glucose ($r = -0.314$, $p < 0.001$) were observed. Mean and standard deviations for FSH, MoCA scores, glucose and estradiol were 71.5±27.5 U/L, 25±4, 5.39±1.16 mmol/L, 21.4±30.7 pmol/L, respectively. No significant relationships were observed between FSH, estradiol, and glucose with BP responses. **Significance:** Lower MoCA scores may be associated with low estradiol and high FSH levels. Higher FSH levels were also associated with lower glucose levels, suggesting altered glucose metabolism may contribute to cognitive vulnerability. These findings clarify associations between estradiol, FSH, and glucose levels in cognitive aging, and inform future research investigating cognition in older females.

Repeatability of Vascular Assessments in Young Hormonal Contraceptive Users

Presenter: Jake Procaccini

Co-author(s): Jenna C. Stone, Joshua M. Cherubini, Matthew I. Badour, Lindsay G. Wilson, Alison K. Shea, Maureen J. MacDonald
Faculty Advisor: Maureen MacDonald, PhD
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INTRODUCTION: Arterial stiffness is an early marker of cardiovascular disease risk, with carotid-femoral pulse wave velocity (cfPWV) as the gold-standard measure of central arterial stiffness in humans. Local arterial stiffness can also be measured by using carotid distensibility, compliance, and β -stiffness derived from ultrasound imaging. Sex hormones influence vascular function through endothelial and smooth muscle pathways, and hormonal contraceptives alter endogenous hormones. Although prior studies report inconsistent short-term changes in cfPWV and carotid stiffness, the magnitude of differences is small. Characterizing the short-term repeatability of vascular measures in young hormonal contraceptive users is necessary to determine whether changes reflect physiological change or expected within-subject variability. The purpose of this study is to evaluate the repeatability of cfPWV and local carotid measures across two visits in young females using hormonal contraception. **METHODS:** Using archival data, six healthy premenopausal participants were included: three second-generation combined OCP users and three intrauterine device (IUD) users. Participants were assessed during two consecutive visits under standardized conditions (two active-pill weeks for OCP users and matched timepoints for IUD users). Participants arrived following overnight fasting and abstained from caffeine, alcohol, and vigorous exercise prior to testing. After 10 minutes of supine rest with electrocardiogram monitoring, cfPWV was assessed using applanation tonometry. Carotid artery distensibility, compliance, β -stiffness, and intima-media thickness were derived from high-resolution B-mode ultrasound calibrated to blood pressure. Data were analyzed using a linear mixed effects model ($\alpha = 0.05$). **EXPECTED RESULTS:** Within-subject differences in cfPWV and local carotid stiffness across two active-pill visits are expected to be small and not exceed short-term repeatability thresholds. Any visit-to-visit differences are anticipated to reflect within-subject variability rather than physiological change. **SIGNIFICANCE:** These findings will clarify the short-term repeatability of central and carotid arterial stiffness measures in young hormonal contraceptive users and inform the interpretation of small between-visit differences

The effect of six hours of continuous hypoxemia on appetite in fasted adult females: preliminary findings from a randomized crossover trial

Presenter: Alice Bohlen

Co-author(s): Serena George, Nihal Yapici, Nicholas Goulet, Pascal Imbeault
Faculty Advisor: Pascal Imbeault, PhD
University of Ottawa

Background: Acute high-altitude exposure suppresses appetite and energy intake. This anorexigenic effect remains even when confounding factors, such as highly palatable food and energy expenditure, are controlled, highlighting the independent effect of low oxygen availability on appetite. However, these studies are primarily limited to males. This constitutes an important knowledge gap, considering well-documented sex differences in appetite sensations and physiological responses to hypoxemia. Therefore, this study investigated the effects of acute passive continuous hypoxemia on appetite in female adults. **Methods:** Using a laboratory-based, single-blind, randomized, sham-controlled, crossover design, participants were exposed to six hours of normoxemia (fraction of inspired oxygen [FiO₂] ~21.0%) and continuous hypoxemia (FiO₂ ~12.0%) in a climate-controlled normobaric chamber, following an overnight fast and remaining fasted with water available ad libitum. A 30-minute buffet was provided after the exposure and consumed in the respective environmental conditions. Nine seemingly healthy females (mean [standard deviation]: 21 [1] years) were recruited in Ottawa, Canada, without chronic diseases or antidepressant medication use. The primary outcomes were appetite scores, assessed hourly using visual analog scales, and at post-buffet, at bedtime, and 24 hours post-exposure. Data were analyzed using baseline-adjusted linear mixed-effects models. **Results:** Scores for desire to eat, hunger, and prospective food consumption changed over time (all $p < 0.001$), increasing during the exposure and decreasing post-buffet, while fullness remained unchanged ($p = 0.817$). Compared to normoxemia, scores for desire to eat, hunger, and prospective food consumption were lower in continuous hypoxemia ($p < 0.046$), while fullness remained similar across conditions ($p = 0.185$). There was no time x condition interaction for any measured outcome ($p > 0.867$). **Interpretation:** These preliminary findings suggest that six hours of continuous hypoxemia acutely reduces appetite in young adult females. Further work is required to elucidate the duration of this anorexigenic effect and to assess whether it translates into clinically meaningful reductions in energy intake.

Changes in exercise oxygen uptake during low volume sprint interval training

Presenter: Sofia Grossi

Co-author(s): John R.M. Renwick, Martin J. Gibala
Faculty Advisor: Martin J. Gibala, PhD
McMaster University

BACKGROUND: Low-volume sprint-interval training (LVSIT) involves brief repeated bouts of 'all out' or extreme domain intensity exercise. LVSIT performed thrice weekly for >2 weeks increases peak oxygen uptake (VO_{2peak}). While oxygen uptake (VO_2) increases during maximal sprint efforts, it remains unclear whether changes in exercising VO_2 occur during a LVSIT regimen and, if so, how rapidly these adaptations can be observed. Thus, we sought to characterize changes in exercising VO_2 during an LVSIT session at week two, six and ten of a 12-week intervention. It was hypothesized that mean exercise VO_2 would increase over the 12-week intervention. **METHODS:** Five insufficiently active females (age 19 ± 2 y; $VO_{2peak} = 31.2 \pm 5.0$ mL·kg⁻¹·min⁻¹) were recruited as part of a larger ongoing study (osf.io/dbuje). The participants completed three LVSIT sessions weekly for 12 weeks. Each session consisted of 3x20s 'all-out' sprints within a 10-min session interspersed with low-intensity cycling. Exercise VO_2 was measured continuously using a metabolic cart and mean relative and absolute VO_2 was calculated as the mean of the three sprint efforts during each session. **RESULTS:** A one-way repeated-measures ANOVA revealed a main effect of time for both relative ($p = 0.03$) and absolute ($p = 0.01$) exercise VO_2 . Post-hoc analysis revealed increased exercise VO_2 after 6 (net change $+4.0$ mL·kg⁻¹·min⁻¹, $+239$ mL·min⁻¹), and 10 weeks ($+5.7$ mL·kg⁻¹·min⁻¹, $+304$ mL·min⁻¹) compared to 2 weeks. Exercise VO_2 was not different between weeks 6 and 10 ($p > 0.05$). **CONCLUSION:** Our findings indicate that at least 8 weeks of LVSIT is a sufficient stimulus to increase exercise VO_2 . These findings also suggest that improvements in VO_2 are most pronounced during the initial phase of training. Future studies with larger exercise cohorts are warranted to confirm the specific time course of this response and the potential mechanistic basis. Supported by NSERC.

The effects of high-intensity interval training versus moderate-intensity continuous training on cardiometabolic health in perimenopausal females

Presenter: Roya Rahmani

Co-author(s): Clara Rivaya Salvadores, Alexa Govette, Alexander Boytar, Emily Van Berkel, Anna Kupraty, Amy Kirkham, Jenna B. Gillen
Faculty Advisor: Dr. Jenna Gillen
University of Toronto

INTRODUCTION: Perimenopause, the 2-8 year transition preceding menopause, is characterized by pronounced fluctuations and an eventual decline in ovarian hormones. These hormonal changes have significant physiological effects, contributing to reduced cardiorespiratory fitness (CRF) and increased abdominal fat deposition, ultimately heightening cardiovascular disease (CVD) risk. Regular exercise is a cornerstone of CVD prevention; however, competing family and career demands often limit engagement in structured exercise among midlife women. High-intensity interval training (HIIT), characterized by repeated bouts of relatively intense exercise interspersed with recovery, elicits similar or greater improvements in CRF and body composition compared with traditional moderate-intensity continuous training (MICT), despite substantially lower time commitment. However, little is known about its effectiveness during perimenopause. **PURPOSE:** To determine the effects of time-efficient HIIT (75 min/week) compared to guidelines-based MICT (150 min/week) in improving cardiometabolic health in perimenopausal women at risk of CVD. **METHODS:** Fourteen sedentary perimenopausal females (49.5±3.8yr, BMI:29.2±6.5kg/m², VO₂max:25.5±3.6mL/kg/min, WC:94.0±10.0cm, WHR:0.85±0.04) were randomized into 6-weeks of MICT (n=5), HIIT (n=4), or a control stretching group (n=5). Each week, MICT performed two in-person, 45-min aerobic exercise sessions at a moderate-intensity (50-60% of heart rate reserve [HRR]) and accumulated the remaining 150 min of exercise remotely. HIIT completed two weekly in-person sessions consisting of 10x1 and 4x4 min aerobic intervals @80-85% HRR with 1- and 3-min low-intensity recovery periods, respectively, and an at-home video consisting of bodyweight intervals to achieve 75 min/week. The control stretching group attended two weekly 30-min zoom-based stretching sessions. CRF and body composition metrics (fat-mass, fat-free mass, waist and hip circumferences) were measured pre- and post-intervention. **ANTICIPATED RESULTS:** We hypothesize that 1) HIIT and MICT will improve CRF and body composition compared to control; and 2) HIIT will produce comparable improvements to MICT. Participants are currently undergoing training, and preliminary results will be presented at the conference.

Endothelial Function in Women During a Ten Week, Low Load Resistance Training Intervention

Presenter: Lily D. Bauman

Co-author(s): Vanessa Mizzi, Baraa Al-Khazraji

Faculty Advisor: Baraa Al-Khazraji, PhD
McMaster University

BACKGROUND: Previous research shows that higher-load resistance exercise improves endothelial function, a key determinant of vascular health mediated by shear stress-induced nitric oxide signaling. Lower-load resistance exercise is characterized by greater metabolic stress and longer time under tension, which may produce distinct endothelial responses than higher-load resistance exercise. However, it remains unclear whether lower-load, high-repetition resistance exercise can also affect endothelial function, and whether any adaptations to endothelial function post-exercise persist following exercise cessation (detraining). **OBJECTIVE:** The purpose of this study is to assess endothelial function before, at the end of, and two-weeks following a lower-load resistance training exercise intervention in young women. **HYPOTHESIS:** It is hypothesized that lower-load resistance training will improve endothelial function, and that these improvements will decline after two weeks of detraining, indicating that adaptations are sensitive to removal of the shear stress stimulus. **METHODS:** Women aged 18-35 will attend a familiarization session followed by 10 weeks of supervised twice-weekly lower-load resistance training (20-30 repetitions until volitional failure) using machine-based supersets (leg press with chest press; leg extension with seated row; shoulder press with lat pulldown). Endothelial function will be assessed using brachial artery flow-mediated dilation at baseline, post-training, and after two weeks of detraining. **ANTICIPATED RESULTS:** It is anticipated that there will be a time-dependent pattern, with increased flow-mediated dilation post-training and attenuation toward baseline after exercise cessation. **SIGNIFICANCE:** This study aims to clarify how young women, an understudied population with sex-specific vascular physiology, adapt to lower-load resistance training and detraining. Although it has been established that higher-load resistance exercise improves endothelial function, the findings from the proposed study will provide insight into whether higher-repetition lower-load resistance training approach elicits vascular adaptations.

Nine-Month Treatment of Senolytics, Aerobic Exercise, or Both Combined Improve Myocardial Performance

Presenter: Kieronne Rodrigues

Co-author(s):

Faculty Advisor: Ryan Bevington, PhD Dr. Gianni Parise
McMaster University

BACKGROUND: Cellular senescence is a biological process where cells enter permanent cell-cycle arrest following replicative exhaustion or stress. While protective in early life, the accumulation of senescent cells with age contributes to late-life cardiovascular decline. In the heart, senescent fibroblasts release inflammatory and pro-fibrotic factors that cause maladaptive remodelling, impairing cardiac function. Senolytics are a novel class of drugs that selectively eliminate senescent cells, reducing their deleterious effects. Regular aerobic exercise has also been shown to counteract senescence-associated effects by reducing oxidative stress and chronic inflammation. This study investigates whether chronic aerobic exercise, senolytic therapy (Dasatinib + Quercetin), or their combination reduces myocardial senescent fibroblasts in aging mice. **METHODS:** Twelve-month-old C57BL/6N mice were assigned to vehicle control, exercise, senolytic, or combined treatment groups for nine months. Cardiac function was assessed using high-frequency ultrasound imaging, and senescent fibroblasts were quantified using immunofluorescence staining for p16+ nuclei surrounded by vimentin. In addition, staining for transforming growth factor-beta (TGF- β), a pro-fibrotic and senescence-associated signaling molecule, was performed to further characterize remodeling and inflammatory signaling within the myocardium to assess myocardial remodelling. **RESULTS:** Although p16+ fibroblasts were successfully identified in myocardial tissue, no significant differences were detected between groups. However, we found that exercise, senolytics, or both combined were able to significantly improve the myocardial performance of the left ventricle compared to naturally aged vehicle hearts. **IMPLICATIONS:** Future analyses will include additional senescence markers (p21) and protein-level validation to robustly characterize the senescent burden. Overall, this work contributes to understanding how lifestyle and pharmacological interventions may influence cardiac aging.

The Effects of Menstrual Cycle Phase-Based Sprint Interval Training on Performance, Aerobic, and Anaerobic Capacity

Presenter: Jonathan Huang

Co-author(s): Celine Bailleul, McKinley Kennedy, Roya Rahmani, Ines Kortebi, Alexa Govette, Victoria Bennett, Clara Rivaya Salvadores, Mai Wageh, Jenna B. Gillen

Faculty Advisor: Dr. Jenna Gillen
University of Toronto

Introduction: Menstrual cycle (MC) phase-based training proposes tailoring exercise to hormonal fluctuations, with some studies suggesting that training in the low-hormone follicular phase (FP) enhances adaptations compared to the luteal phase (LP). However, evidence is limited and primarily focused on resistance training, with little research examining whether MC phase influences adaptations to sprint interval training (SIT).

Purpose: To investigate if 2 weeks of SIT in the FP and LP differentially impacts endurance performance, cardiorespiratory fitness, and anaerobic performance in eumenorrheic females.

Methods: Recreationally active, eumenorrheic females were randomized to FP ($n=8$, 23 ± 6 yr, 49.5 ± 10.7 ml/kgFFM/min, 21.2 ± 2.3 kg/m²) or LP ($n=9$, 24 ± 3 yr, 52.4 ± 10.1 ml/kgFFM/min, 21.7 ± 1.3 kg/m²). Participants completed six sessions of SIT (4-6x30s all-out Wingates, 4-minute recovery) over 2 weeks. The primary outcome was time to completion (TTC) of a 250-kJ time trial measured pre- and post-intervention. Secondary outcomes included pre- and post-training VO₂peak, and anaerobic performance measured via peak, mean power, and fatigue index (PP, MP, FI) during the first Wingate of session 1 vs. 6. Results were analyzed with a two-way ANOVA.

Results: There was no significant interaction between time and MC phase for any measured variable (all $p>0.05$). However, there was a main effect of time for 250-kJ TTC, such that FP and LP improved from pre- to post-training (21.6 ± 1.9 vs. 21.0 ± 2.0 min, $p=0.042$, $\eta^2p=0.248$). Similarly, anaerobic PP increased from pre- to post training in both groups (694 ± 153 to 779 ± 142 W, $p=0.01$, $\eta^2p=0.363$), however, there was no change in MP (483 ± 76 vs. 479 ± 73 W, $p=0.7$, $\eta^2p=0.008$). FI during the anaerobic test increased from 50.0 ± 14.1 to $63.5\pm 11.7\%$ ($p=0.008$, $\eta^2p=0.379$). There was no effect of training on VO₂peak (51.1 ± 10.2 vs. 51.6 ± 7.1 ml/kgFFM/min, $p=0.5$).

Conclusion: MC phase does not influence performance adaptations to 2 weeks of SIT in eumenorrheic females, suggesting that phase-based training approaches may not be necessary for optimizing training adaptations.

Evaluating Alternative Electromyography Normalization Methods

Presenter: Claire McLaughlin

Co-author(s): Evan Curd, MSc
Faculty Advisor: Timothy Burkhart, PhD
University of Toronto

Background: Surface electromyography (sEMG) data are commonly normalized to a percent of maximum voluntary isometric contractions (MVIC). However, this method has significant limitations, that include producing supramaximal values when normalizing to MVIC, and an inability for some individuals to produce a representative maximal contraction. While MVIC remains most common in the literature, there is a need to explore the utility of alternative normalization techniques that provide reliable data without requiring maximal physical exertion. **Objective:** Quantify the impact of four normalization techniques on EMG signal outputs during three dynamic multiplanar tasks. **Methods:** Twenty healthy active participants will be recruited (N=12 currently). Participants will complete four normalization techniques (MVIC, quiet supine, baseline standing, and dynamic maximum) and three movement tasks (gait, drop vertical jump, and squat). sEMG data will be collected from the right quadriceps (rectus femoris, vastus lateralis) and hamstrings (biceps femoris, semitendinosus). Kinematic and kinetic data will be quantified with an 8-camera motion capture system paired with two 6-degree of freedom force plates and later processed in Theia3D Markerless and Visual3D. For each movement task, the EMG signals will be compiled into ensemble averages. The ensemble averages will then be normalized to each of the four normalization techniques and presented graphically. **Expected Results:** It is expected that each alternate normalization task will produce unique activation profiles that offer valid alternatives to MVIC. In identifying effective alternative normalization tasks, this study seeks to inform and optimize future research methodologies. Ultimately, this work contributes to a more robust framework for EMG analysis, allowing researchers to select normalization protocols that best match the mechanical demands of their specific experimental tasks. Preliminary results will be presented at the Undergraduate Research Conference.

Golfers' Perception of the Application of Motor Learning Principles

Presenter: Paramjyot Singh Kainth

Co-authors: Arya Poorchavoshzadeh
Faculty Advisor: Luc Tremblay, PhD
University of Toronto

BACKGROUND: In golf, many factors inform how a golfer organizes practice sessions. For example, distributed practice (vs. massed practice) is known to favour motor performance and learning, although this topic has received less attention in motor skill acquisition research than other motor learning concepts, such as contextual interference (CI) and variability of practice (VP). Recent research also supports a focus on the specific time between successive trials (i.e., intertrial intervals [ITIs]) because of new knowledge about micro-consolidation processes and mechanisms of error detection and correction. Yet it remains unclear whether and why ITIs are intentionally considered during practice sessions. Therefore, the purpose of the study is to determine the extent to which ITIs are considered by golfers during practice and why they do or do not consider them. To do so, we will assess how golfers' practice, including ITIs, CI, and VP, is organized. **METHODS:** Participants will include 10 golfers aged 17 or older with at least 5 years of golfing experience. Participants will complete a 30 min interview-based questionnaire. Responses will be analyzed using thematic analysis to identify common patterns in practice organization and the reasoning underlying those decisions. **EXPECTED RESULTS:** We hypothesize that golfers will exhibit limited prior knowledge of ITIs, likely to a greater extent than of CI or VP. Additionally, we expect golfers to mention pragmatic reasons when applying or not applying the investigated motor learning concepts. **SIGNIFICANCE:** Investigating factors that influence golfers' practices, with a focus on their application and understanding of ITIs, CI, and VP, will provide insight into how research-informed principles can better support golf skill development.

Lower Limb Control and Foot Dominance in Elite and Non-Elite Athletes: A Comparative Study

Presenter: Jacob Snelgrove

Faculty Advisor: Dr. Gerome Manson
Queen's University

Lower Limb Control and Foot Dominance in Elite and Non-Elite Athletes: A Comparative Study
Presenter: Jacob Snelgrove Faculty Advisor: Dr. Gerome Manson Queens University
Footedness questionnaires are widely used to classify lower-limb dominance, yet whether these classifications reflect meaningful differences in dynamic motor control remains unclear. Moreover, while sport-specific training is known to influence lower-limb coordination, its effect on interlimb asymmetry relative to non-athletes is not well characterized. Most investigations of lower-limb asymmetry have focused on strength and power measures, leaving open whether similar patterns emerge in tasks requiring rapid visuomotor responses. This study compared lower-limb asymmetry across three motor tasks in varsity soccer athletes ($n = 10$), non-soccer varsity athletes (rugby and hockey; $n = 13$), and healthy non-athlete controls ($n = 10$). Participants reported their footedness using the Waterloo Footedness Questionnaire before performing three lower-limb tasks bilaterally: a standing circle-tracing task (CTT), a single-leg jump (SLJ), and a reactive foot-control task requiring rapid responses to visual targets during single-leg stance (FRT). Tracing error, jump height, and reaction time were used to characterize between-limb asymmetry and compared across groups. Neither the CTT nor SLJ revealed significant between-limb differences or group differences in asymmetry, though both athlete groups jumped significantly higher than controls overall. In contrast, the FRT revealed significant between-limb differences in reaction time across groups, with soccer athletes exhibiting reduced reaction-time asymmetry relative to controls. These findings suggest that soccer training may selectively promote symmetrical reactive motor control, a capacity not captured by standard footedness classifications or standard gross motor tasks. This dissociation between task types underscores the importance of using reactive, precision-demanding measures to characterize functional limb asymmetry in athletic populations.

Investigating the Role of Gradual Motor Adaptation in Interference Between Competing Visuomotor Rotations

Presenter: Nathan Castanheiro

Co-author(s): Aarohi Pathak
Faculty Advisor: Dr. Timothy Welsh
University of Toronto

Investigating the Role of Gradual Motor Adaptation in Interference Between Competing Visuomotor Rotations Presenter: Nathan Castanheiro Co-author: Aarohi Pathak Faculty Advisor: Tim Welsh University of Toronto Prior work has shown learning a new visuomotor rotation can interfere with the retention of a previously acquired rotation when experienced in close temporal proximity. Implicit tasks do not require conscious control and have shown more interference than explicit tasks. Interference refers to reduced early compensation when the initial rotation is reintroduced following learning of a competing rotation. Participants completed a baseline task followed by an ABA visuomotor rotation paradigm with 24-hour intervals between sessions. On Day 1 (A), an abrupt 30° clockwise visuomotor rotation was introduced for 200 trials. On Day 2 (B), participants performed a gradual rotation condition in which the perturbation increased incrementally to 30° for 200 trials, a manipulation thought to preferentially engage implicit processes. On Day 3 (A), the abrupt 30° rotation was reintroduced to assess if interference was present. Based on a priori sample size estimation, seven right-handed adults (18-34 years), will be recruited for the study. Reaching movements were performed using a stylus on a digitizing tablet while cursor feedback was displayed via a semi-reflective mirror apparatus with the primary outcome measure as relative hand angle. Early compensation during re-exposure (Day 3) will be compared to initial exposure (Day 1) to assess interference. We hypothesize that adaptation a gradually introduced perturbation as a competing rotation will reduce early compensation upon re-exposure to the initial abrupt learning, providing evidence for the role of implicit mechanisms in driving interference. The purpose of the study is to clarify the contribution of implicit adaptation to motor learning retention.

The Influence of Intertrial Interval on Error Estimation during Golf Putts

Presenter: Rafael Rodrigues Simoes

Co-author(s): Sam Coppa, Julia Kochanski, Mehar Lekhi, Paramjyot Kainth, Arya Poorchavoshzadeh, Luc Tremblay
Faculty Advisor: Luc Tremblay, PhD
University of Toronto

Background: Intertrial interval (ITI) is the time between each movement attempt during motor skill practice. ITI can influence motor learning by modulating how performance errors are processed between trials. Schmidt's (1975) theory proposes that repeated practice updates a motor response schema through the integration of error information, strengthening the learner's internal reference of correctness. But how long does this process take? While shorter ITIs increase practice density, longer ITIs facilitate performance evaluation and consolidation processes (Weinberg et al., 1964; Buch et al., 2021). However, it remains unclear whether the temporal structure of ITIs during acquisition influences internal representations and, consequently, the learner's ability to detect and estimate errors. **Objective:** This study will examine how short versus long ITI during acquisition influence error estimation during golf putts. **Methods:** Participants will perform a golf putting task on an artificial putting green in a laboratory. Ball endpoint locations will be recorded using marker-less tracking. On Day 1, participants will complete 144 acquisition putts (12 blocks of 12 trials) toward three targets under either a short (5s) or long ITI (10s) schedule, in a between-subjects design. On Day 2, participants will complete a retention test while wearing liquid-crystal goggles that occlude vision once the ball leaves the starting position. After each trial, participants will indicate their perceived ball endpoint on the green using a ball grabber. A free transfer test (2 blocks of 10 putts) will then follow at a self-selected pace without occlusion. **Expected Results:** ITI structure during acquisition is expected to influence estimation accuracy under occlusion, with longer intervals yielding more accurate and consistent estimates through enhanced consolidation and stronger reference of correctness. **Significance:** Findings will contribute to understanding how the temporal organization of practice influences performance and self-evaluation in a skilled motor task, informing optimization of training protocols and motor learning.

Session: III-C
Time: 2:10 p.m.
Location: BN307

Golf Coaches Perception on the Application of Motor Learning Principles

Presenter: Arya Poorchavoshzadeh

Co-author(s): Paramjyot Singh Kainth
Faculty Advisor: Luc Tremblay, PhD
University of Toronto

BACKGROUND: During skill acquisition, inter-trial intervals (ITIs) are the periods of time between successive movements, which shape how learners process feedback. Shorter ITIs may enhance sensory contrast and facilitate the immediate use of feedback, whereas emerging neurophysiological evidence indicates that longer ITIs can promote between-trial consolidation processes. Despite these implications, it remains unclear whether coaches intentionally structure ITIs during practice and whether timing between shots is guided by science or tradition. Therefore, the purpose of this study is to examine how golf coaches understand, prioritize, and apply ITIs in their coaching practice. **METHODS:** Participants will include 10 golf coaches, with recruitment currently ongoing. Using open-ended, qualitative questions and structured rating-scale items, questionnaire-based interviews will be conducted to explore how and why participants implement ITIs in their practice. As well, two other practice scheduling principles from motor learning will be explored (i.e., Variability of Practice (VP) and Contextual Interference (CI)). Likert-type scale responses will be analyzed using descriptive statistics to summarize central tendencies and variability in reported practice structures. Also, explanations for these responses will be analyzed using thematic analysis, to identify recurring terms and explanation patterns in the coaches' beliefs, intentions, and decision-making processes. These themes will seek to better understand how and why ITIs are selected during coaching practices, as well as other practice scheduling principles. **EXPECTED RESULTS:** We hypothesize that coaches will demonstrate some awareness of the relevance of ITIs as a significant motor learning variable, but to a lesser extent than more established motor learning principles such as VP and CI. As well, it is expected that explanations for ITI selection will reflect pragmatic considerations (e.g., time constraints, group size, and facility limitations). **SIGNIFICANCE:** Findings will clarify the extent and explanations for any golf coaching gaps between motor-learning research and golf practice.

Session: III-D
Time: 12:55 p.m.
Location: WS2007

Rewriting Hazing: Media Narratives, Sexual Violence, and Shifting Social Values in Canadian Sport

Presenter: Xavier D'silva
Faculty Advisor: Dr. Daniel Sailofsky
University of Toronto

In November of 2018, Canadian news articles went ablaze over an incident of athletic hazing involving minors at the elite St Michael's College school, discussing the lawsuits and sexual violence which occurred. Such a case was groundbreaking in the context of media coverage surrounding hazing in the context of Canadian sport culture, as it reframed hazing practices as sexually violent, rather than classifying it as a taboo, yet legitimate practice. Moreover, the classification of it as sexually violent reflected changing social values towards acts of misogyny and gendered humiliation in hazing, which had been framed by previous research. We analyzed article data from 7 years previous to the incident as well as 7 years after in order to analyze the changing role of gendered humiliation and misogyny in hazing, as well as the media's coverage and role in affirming these practices, detailing social shifts in language used to describe hazing, as well as potential shifts in the rituals themselves.

Navigating inequities between healthcare practitioners and disabled clients: a multi-perspective approach

Presenter: Gerard Reginio

Co-author(s): Cade Kuehl, Dr. Uk Kim

Faculty Advisor: Dr. Kyoung June Yi
McMaster University

Background: Individuals experiencing disability are disproportionately affected by institutional and attitudinal barriers in healthcare. For example, healthcare practitioners can have an unconscious bias that individuals with disabilities are less capable of making their own decisions, undermining client engagement and autonomy. With both sides of the practitioner-client relationship facing unique challenges in navigating inequities, there is a need for research that emphasizes the collaborative co-creation of solutions. **Objectives:** This study aims to gauge real-world understandings and perceptions of disability within healthcare relationships. The study also aims to converge practitioner and client insights on challenges and potential solutions. **Methods:** This is an ongoing qualitative study informed by modern understandings of disability and co-design research principles. Five healthcare practitioners and five clients experiencing disability are being recruited. Data collection will be done virtually in three sequential phases of discussion and analysis. The three phases are: (1) one-on-one interviews to privately gather data about individuals' experiences and perspectives; (2) focus group discussions with each participant group to collaboratively reflect on emerging findings from phase one; and (3) a reflexive discussion between the researchers with lived experience in healthcare settings, to perform initial data analysis of prior phases and address personal biases in analyses. All discussions will be audio- and video-recorded, then transcribed into text to be analyzed using NVivo software. The final thematic analysis will review all transcripts and identify 3-5 key themes. **Results:** Data collection and analysis are ongoing, and results will be presented at the conference. The results are expected to inform changes in institutional policies, practitioner education, and client approaches, to better serve individuals experiencing disabilities.

Athletes from Racialized Communities in Canada: Using Sport as a Space for Identity Formation, Community Connection, and Belonging.

Presenter: Jhanvi Panchal

Co-author(s): Kyoung June Yi, Uk Kim
Faculty Advisor: Kyoung June Yi, PhD
McMaster University

Background: Sport is widely recognized as a meaningful space for identity development and social connection, offering opportunities for individuals to express themselves and build confidence through skill, performance, and group belonging. However, for racialized athletes, these identity processes are often shaped by racial-ethnic dynamics, cultural expectations, and inequitable opportunities for representation and inclusion. In Canada, limited research has examined how racialized athletes navigate sport environments through social and cultural lenses. This study seeks to address this gap by exploring how athletes from racialized communities in Canadian post-secondary institutions experience sport as a space for identity formation, community connection, and belonging. **Objectives:** This research is guided by two questions: (1) How do racialized athletes interpret and negotiate the role of sport in shaping their personal and cultural identities through an intersectional lens? (2) In what ways do sport environments facilitate or constrain belonging across intersecting dimensions of race, culture, and other social identities? **Methods:** Using an interpretive phenomenological analysis approach informed by an equity, diversity, inclusion, and accessibility framework, this study examines the lived experiences of student-athletes who self-identify as belonging to racialized groups. Participants are 18 years or older, currently or formerly involved in varsity or intramural sport, enrolled in a Canadian post-secondary institution, and able to participate in an interview in English. Semi-structured interviews are being conducted to explore participants' reflections on identity, belonging, and sport participation, supported by field notes to enhance contextual understanding. Data are analyzed thematically to identify recurring patterns related to identity construction and social relationships within systems of privilege and marginalization. **Significance:** This study is expected to provide insight into how structural and cultural dynamics within post-secondary sport environments shape racialized student-athletes' experiences of identity and belonging, and to inform inclusive coaching practices, equitable institutional policies, and initiatives that strengthen student well-being and representation.

Exploring the Experiences of Culturally-Relevant Wellness Initiatives for Diverse Canadian University Student-Athletes Through an Arts-Based Representative Collage Task

Presenter: Kayla Marie Chow

Faculty Advisor: Simon Darnell, PhD
University of Toronto

Ontario University Athletics (OUA), a comprehensive university sport organization, aims to elevate human potential in collegiate sport by providing provincial-level competition in amateur sport. Ethnically diverse student athletes are underrepresented in Canadian university-level sport organizations, as White athletes accounted for a disproportionate 71.3% of all OUA athletes in 2021. Mainstream wellness practices may not be relevant to all athletes' backgrounds and cultures, meaning that diverse members may feel unsupported if these programs are not addressed to their needs. While involvement can provide visibility and voice for diverse student-athletes, current initiatives are often driven by student groups rather than the organization itself. There is a demand for Canadian-specific diverse student-athlete research, as current work involves collegiate sport in the United States (i.e. NCAA), therefore engaging different sociopolitical contexts. Access to external wellness programs can be difficult considering student-athlete schedules and limited availability. As student-athletes spend frequent time in team settings, these environments have the potential to act as a centre for incorporating wellness into regular practice. Thus, the specific research questions are to a) explore diverse experiences of diverse student-athletes, b) evaluate how current culturally-relevant wellness initiatives benefit diverse varsity athletes, and c) recommend how university athletics programs can best support athlete wellness to provide a space of belonging and community. Participants must self-identify as BIPOC, and be actively or formerly competing in the OUA. Student-athletes who are interested in participating will complete two semi-structured interviews depicting their sport background and experiences. After the first interview, participants will create a digital collage using creative media as an interpretation of wellness intersecting with culture and sport. The second interview will summarize their artwork and highlight wellness strengths and needs. Acknowledging these experiences provides insight for coaches and policymakers to better support diverse student-athletes and wellness resources in Canadian intercollegiate athletics.

The Collective and Distinct Influences of Culture, Access, and Belonging on Physical Activity Among First- and Second-Generation Immigrant Families

Presenter: Kristen Yee

Co-author(s): Uk Kim, Kyoung June Yi
Faculty Advisor: Kyoung June Yi, PhD
McMaster University

BACKGROUND: Physical activity (PA) participation is shaped by cultural, social, and structural factors, which may be especially complex for immigrant families adapting to new environments. Intergenerational differences in cultural values, access to resources, and sense of belonging may influence how PA is understood and practiced. This study aims to explore how these factors interact to shape PA behaviours among first- and second-generation immigrant families in Ontario. **METHODS:** A qualitative interpretive design was employed. Using convenience and snowball sampling, 5 immigrant families reflecting diverse cultural backgrounds and migration histories were recruited. One-on-one semi-structured interviews were conducted with multiple family members across generations to capture shared and contrasting perspectives. Interviews were audio-recorded, transcribed verbatim, and analyzed using reflexive thematic analysis in NVivo to identify and interpret emerging themes, highlighting barriers and facilitators to PA within and across families. **EXPECTED RESULTS:** Findings are expected to reveal intergenerational differences in the meanings and practices of PA. First-generation immigrants may engage in PA through occupational or daily activities shaped by cultural norms and gender roles, whereas second-generation immigrants may emphasize recreational or school-based activities influenced by Canadian social environments. Anticipated barriers include financial constraints, time demands, language challenges, and limited culturally relevant programming, while facilitators may include family support and community belonging. These factors are expected to interact dynamically in shaping PA participation. **CONCLUSION:** By centering intergenerational family experiences, this study challenges assumptions that PA practices are universally understood and experienced. Findings will inform more culturally responsive and equitable PA programs and policies that better reflect the lived realities of immigrant communities. Although limited by a small sample, the study provides rich insights into how PA experiences may differ within the same household. Future research should include larger samples across age groups to deepen understanding of diverse intergenerational PA dynamics across the life course.

Beyond Visibility: Indigenous Disability Narratives and Community Practice in Maskwacis Nations

Presenter: Zicheng Yao

Faculty Advisor: Tricia McGuire-Adams, PhD
University of Toronto

The perspectives and experiences of First Nations people with disabilities remain insufficiently understood in research about disability. This systemic neglect reflects a persistent erasure of First Nations people who live with disabilities, resulting in a profound disconnect in research, policy, and practice. This void in representation manifests as what one participant named as a critical "care gap," where First Nations individuals experience significantly higher rates of secondary health complications and shorter life expectancies due to delayed or culturally inappropriate interventions. Such a disconnect between First Nations people and the healthcare system may be addressed through the centering of First Nations community-led care and relational practice. This study examines how research participants from Maskwacis Nations perceived disability, health, and access to health services. The researchers employed a qualitative thematic analysis of the interview transcripts following Braun and Clarke's framework. The thematic analysis identifies six themes: embodied experiences, identity and (in)visibility, colonial structures, family regulation, community resilience, and research ethics. Findings reveal that "visibility" is frequently hindered by external biomedical diagnostic requirements that pathologize First Nations bodies and ignore relational knowledge. The knowledge is rooted in Cree-specific teachings, which prioritise the interconnectedness of all living things and the spiritual laws governing human conduct. Conversely, internal resilience is fostered through Wahkohtowin (kinship practices) and values such as Sakitowin (love) and Wichitiowin (helping one another), which frame disability as a collective responsibility rather than an individual deficit. The results demonstrate that relational visibility emerges through relationships and ceremonial practices rather than external or medical model classifications. By centering Cree-specific teachings, this study provides a foundation for connecting the First Nations people and the healthcare system with culturally safe policy frameworks. Such frameworks may address the jurisdictional gaps and institutional discrimination that continue to exclude First Nations voices from disability governance.

Session: III-E
Time: 12:55 p.m.
Location: WSB67

The Role of Aerobic Fitness on Middle Cerebral Artery Blood Velocity Fluctuations During Prolonged Rowing

Presenter: Bahar Alasti

Co-author(s): Matin Borhani, Dr. Baraa Al-Khazraji

Faculty Advisor: Baraa Al-Khazraji, PhD

McMaster University

Background: The brain requires a continuous and tightly regulated blood supply to maintain adequate perfusion. During exercise, blood pressure (BP) and cerebral blood flow (CBF) increase, and large BP fluctuations may challenge perfusion stability, particularly in exercise modalities with pronounced oscillations in BP. Rowing is a hybrid aerobic-resistance exercise characterized by large, stroke-synchronous BP fluctuations that are transmitted to the brain and reflected in middle cerebral artery blood velocity (MCAv). However, cerebrovascular regulation during and immediately after rowing remains poorly understood. While aerobic fitness is associated with vascular adaptations, its role in maintaining CBF stability during prolonged exercise and early recovery has yet to be established. **Objective:** The purpose of this study is to examine how aerobic fitness, quantified as VO_{2peak} , relates to fluctuations in MCAv at rest, during a 20-minute bout of submaximal rowing, and during the first minute of recovery. It is hypothesized that individuals with higher VO_{2peak} will exhibit smaller fluctuations in MCAv, indicating greater stability of CBF during exercise and recovery. **Methods:** 14 Healthy young adults will complete three laboratory visits, including a cardiopulmonary exercise test to determine VO_{2peak} and a submaximal rowing session performed at 70% VO_{2peak} . MCAv will be measured continuously using transcranial Doppler ultrasound, alongside BP, heart rate, and breathing gases. This study aims to advance understanding of cerebrovascular regulation during and after exercise by investigating the relationship between aerobic fitness and CBF stability. Acute exercise-induced changes in MCAv will be assessed using paired t-tests comparing each exercise time point and first-minute recovery to baseline, as well as end-exercise to recovery. Pearson's correlation will examine the relationship between VO_{2peak} and baseline-referenced MCAv changes. **Results:** Data collection is ongoing, and findings will be shared during the presentation. **Conclusion:** This study will clarify how aerobic fitness influences cerebrovascular responses to prolonged rowing and early recovery.

Central and Peripheral Hemodynamic Implications of Body Position During Submaximal Cycling

Presenter: Nathaniel Wolfs

Co-author(s): Sinan Osman, Sicheng Hong, Heeva Ramezankhani, Youna Uehara, and Robert F. Bentley

Faculty Advisor: Dr. Robert F. Bentley
University of Toronto

Background: Recent evidence suggests that cycling in a semi-upright position enhances cardiac output, yet active skeletal muscle oxygenation is impaired compared to upright cycling. This highlights the important implications of body position and hydrostatic pressure gradients on cardiac function and skeletal muscle perfusion; however, previous work was limited by the omission of muscle blood flow measures. **Purpose:** Therefore, this study sought to elucidate the effect of body position on exercising skeletal muscle blood flow and oxygenation. **Methods:** As part of a larger investigation, healthy young adults (ages 18-35, 50% female) will complete 5 minutes of supine (0 degrees) and semi-upright (45 degrees) cycling at a heart rate of 100 bpm on a tilt-recline table ergometer. Cardiac output (transthoracic echocardiography), vastus lateralis oxygenation (frequency-domain near infrared spectroscopy), vastus lateralis blood flow (diffuse correlation spectroscopy), and blood pressure (finger photoplethysmography) will be assessed during steady state in each body position. **Results:** Data collection and analysis are ongoing. It is hypothesized that cardiac output will be greater during supine compared to semi-upright exercise, with a concurrent elevation in blood pressure. Additionally, it is hypothesized that vastus lateralis blood flow and oxygenation will be lower during supine cycling compared to semi-upright. **Significance:** By measuring active skeletal muscle blood flow, this study directly addresses a gap in the current literature to advance our understanding of the implications of body position on central and peripheral hemodynamic responses during submaximal exercise. This can have important implications as semi-upright cycling is common when performing detailed assessments of cardiac function during exercise in health, as well as in patients with cardiopulmonary diseases during diagnostic assessments.

The Influence of Cardiorespiratory Fitness and Sex on Arterial Stiffness Responses to Acute Rowing Exercise

Presenter: Shazmeen Shakeel

Co-author(s): Matin Borhani, Dr. Baraa Al-Khazraji

Faculty Advisor: Baraa Al-Khazraji, PhD

McMaster University

Background: Arterial stiffness is a key marker of cardiovascular disease risk. While regular aerobic exercise and higher cardiorespiratory fitness (CRF) are generally associated with lower baseline arterial stiffness, the relationship between CRF and acute, post-exercise changes in arterial stiffness remains poorly understood. Furthermore, biological sex is known to influence arterial stiffness and may affect fitness-related vascular responses. **Objective:** The objective of this study is to examine the relationship between cardiorespiratory fitness and sex on arterial stiffness at baseline and following a bout of acute rowing exercise in healthy young adults. It is hypothesized that lower CRF is associated with higher baseline arterial stiffness and that males exhibit greater post-exercise increases in arterial stiffness compared to females. **Methods:** 14 recreationally active participants (7 males, 7 females; 18-35 years) completed a familiarization and exercise visit. During the familiarization visit, CRF was assessed via an incremental VO_2 peak test. During the exercise visit, arterial stiffness was measured using carotid-femoral and femoral-dorsalis pedis pulse wave velocity (PWV) using applanation tonometry at rest, and at 10 and 45 minutes after 20 minutes of submaximal rowing performed at 70% of Heart Rate Reserve or VO_2 peak. Participants are categorized into low, medium, and high CRF tertiles based on normative values. Acute exercise-induced changes in PWV will be assessed using a paired t-test, and a Pearson's correlation test will elucidate the relationship between CRF, and arterial stiffness responses compared to baseline. **Results:** Data analysis is underway, and findings will be shared during the presentation. **Conclusion:** Findings from this study will enhance understanding of how fitness and sex interact to influence acute vascular responses to mixed-modality exercise, with implications for individualized exercise prescription.

Impact of Aromatase Inhibitors on Cerebrovascular Function in Breast Cancer Survivors

Presenter: Celine Safati

Co-author(s): Deshnaa Murali Madhumathy, Jennifer Williams, Alexander Boytar
Faculty Advisor: Amy Kirkham, PhD
University of Toronto

BACKGROUND: Aromatase inhibitors (AIs) have become a standard adjuvant therapy for hormone-receptor positive (HR+) breast cancer (BC) in postmenopausal women. AIs suppress tumour growth by blocking peripheral conversion of androgens into estrogen. Estrogen plays an important role in vascular regulation, and its decreased serum concentration through menopause has been associated with increased rates of cerebrovascular disease. Postmenopausal BC survivors treated with AIs may experience compounded risks of cerebrovascular dysfunction, though this has yet to be examined in human studies.

METHODS: This cross-sectional study of postmenopausal women aimed to compare cerebrovascular function between HR+ BC survivors treated with AIs (n=9; 65.0±6.2 years), recruited 5- and 10-years after diagnosis, and non-cancer controls (n=14; 63.4±4.9 years). Primary outcomes included mean, systolic, and diastolic cerebral blood flow velocities, as well as cerebrovascular pulsatility and resistance indices in steady-state supine, seated, and standing postures. Secondary outcomes included transfer function analysis (TFA) gain and phase measures during a repeated sit-stand maneuver. Continuous hemodynamics and cerebral blood flow velocity were assessed using finger plethysmography and middle cerebral artery (MCA) insonation via transcranial Doppler ultrasound.

ANTICIPATED RESULTS: We hypothesize that AI-treated BC survivors will exhibit lower MCA blood flow velocities and higher pulsatility and resistance indices in seated and standing postures, relative to controls. We further anticipate AI-treated BC survivors to yield higher TFA gain and lower phase values during repeated sit-stand maneuvers, suggesting impaired dynamic cerebral autoregulation. Collectively, these findings would suggest reduced cerebrovascular function in postmenopausal AI-treated BC survivors compared to cancer-free postmenopausal women.

SIGNIFICANCE: This study provides necessary insight into the long-term cerebrovascular sequelae associated with AI use. Findings may inform clinical guidelines for ongoing treatment aimed to reduce BC recurrence risk, and establish a basis for further research exploring the underlying mechanism and clinical implications of AI-associated cerebrovascular dysfunction.

Consistency in Cardiovascular Responses Across Exercise Type and Position

Presenter: Sicheng Hong

Co-author(s): Sinan Osman MSc, Heeva Ramezankhani, Nathaniel Wolfs, Youna Uehara
Faculty Advisor: Dr. Robert F. Bentley
University of Toronto

Background: The cardiovascular system controls oxygen delivery (O_2D) to meet skeletal muscle metabolic demands at rest and during exercise. Exercise intensity, body position, and the proportion of active muscle mass represent cardiovascular perturbations that may influence central and peripheral responses. However, it remains unclear whether individual responses are consistent across these perturbations. **Purpose:** This study examines whether individual central and peripheral cardiovascular responses are consistent when challenged by perturbations in exercise intensity, active muscle mass, and body position. **Methods:** This study is a sub-analysis of a larger investigation recruiting healthy, non-anemic young adults (ages 18-35 years, BMI 18.5-24.9 kg/m², 50% female). Participants will complete seven, 5-minute stages alternating between supine (0°) and semi-upright (~45°) body positions at rest, during unloaded cycling, and cycling intensities eliciting heart rates of ~100 and ~120 bpm. Whole-body gas exchange (rate of oxygen consumption: $\dot{V}O_2$; indirect calorimetry), central hemodynamics (heart rate: HR, stroke volume: SV, cardiac output: Q; finger photoplethysmography), vastus lateralis skeletal muscle oxygenation (SmO_2 ; frequency-domain near infrared spectroscopy), and vastus lateralis skeletal muscle blood flow (MBF; diffuse correlation spectroscopy) will be assessed within the final minute of each stage at steady state. Participants will also perform 3-minute stages of unilateral and bilateral isometric knee-extension exercise with a 1-second contraction: 1-second relaxation duty cycle at 40% and 80% maximal voluntary contraction (MVC). HR, SV, Q, SmO_2 , and MBF will be assessed within the final minute of each stage. **Results:** It is hypothesized that individuals who present with lower cardiovascular responses to one perturbation, will consistently have lower responses during the other perturbations. **Significance:** Identifying whether responsiveness is an individual trait rather than perturbation-specific will advance the understanding of variability in how central and peripheral factors facilitate O_2D during periods of physical activity. This information may be applied in numerous exertional situations across the health spectrum.

Cardiovascular Disease Event Risk Among Patients Undergoing Non-Cardiac Surgery

Presenter: Sebeena Seby

Co-author(s): Marc Sicova, Wilton van Klei, and Daniel Santa Mina
Faculty Advisor: Dr. Daniel Santa Mina
University of Toronto

BACKGROUND: Cardiovascular disease (CVD) is the leading cause of mortality worldwide, representing nearly 30% of deaths. The relationship between CVD and cardiac surgery is well established; however, less is known about the burden and longitudinal impact of CVD among patients undergoing major non-cardiac surgery. This study aims to evaluate the burden of CVD and estimate long-term CVD risk prior to and following major non-cardiac surgery. **METHODS:** Patients undergoing major non-cardiac surgery were recruited from University Health Network (Canada) and University Medical Centre Utrecht (Netherlands). Eligible participants were 45-75 years of age and had at least two CVD risk factors (e.g., hypertension, current smoking). Baseline assessments were completed within 30 days prior to surgery, with follow-up occurring 150±50 days post-operatively. Health history, lifestyle behaviours, and validated questionnaires, including the Duke Activity Status Index (DASI) and the Godin Leisure-Time Exercise Questionnaire (GLTEQ), were collected. Ten-year CVD event risk was estimated using the American College of Cardiology Atherosclerotic CVD (ASCVD) risk calculator. Linear mixed-effects models were used to compare baseline and follow-up outcomes. **RESULTS:** 45 participants completed both baseline and follow-up assessments. Average ASCVD event risk was 13.40%, indicating intermediate CVD event risk. 11 patients were considered high risk. CVD event risk remained similar between baseline (13.40%) and follow-up (14.11%, $p=0.8$). Similarly, results from the DASI (30 vs. 33, $p=0.5$) and GLTEQ (13 vs. 14, $p=0.3$) did not vary between baseline and follow-up. **CONCLUSION:** Patients undergoing major non-cardiac surgery demonstrate intermediate to high 10-year CVD risk with low-to-moderate functional capacity and exercise participation. These findings highlight a potential opportunity to implement targeted cardiovascular risk-reduction strategies during the perioperative period to reduce long-term CVD burden in this population.

Changes in Strength Endurance Following A-Type Proanthocyanidin Supplementation in Rock Climbers

Presenter: Natasha Fedorsen¹

Co-author(s): Antoine Denis², Kate Kraemer²

Faculty Advisor: Andreas Bergdahl, PhD²

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BACKGROUND: Rock climbers routinely perform repeated intervals of strenuous muscular effort over extended periods of time, engaging strength endurance. A-type proanthocyanidins (APACs), a rare polyphenol found in cranberries, have been shown to increase aerobic performance; however, limited research has directly investigated the effects of APACs on strength endurance. This study aims to investigate whether a 28-day APACs intervention will increase strength endurance performance in rock climbers. **METHODS:** This randomized, experimental design study examined climbing levels of 18 ± 2.3 on the International Rock-Climbing Research Association Scale. Participants (15:6 M:F; Age= 25 ± 3.7 yrs) were recruited into cranberry intervention (n=10) and control groups (n=11); the experimental group consumed freeze-dried cranberry powder (0.3g/kg bw, 7.2-10% APAC). Participants came to three testing sessions: Baseline (T0), Midpoint (T1), Endpoint (T2). Each session consisted of max push-up repetitions, max pull-up repetitions, and max hang-boarding, with a 5-minute rest between each test. Two-way mixed measures ANOVA was used to analyze all tests. **RESULTS:** The experimental group's pull-ups increased by 11% (pre-mid) and 13% (pre-post), while the control group increased by 3% (pre-mid) and 2% (pre-post). The experimental group's push-ups increased by 9% (pre-mid) and 12% (pre-post), while the control group increased by 11% (pre-mid) and 9% (pre-post). There was a main effect of time for pull-ups and push-ups ($p < 0.05$) between pre-mid and pre-post; however, there were no interaction effects observed. There was no statistical significance for hang-board ($p = 0.430$). **SIGNIFICANCE:** Although statistical significance was not observed, the results demonstrated meaningful increases in push-up and pull-up performance, suggesting potential practical benefits that warrant further investigation. Ongoing studies are underway to increase the sample size and improve statistical power to better determine the effectiveness of the intervention.

Investigating the Effects of Progesterone on Muscular Fatigue in Healthy Premenopausal Females

Presenter: Hafsa Ali

Co-author(s): Alysha D'Souza PhD (c), Caroline Dunlop, Kareem Shakeel
Faculty Advisor: Dr. Stuart Phillips
McMaster University

BACKGROUND: Females are exposed to a spectrum of hormonal fluctuations across their lifespan; however, the nonreproductive effects of these hormones remain incompletely understood. Ovarian hormones, estrogen and progesterone, fluctuate across the menstrual cycle and may modulate fatigue through effects on thermoregulation, substrate metabolism, and neural activation. Progesterone enhances GABAergic inhibition in the central nervous system, potentially reducing neural drive and increasing central fatigue. While phase-based menstrual cycle studies suggest greater fatigability during the progesterone-dominant luteal phase, the independent effects of progesterone have not been experimentally isolated in humans. **OBJECTIVE:** We aimed to investigate the isolated effects of progesterone on central and peripheral fatigue following acute resistance exercise in healthy, naturally menstruating females. **METHODS:** Healthy, naturally cycling, premenopausal females (n = 20; aged 18-30 years) completed a randomized, double-blind, placebo-controlled, parallel-group study. During the early follicular phase, participants ingested micronized progesterone (n = 10; 400 mg in 2 doses) or a matched placebo (n = 10) 34 and 10 hours prior to a unilateral leg extension exercise protocol performed until volitional failure. Central fatigue was assessed using the Borg 6-20 rating of perceived exertion (RPE) scale, and peripheral fatigue was quantified using the muscle fatigue index (MFI) derived from the decrease in repetitions across sets. Baseline serum progesterone and reproductive hormones were assessed to confirm hormonal status. **HYPOTHESIS:** We hypothesized that elevated progesterone levels would increase RPE and MFI, reflecting an increased susceptibility to central and peripheral fatigue, respectively. **STATISTICAL ANALYSIS:** Data will be analyzed using RStudio. A linear mixed-effects model will be used to evaluate the effect of condition on RPE. Differences in MFI between conditions will be assessed using an independent t-test, with $p < 0.05$ as criteria for statistical significance. **RESULTS/CONCLUSION :** Data analysis is ongoing; full results will be presented at the conference.

The Effect of an A-Type Proanthocyanidin-Rich Cranberry Supplement on Lactate Accumulation in Rock Climbers

Presenter: Kate Kraemer

Co-author(s): Antoine Denis, Natasha Fedorsen
Faculty Advisor: Dr. Andreas Bergdahl
Concordia University

Background: Rock climbers' performance relies on repeated bouts of high-intensity effort over extended periods, leading to the buildup of anaerobic metabolites such as lactate. By enhancing mitochondrial function, A-type proanthocyanidins (APACs), a rare polyphenol found in cranberries, have been shown to improve aerobic performance among athletes. However, limited research has examined the effects of polyphenols on anaerobic performance and respiration. **Purpose:** This study aims to evaluate the effect of cranberry supplementation, taken over 28-days, on rock climbers' anaerobic metabolic performance. **Methods:** This randomized experimental study included 21 rock climbers (15M, 6F; 25.0 ± 3.7 years; IRCRA 17.5 ± 2.3) assigned to a control group (CON; $n = 11$) or cranberry supplement group (CS; $n = 10$). Both groups maintained their usual diet and training, while the CS group consumed cranberry powder (0.3 g/kg; 7.2-10% APAC) for 28 days. Participants completed three testing sessions 14 days apart, performing maximal pull-ups, push-ups and a maximal hang-board test, separated by five minutes of rest. Lactate was measured at rest, pre-hang-board, and at 1-, 3-, and 5-minute post-hang-board. A two-way mixed ANOVA analyzed lactate measurements (LM), and an independent t-test assessed resting lactate. **Results:** Resting LM showed trends of improvement (CS_{post} = 0.78 mmol/L, CON_{post} = 0.98 mmol/L; $p = 0.10$). Post-hang-board LMs for CS increased by 14%, 7%, and 3% at 1-, 3-, and 5-min, respectively, while the CON increased by 20%, 13%, and 7% at 1-, 3-, and 5-min, respectively. **Conclusion:** Although not significant, the results suggest reduced lactate accumulation and possibly lower resting lactate following chronic cranberry supplementation, indicating a potential interaction between polyphenols and mitochondrial anaerobic respiration. Ongoing studies aim to increase sample size.

Effects of Polyphenol Supplementation and Exercise on Physical Performance in Older Adults: A Randomized Controlled Pilot Feasibility Trial

Presenter: Mathews Antony

Co-author(s): Mathews Antony, Noah Gittens, Raymond Schnuerer, Lauren Pacitti, Lucas Beaupre, Brendon J Gurd, Chris McGlory
Faculty Advisor: Chris McGlory, PhD
Queen's University

Introduction: Sarcopenia is an age-related decline in skeletal muscle mass and strength that reduces physical function and quality of life in older adults. Importantly, exercise training is only partially protective against these declines in muscle mass and strength and chronic inflammation and impaired mitochondrial function often observed in older adults may limit the beneficial effects of exercise training. Polyphenols are plant-based bioactive compounds with anti-inflammatory and antioxidant properties associated with favourable skeletal muscle outcomes including reduced muscle damage, improved motor performance, and mitochondrial remodelling in humans and pre-clinical models. Whether polyphenol supplementation may enhance exercise training-induced adaptations when combined with supervised resistance and aerobic exercise in older adults has not been fully elucidated. The purpose of this feasibility trial is to assess recruitment, retention, and supplement adherence while exploring whether polyphenol supplementation augments exercise-induced improvements in physical function and skeletal muscle health in older adults. Methods: Forty community-dwelling adults aged 60 years and older will be randomized to receive either 3 g per day of Phyto-P, a polyphenol-rich red lettuce extract, or maltodextrin placebo, alongside a 12-week supervised banded resistance training and aerobic cycling program. Feasibility outcomes will include recruitment, retention, and supplement adherence. Skeletal muscle function, body composition (bioelectrical impedance analysis), circulating inflammatory markers, and skeletal muscle mitochondrial respiration will be assessed prior to, and immediately following, the 12-week exercise training protocol. Skeletal muscle function and exercise performance will be assessed using the Short Physical Performance Battery, 30-s sit-to-stand, functional forward reach, stair-climb power, handgrip strength, quadriceps dynamometry, and peak work rate cycling tests. Mitochondrial respiration will be measured using high-resolution respirometry. Significance: Our data will inform future large-scale randomized controlled trial design and will yield mechanistic insight as to the potential effect(s) of polyphenol supplementation on improvements in skeletal muscle health following exercise training in older adults.

Comparing Fatigue Measures to an Aerobic, Isometric, and Aerobic-Anaerobic Fatigue Protocol

Presenter: Ayden Sendeki

Co-author(s): Dveeta Lal, Quinn Mulligan
Faculty Advisor: Timothy Burkhart, PhD
University of Toronto

BACKGROUND: Approximately 250,000 ACL injuries are reported yearly, with 70% occurring from non-contact mechanisms. One potential injury risk factor is neuromuscular fatigue. As supporting muscles become fatigued, movement patterns alter, placing the lower extremity in risky postures. However, fatigue risk remains debated, likely due to the variable methodologies across studies. The two main approaches to determine when the musculature has become fatigued are objective (e.g., RPE > 8) and subjective (e.g., participant stops biking). In addition, there are inconsistencies in the protocols used to induce fatigue, which can be categorized as anaerobic, aerobic, and isometric. **OBJECTIVE:** The purpose of this study was to develop a standardized fatigue protocol that can be used in future research to obtain more generalizable and accurate conclusions regarding ACL fatigue testing. **METHODOLOGY:** 20 healthy participants (10 males, 10 females) will be exposed to three separate fatigue protocols spread over two days. i) Aerobic: a cycle ergometer where resistance is increased every 5 minutes until fatigue. ii) Isometric: Sustained extension of the lower extremity at 90° until failure. iii) Aerobic-Anaerobic: Sets of 5 squat jumps followed by 30 seconds of high knees until fatigue. Bilateral surface electromyography data will be collected from the rectus femoris (RF), vastus lateralis (VL), and vastus medialis (VM), and the mean power frequency of the EMG signal will be analysed in real time. Fatigue is determined by a 10% decrease in mean power frequency compared to baseline, and is measured using Delsy's Trigno EMG sensors, and data is visualized using LabVIEW software. **EXPECTED RESULTS:** We expect the percentage of people who reach neuromuscular fatigue to be lowest in the aerobic protocol. As well, we expect there to be inconsistencies between the rate of perceived exertion (RPE) and the objective neuromuscular fatigue (MnPF) when comparing the three protocols.

Session: III-G
Time: 1:10 p.m.
Location: SS1085

Neuroimaging Correlates of Exertional Test Performance Following Sport-Related Concussion

Presenter: Katie Stanojlovic

Co-author(s): Michael Hutchison, Elizabeth Waye, Nathan Churchill, Kyla Pyndiura
Faculty Advisor: Dr. Michael Hutchison
University of Toronto

Background: Interest in exertional testing as an objective indicator of recovery sports-related concussion (SRC) has increased. Monitoring symptoms and graded exertional testing are commonly used to guide return-to-sport (RTS) decision; however, the neurophysiological mechanisms responsible for symptom provocation during exertion remains poorly understood. Few studies have examined the neurobiological differences between athletes who pass versus fail exertional testing after SRC. Objective: To examine differences in cerebral blood flow (CBF) and resting state functional connectivity (rs-FC) associated with exercise induced symptom exacerbation in athletes with a SRC based on Multimodal Exertional Test (MET) performance. Methods: Athletes with concussion (n=14) completed the MET and were stratified into MET-Pass (n=7), and MET-Fail (n=7) groups. Neuroimaging was conducted within 10 days of injury. Between group difference in CBF and rs-FC involved were assessed using independent two-sample comparisons of means, and effect sizes were quantified using Cohen's D. Results: MET-Fail athletes showed significant reductions in CBF relative to MET-Pass in the occipital, subcortical and mid/posterior cingulate regions. Reduced rs-FC was also observed in the MET-Fail group, with the largest effects within temporo-parietal, fronto-occipital and subcortical connections to parietal and subcortical networks. Significance: Reductions in CBF and rs-FC are associated with exercise intolerance during early SRC recovery. Neuroimaging markers may provide objective insight into physiological recovery beyond symptom reporting and could enhance current concussion and return-to-sport frameworks.

Prehabilitation among Frail and Non-Frail Patients undergoing Elective Surgery

Presenter: Lauren Amanda Lee

Co-author(s): Daniel Sibley, Rebecca Wong

Faculty Advisor: Daniel Santa Mina, PhD Daniel Sibley, RKin, PhD
University of Toronto

Background: Prehabilitation involves preoperative physical and psychosocial conditioning to improve functional capacity and postoperative recovery. Frailty causes increased vulnerability and reduced physiological reserve and is frequently classified using the Edmonton Frailty Scale (EFS). **Objective:** This study aimed to examine whether prehabilitation interventions are associated with enhanced postoperative outcomes among frail and non-frail patients undergoing elective surgery. **Research questions include:** (a) Is there a difference between frail and non-frail patients undergoing prehabilitation in their change from baseline to pre- and post-surgery?, and (b) Is there a significant change in 6-minute walk test distance from baseline to postoperative assessment among frail patients? **Methods:** This study employed a single-arm longitudinal cohort design within the University Health Network (UHN) Surgical Prehabilitation Program, operating across various Toronto-based hospitals. 105 patients undergoing elective surgery participated in preoperative and individualized prehabilitation exercise programs. Descriptive statistics were calculated, and independent and paired samples t-tests were conducted for between-group and within-group differences in functional capacity. **Expected Results:** Significant between-group differences were anticipated ($p < 0.05$), with non-frail patients expected to demonstrate enhanced postoperative functional capacity compared to frail patients. Frail patients were expected to show improvements following prehabilitation but to demonstrate reduced postoperative physical functioning compared to non-frail patients. **Conclusion:** Findings will contribute to the understanding of prehabilitation and its impact on postoperative functional capacity among frail and non-frail patients undergoing elective surgery. Findings may help inform structured and targeted future prehabilitation interventions to optimize surgical readiness and resilience, especially for frail patients.

Evaluating Recovery and Meaningful Change After ACL Reconstruction Using the Knees Numeric-Entity Scale (KNEES-ACL) Questionnaire

Presenter: Layne Jessup

Co-author(s): Hana Marmura, Kevin Willits, Robert Litchfield, Alan Getgood, Ryan Degen, Dianne Bryant

Faculty Advisor: Dianne Bryant, PhD
Western University

BACKGROUND: The Knee Numeric-Entity Evaluation Score (KNEES-ACL) is a patient-reported outcome measure (PROM) tailored to patients who have had an anterior cruciate ligament (ACL) injury or ACL reconstruction (ACLR). The KNEES-ACL has 6 domains (Problems with Daily Activities, Mental Impact, Stability, Strength and Control, Pain, Sport and Physical Activity). To date, no thresholds of clinical relevance have been established for the KNEES-ACL. **OBJECTIVE:** To calculate the Patient Acceptable Symptom State (PASS) thresholds for each KNEES-ACL domain in ACLR patients pre-operative to 2 years post-operative. **METHODS:** We classified patients into those who indicated that the current state of their knee was satisfactory versus those who did not using the Patient Acceptable Symptom State (PASS) and then used a receiver operating characteristic (ROC) curve to find Youden's Index for each of the domains at several time points along the recovery curve (2 and 6 weeks, 3, 6, 12, 24 months). **RESULTS:** A total of 382 unique patients were included in the study (age: 34.1 ± 13.1 years, 52.7% female, 44% injured while participating in sports). In general, PASS thresholds were higher at later post-operative timepoints for each domain of the KNEES-ACL. Pain PASS thresholds improved more rapidly in the early stages, while Sports and Physical Activity PASS thresholds showed more gradual increase across time. **SIGNIFICANCE:** A higher score was required on the KNEES-ACL as recovery progressed to achieve an acceptable symptom state following ACLR. PASS thresholds should be used alongside patient-reported goals, functional testing, and psychological assessments to provide a complete picture of post-ACLR recovery.

Exploring Concussion Symptom Profiles and Patterns Among Canadian Special Olympics Athletes

Presenter: Dylan Silver

Co-author(s): Nick Reed (Dept of Occupational Science & Therapy, University of Toronto), Emily Bremer (Acadia University), Victoria Formusa (Special Olympics Canada), Tom Davies (Special Olympics Canada), Hui Xiao (Faculty of Kinesiology and Physical Education, University of Toronto)
Faculty Advisor: Kelly Arbour-Nicitopoulos, PhD
University of Toronto

Background: All athletes are at risk for concussion; however, little is known about concussion among athletes with intellectual disability (ID). Established risk factors for sport-related concussion include previous concussion and female sex. Although there is research to describe concussion symptom profiles and patterns among neurotypical athletes, there have been no similar studies in athletes with ID. **Objective:** The aim of this study is to examine concussion symptom profile and pattern differences in athletes with ID based on demographic (age, gender, and ethnicity) and sport-related (high- vs low-risk sports, team vs individual sports, and summer vs winter sports) factors. **Methods:** Survey data from a larger cross-sectional study were used for this secondary analysis. Data include concussion history and symptoms, in addition to demographic and sport history, from Special Olympics (SO) athletes at Provincial and National SO Games. Descriptive statistics characterized the sample, and latent class analysis (LCA) was used to explore concussion symptom patterns across physical, emotional, cognitive, and sleep-related symptoms. Multinomial logistic regression analyses will be used to determine whether demographic or sport factors are associated with identified symptom classes. **Preliminary Results:** Survey respondents included 152 participants (Mean age=36.49±20.66) with a diagnosed and/or suspected concussion (67.8% male; 78.9% White). LCA supported a 3-class solution based on model selection criteria: Class 1 ("High Physical Symptoms, No Emotional Symptoms, and Low Cognitive/Sleep-related Symptoms"), Class 2 ("High Physical Symptoms with Moderate Emotional, Cognitive, and Sleep-related Symptoms"), and Class 3 ("High Physical, Emotional, Cognitive, and Sleep-Related Symptoms"). Regression analyses are underway to determine predictors of class membership. **Conclusion/Implications:** Distinct concussion profiles and patterns exist among athletes with ID, calling attention to the symptom pattern diversity within this athlete population. Findings are unique to athletes with ID and can inform future concussion education in collaboration with Special Olympics Canada, crucial to improving concussion recognition and management.

The Influence of Emergency Contraception on D-dimer Concentrations in Healthy Premenopausal Females.

Presenter: Ava Forbes-Schnick

Co-author(s): Jenna C. Stone, Mark Crowther, Maureen J. MacDonald
Faculty Advisor: Maureen MacDonald, PhD
McMaster University

INTRODUCTION: Emergency contraception is a key component of reproductive healthcare, and levonorgestrel (LNG)-based formulations such as Plan B® are widely used. In Canada, an estimated 1 in 10 sexually active females aged 15-24 report using emergency contraception in the past year. While chronic LNG exposure in combined oral contraceptives is associated with increased venous thrombosis risk, the acute thrombotic effects of a single high dose remain unknown. D-dimer, a fibrin degradation product, is a sensitive biomarker of coagulation and fibrinolytic activation. The purpose of this study is to determine whether ingestion of a single 1.5 mg dose of LNG acutely increases plasma D-dimer concentrations compared with placebo in healthy, naturally cycling premenopausal females. We hypothesize that LNG will increase D-dimer two hours post-ingestion and that plasma LNG concentrations will positively correlate with D-dimer levels. **METHODS:** In a double-blind, randomized, placebo-controlled trial, 40 healthy females aged 18-35 years, not using hormonal contraception, will be recruited to achieve >80% power. Participants will be stratified by body mass index and randomized to receive Plan B® or placebo. Venous blood samples will be collected at baseline and two hours post-ingestion, corresponding to expected peak plasma LNG concentration. Plasma D-dimer will be quantified to assess changes in venous thrombosis risk and LNG concentrations will also be measured. Linear mixed-effects modeling will assess the influence of Plan B® versus placebo on D-dimer concentrations. **EXPECTED RESULTS:** We predict that Plan B® ingestion will be associated with increased D-dimer compared to placebo at two hours post-dose and that circulating LNG concentrations will positively correlate with D-dimer levels. **SIGNIFICANCE:** This study will provide the first direct evaluation of the acute hemostatic effects of single-dose LNG emergency contraception and inform its short-term vascular safety profile, particularly for individuals at elevated thrombotic risk. **Funding:** NSERC

The effects of short-term bed rest on mitochondrial content and respiration

Presenter: Yasmin Asadi

Co-author(s): Thomas Tripp, Sebastian Camargos, Jennifer Wilkinson
Faculty Advisor: Chris McGlory, PhD
Queen's University

Background: Short-term bed rest reduces skeletal muscle's capacity to synthesize ATP. Mitochondria are the site of oxidative ATP resynthesis, so alterations to mitochondrial function may explain bed rest-induced impairments in skeletal muscle oxidative capacity. There is some evidence to suggest that decreases in mitochondrial content, rather than changes in intrinsic mitochondrial respiration (respiratory function normalized to mitochondrial content), may underlie reductions in aerobic ATP synthesis. However, few studies have directly assessed changes in mitochondrial content and respiratory function simultaneously in response to a clinically relevant period of bed rest. **Objective:** The purpose of this study is to 1) investigate changes in mitochondrial content, and 2) determine whether these changes correspond with changes in mitochondrial lipid- and carbohydrate-supported respiration following 5 days of bed rest. **Hypotheses:** We hypothesize that 5 days of bed rest will result in reduced mitochondrial content and respiration, but no change in intrinsic mitochondrial respiration. **Methods:** Healthy young males and females will undergo 5 days of bed rest. Skeletal muscle biopsies will be taken from participants' vastus lateralis before and after bed rest to analyze changes in mitochondrial content (Transmission Electron Microscopy; TEM) and respiration (Oxygraph-2K). **Results:** Six participants (n=4 females, n=2 males) have completed the study to date. Respiration data is currently being analyzed and full results will be presented during the National Undergraduate Research Conference. **Significance:** This study will characterize early mitochondrial adaptations during bed rest and their impact on skeletal muscle oxidative capacity. These results will improve our understanding of the negative consequences of muscle disuse, helping inform targets for future countermeasures.

Session: IV-A
Time: 3:10 p.m.
Location: BN302

The Effect of Limb and Biological Sex on Macro and Micro - Vascular Function

Presenter: Aisha Khan

Co-author(s): Nino Nikolovski, Jacob Schwartz, Ely Wyman, and Robert F. Bentley

Faculty Advisor: Dr. Robert Bentley

University of Toronto

Background: Macro- and micro -vascular function is important for oxygen delivery towards active skeletal muscle, and by extension skeletal muscle oxygenation and exercise performance. Basal vascular function may differ between biological males and females as well as between upper and lower limbs. While potential differences arising from sex-related physiology and hydrostatic influences across limbs are appreciated, the combined influence on vascular function is unclear. Purpose: To determine how biological sex and limb position relative to heart level impact basal macro- and micro -vascular function. Methods: This study is a sub-analysis of a larger study. 4 healthy participants (26 ± 4 years; 25% female) completed basal vascular assessments in the arm (brachial artery, flexor digitorum superficialis) and leg (common femoral artery, vastus lateralis). Macro- and micro -vascular function were assessed simultaneously using duplex ultrasound (GE Vivid e9, Horton, Norway), and frequency-domain near infrared spectroscopy (Meta Ox, ISS Medical, Champaign IL, USA). Participants remained supine throughout 2 minutes of rest, 5 minutes of cuff-induced blood flow occlusion at 250 mmHg, and 5 minutes of recovery following cuff deflation. Preliminary analyses assessed the relationship between upper- and lower-limb outcomes using Pearson correlation coefficients. Results: Macrovascular function, assessed by flow-mediated dilation, was not associated between upper and lower limbs ($r = 0.09$, $p = 0.91$). Skeletal muscle oxygenation re-saturation rate, reflecting the immediate microvascular recovery response, was not associated between limbs ($r = 0.13$, $p = 0.86$). Skeletal muscle oxygenation area under the curve, reflecting the sustained microvascular response, showed a negative association between limbs ($r = -0.64$, $p = 0.36$). Sex-based analyses will be completed once expected males and females are recruited. Conclusion: Preliminary findings suggest limited correlation between upper- and lower-limb macrovascular and microvascular outcomes. Completion of the full dataset and sex-based analyses will help clarify limb- and sex-related contributions to vascular function.

The Effect of Physical Limb Characteristics on Blood Flow and Muscle Oxygenation

Presenter: Heeva Ramezankhani

Co-author(s): Sinan Osman, Youna Uehara, Nathaniel Wolfs, Sicheng Hong, Robert F. Bentley
Faculty Advisor: Dr. Robert F. Bentley
University of Toronto

Background: Muscle blood flow facilitates the matching of oxygen delivery to the skeletal muscle's oxygen demand during physical activity. While assessments of blood flow towards an active muscle are common using Doppler ultrasound, diffuse correlation spectroscopy (DCS) and frequency-domain near-infrared spectroscopy (fdNIRS) offer an opportunity to assess blood flow and oxygenation at the active muscle. While differing optical properties of tissues may influence signals, how physical limb characteristics impact DCS and fdNIRS signals in vivo at rest and during exercise is poorly described. **Purpose:** The purpose is to determine the extent to which inter-individual differences in adipose tissue thickness, muscle mass, and melanin concentration at the measurement site impact blood flow and oxygenation measures. **Methods:** Healthy individuals (aged 18-35, 50% female) will complete cycling at intensities equivalent to heart rates of 100 and 120 bpm as well as single-leg and double-leg knee extension exercise at 40% and 80% of maximum voluntary contraction. At the vastus lateralis, adipose tissue will be assessed via manual caliper skinfold thickness, muscle mass via thigh circumference measurement, and melanin concentration via colorimetry. DCS muscle blood flow and fdNIRS muscle oxygenation at the vastus lateralis will be assessed throughout. **Results:** Data collection is presently underway. **Hypotheses:** It is hypothesized that oxygenation and blood flow will be underestimated with greater adipose tissue thickness and higher melanin concentrations due to greater light scattering and greater epidermal light absorption, respectively. Greater muscle mass will result in greater oxygenation and blood flow measures due to elevated metabolic activity. **Significance:** Understanding how physical limb characteristics influence DCS muscle blood flow and fdNIRS muscle oxygenation represents a key advancement in ensuring correct interpretation while minimizing systematic error during future measurement applications across the health spectrum at rest and during periods of physical activity.

The Effects of No Tape Compared to Kinesio Tape® on Knee Valgus Mechanics in Basketball Players

Presenter: Alana Zawadski

Faculty Advisor: Paolo Sanzo, DSc
Lakehead University

Background: Basketball demands speed, agility, power, and coordination, and is strongly associated with knee injuries from jumping, landing, and quick directional changes. Excessive knee valgus angles, often observed in basketball movements, increase ligamentous injury risk, patellofemoral pain syndrome, and dislocations by compromising knee joint stability and stressing the ligaments and patellofemoral joint. Support devices such as Kinesio Tape® and valgus knee braces may also reduce valgus angles by improving proprioception and reducing mobility. While both methods aim to stabilize the knee during activity, they function differently and have distinct effects. Objective: To investigate the effects of tape compared to no tape on knee valgus angle during three sport-specific lateral knee valgus tasks, including a lateral jump (Task 1), a drop jump (Task 2), and forward and sideways cutting tasks (Task 3) in basketball players aged 18-45 years. Method: Nine participants aged 18-45 years participated in two 45-minute sessions, one with tape and one without, scheduled within 48 hours of each other. Each session included pre- and post-tests involving three sport-specific tasks performed three times. Between the tests, a 15-minute fatiguing protocol with three basketball drills that mimicked game-like conditions was completed, followed by pre- to post-test comparisons. The change scores from both the tape and no-tape sessions were recorded and analyzed using Kinovea and IBM® SPSS®. Results: Taping resulted in larger mean reductions in knee valgus in Tasks 1 (-3.16° versus -1.88°) and 3 (-2.85° versus -1.11°), and a slightly higher reduction in Task 2 (-1.02° versus -0.02°). Conclusion: Although data collection and analysis are still in progress, initial results suggest that taping may lead to a larger reduction in knee valgus angle.

Epidemiology of Proximal Adductor and Trunk Musculoskeletal Injuries: A Retrospective Review at the David L. MacIntosh Sport Medicine Clinic

Presenter: Fatima Zahra

Co-author(s): Evan Curd

Faculty Advisor: Timothy Burkhart, PhD
University of Toronto

BACKGROUND: Hip and groin injuries are common in athletes participating in cutting, pivoting, and high-velocity sports such as soccer and hockey. The anatomical region frequently implicated is the Inguinal Adductor Muscle Complex (IAMC), which includes the proximal adductors (longus and brevis), rectus abdominis and external obliques. Despite existing literature on clinical presentation and implications, epidemiological evidence on IAMC injuries remain limited. Establishing clinical patterns consistent with repetitive trauma may reconcile anatomical theory and injury presentation. The purpose of this study is to retrospectively examine clinical observations for potential risk factors leading to the development of IAMC injury from initial complaint. Additionally, this study seeks to identify temporal relationships from initial symptom presentation to confirmed diagnosis. **METHODS:** This study is a retrospective chart review that will be conducted through the David L. MacIntosh Sport Medicine Clinic, affiliated with the University of Toronto. Electronic medical records (EMR) from a 1-year period will be reviewed. EMR records corresponding to 5 common diagnostic codes used for IAMC injury will be obtained. The extracted data will be summarized to convey the total number of injuries, total and mean time lost due to injury, and time from diagnosis to initial complaint. For each confirmed injury, we will extract injury onset, mechanism (acute versus repetitive/overuse), sport type, side of involvement, seasonal timing, session timing (if applicable), and days lost from sport participation. **EXPECTED OUTCOMES:** It is expected that this study will identify risk factors for the development of IAMC injury from a macroscopic standpoint and at the sport-specific level. It is also expected that the general chronicity of these injuries will be identified (if not acute injury mechanism). **SIGNIFICANCE:** This study will provide preliminary epidemiological data regarding IAMC injury risk factors. The identification of these risk factors may support the proposed biomechanical mechanisms underlying IAMC injury development.

Pose-Based Kinematic Archetypes in Elite Soccer: A Proof-of-Concept Framework for Role-Specific Movement Profiling

Presenter: Kal Kiswani

Co-author(s): Joseph Baker, PhD
Faculty Advisor: Joseph Baker, PhD
University of Toronto

Background: Traditional soccer analytics relies primarily on event-based metrics (e.g., passes, shots, duels), which quantify outcomes but overlook how players physically express their roles through continuous movement. Consequently, biomechanical and stylistic differences between players occupying the same position often remain obscured. Advances in computer vision-based pose estimation now enable frame-by-frame skeletal tracking from broadcast footage, allowing joint-level kinematic analysis in ecologically valid match environments. **Purpose:** This proof-of-concept study aims to develop and evaluate a biomechanically grounded analytical pipeline for extracting discrete movement primitives from the WorldPose dataset (6 FIFA World Cup matches) and aggregating them into within-position player archetypes. Analyses focus on three tactically distinct roles (Centre Forwards, Left Wingers, Centre Backs) to examine whether players within the same nominal position exhibit distinguishable kinematic profiles when clustered using movement features independent of event labels. **Methods:** Two-dimensional pose-estimated data (25 Hz) from elite international matches were spatially calibrated to global pitch coordinates. Continuous player trajectories were temporally segmented using velocity, acceleration, and directional-change thresholds to identify candidate movement primitives. Segment-level biomechanical features (e.g., joint velocity profiles, deceleration magnitudes, turn curvature, transition frequency, etc.) were extracted and normalized. Unsupervised clustering techniques (HDBSCAN and k-means) were applied to identify recurring movement motifs. Player-level profiles were constructed as frequency distributions across primitives and subsequently clustered within each positional cohort using hierarchical clustering and Gaussian mixture modeling. **Preliminary Results:** Initial analyses indicate that unsupervised clustering produces interpretable movement primitives corresponding to functional actions (e.g., press accelerations, recovery sprints, lateral repositioning). Early within-position clustering suggests emergent archetypal groupings, with deceleration mechanics and transition frequency contributing to between-player differentiation. Full dataset analysis is ongoing. **Significance:** This work demonstrates the feasibility of movement-based archotyping independent of event data and reveals a promising reproducible framework integrating biomechanics and machine learning for performance profiling in elite soccer.

The Effect of Wrist Guards on Radial and Ulnar Load Distribution in Adolescent Gymnasts: Implications for Preventing Distal Radius Physeal Stress Syndrome

Presenter: Kristy Chow

Co-author(s): Stefania Di Leo, MSc, PhD Student
Faculty Advisor: Timothy Burkhart, PhD
University of Toronto

BACKGROUND: Wrist guards have recently been introduced in gymnastics as a preventive strategy against distal radius physeal stress reaction, commonly known as Gymnast Wrist. This is a frequent overuse injury caused by repetitive weight-bearing and compressive wrist loading in young athletes. As the adolescent growth plates remain vulnerable to repetitive mechanical stress, reducing compressive forces at the wrist may help mitigate injury risk. **OBJECTIVE:** To compare radial and ulnar wrist pressure distribution with and without wrist guards in stage 6-8 adolescent gymnasts. **METHODS:** Fourteen healthy female adolescent gymnasts (n=14) at stages 6-8 were recruited. Each participant performed three tasks: (i) Front Handspring (FH), (ii) Back Handspring (BH), and (iii) Roundoff (RO). A Tekscan pressure sensor was used to record hand impact during each exercise across three trials following system calibration. The peak loading frame is being identified within the software for analysis. Radial and ulnar regions of interest (ROIs) are manually created using boxes aligned with anatomical landmarks to divide the contact surface. Peak force and pressure values for each ROI were extracted and exported as ASCII files for analysis to evaluate wrist guard effects on load distribution. **RESULTS/EXPECTED RESULTS:** It is expected that wrist guards will promote a more even load distribution across the wrist, minimizing peak forces on both the radial and ulnar sides and reducing the risk of distal radius physeal stress injuries in adolescent gymnasts. These findings will help inform injury prevention and training guidelines by improving our understanding of how wrist guards influence load distribution and protect the distal radius and ulna growth plates.

Nature of Unilateral Reactive Strength and Force Absorption in Youth Baseball Players

Presenter: Nolan Height

Faculty Advisor: Dr. Eryk Przysucha
Lakehead University

Nature of Unilateral Reactive Strength and Force Absorption in Youth Baseball Players
BACKGROUND: In line with the conceptual model by Sheppard and Young (2006) force absorption and reactive strength represent important determinants of change of direction. The baseball literature is saturated with studies focusing on hitting and pitching, and there is practically no research related to issues of change of direction even though it is an essential component of the game. These issues are especially focal for youth players who are more susceptible to various non-contact injuries when cutting, decelerating, and pivoting. **OBJECTIVE:** To examine the nature of unilateral force absorption and reactive strength in youth competitive baseball players. **METHOD:** Fourteen ($M = 16.3$, $SD = 2.1$) youth baseball players performed a series of unilateral drop and depth jumps on AMTI force platform. The measures of force absorption (Peak Vertical GRF; Time to Absorption; Loading Rate), and reactive strength (Peak GRF; Reactive Strength Index (RSI)) were derived. Also, index of symmetry was calculated for all the variables. **RESULTS:** Dependent samples t-tests revealed significant differences between the dominant and non-dominant legs across all the measures ($p < .01$ to $.05$), with moderate to large effect sizes ($d = .30$ to $.48$). Symmetry index revealed most pronounced deficiencies in Reactive Strength Index ($M = 20.3\%$), as compared to Force Absorption ($M = 13\%$) ($p < .02$). **CONCLUSION:** The Reactive Strength Index (RSI) is a measure of explosive reactive ability of the neuromuscular system, on the other hand, force absorption refers to the ability to dissipate mechanical energy during a landing.

Policies on Heat Stress and Human Limits in Motor Sport: Implications for Occupational Exposure and Cognitive Function

Presenter: Amina Abdul Jalil

Faculty Advisor: Madeleine Orr, PhD
University of Toronto

BACKGROUND: Extreme heat is an increasingly prominent consequence of climate change and represents a growing threat to human health, safety, and performance across occupational and sporting environments. Motorsport is uniquely vulnerable due to the convergence of high ambient temperatures, radiant heat from track surfaces, localized heat from engines and exhaust systems, restrictive fire-resistant clothing, and cognitively demanding tasks performed under time pressure. While the physiological effects of heat stress in athletes have been widely studied, motorsport has historically lacked consistent, standardized heat-risk regulations comparable to those in other high-risk industries. Recent assessments by the Fédération Internationale de l'Automobile (FIA) emphasize that climate change is already affecting motorsport operations worldwide, underscoring the need for proactive adaptation and formal governance responses. **OBJECTIVE:** The objective of this study is to evaluate how evidence-based heat-risk management strategies can be translated into structured policy frameworks within motorsport, with the aim of protecting health, preserving cognitive and physical performance, and ensuring event safety, focusing on officials, pit crews, and support personnel. **METHODS:** This study employs a multidisciplinary narrative synthesis of peer-reviewed literature on thermoregulation, exertional heat stress, and cognitive impairment, alongside occupational health research. Future phases of this research will involve semi-structured interviews with drivers, pit crew members, race officials, and medical personnel to capture lived experiences, risk perceptions, and practical challenges related to heat exposure. These qualitative insights will be combined with observational data and environmental monitoring to inform more context-specific and inclusive heat-management policies. **EXPECTED RESULTS:** The study is expected to produce a detailed, evidence-based heat policy defining thermal thresholds, tiered interventions, role-specific protections, and decision authority to reduce heat illness, preserve performance, and standardize safety practices in motorsport environments.

Strengths-Based Dyadic Coping and Physical Activity Engagement Among Spousal Care Partners of Individuals with Parkinson's Disease

Presenter: Asmi Khanna

Co-author(s): Olivia Crozier, Talha Khan, Stephanie Cimino, Mervin Blair, Tuoyo Awani, Jacobi Elliott, Dalton Wolfe, Jeff Holmes

Faculty Advisor: Tuoyo Awani, MBBS, FRCPsych, CCT (UK), PG Cert HCL, CINP
University of Toronto

Background: Parkinson's disease (PD) is a progressive neurodegenerative condition that disrupts motor, cognitive, and psychosocial functioning, often limiting physical activity participation and everyday movement. While physical activity is a cornerstone of PD management, less is known about the behavioural and relational processes that support sustained engagement in activity and caregiver burden within couples. This study aimed to examine strengths-based dyadic coping strategies used by spousal care partners (SCPs) to maintain wellbeing, relationship continuity, and everyday physical activity as PD progresses. Methods: Semi-structured interviews were conducted with 24 SCPs of individuals living with PD (6 men, 18 women; primarily aged ≥ 65 years). Participants were recruited through community organizations and health programs. Interviews explored caregiving experiences, daily routines, activity participation, and relational adaptation. Interviews were transcribed verbatim, analyzed using reflexive thematic analysis, and supported by NVivo 15 to generate clinically relevant insights. Results: Five interrelated dyadic coping processes were identified: (1) adopting a partnership-oriented identity; (2) using communication for emotional co-regulation; (3) preserving dignity and autonomy through role-sharing and task adaptation; (4) assuming increased planning and executive coordination to scaffold daily functioning; and (5) sustaining meaning and resilience through routines, community engagement, and personal purpose. Physical activity emerged as a relational practice rather than an individual behaviour, with shared walks, adapted household tasks, and modified routines supporting continued participation, autonomy, and normalcy. Care partners prioritized engagement and dignity over efficiency, adapting activities to accommodate motor and cognitive changes. Interpretation/Conclusion: These findings highlight the relational foundations of physical activity engagement in PD and underscore the importance of dyadic, strengths-based approaches to activity promotion. Strengths include in-depth exploration of lived experience across disease stages, while limitations include a single-region sample and reliance on care partner perspectives. Future research should examine dyadic and longitudinal activity interventions to inform kinesiology programs that support individuals with PD.

Past to Present: Canadian University of Toronto Students' Experiences with Screen Usage and Its Impact on Social Development

Presenter: Michelle Miao Pang

Co-author(s): Sabrina Alisha Razack
Faculty Advisor: Sabrina Razack, PhD
University of Toronto

The rapid and continuous integration of digital devices in everyday life has led to increased screen time and usage across all age groups. The shift from in-person interactions to socialization in the digital realm has raised concerns about how screen use affects social development. Our study aims to investigate how digital technology is used across key developmental stages-childhood, adolescence, and early adulthood-and to examine the self-perceived impacts of screen use on social development among Canadian University of Toronto students. This study employs a qualitative research design grounded in social constructivism. Participants were third and fourth-year undergraduate students from various programs aged 20-21. Six semi-structured interviews were conducted throughout February 2026 to explore both retrospective and current experiences with screen use. Interviews took approximately 20-40 minutes, either in person or virtually, and were audio-recorded and encrypted using Apple's Voice Memos. Participants chose between AI-assisted transcription (Otter AI) or manual transcription by the researcher. Interview transcripts are being coded through NVivo and analyzed using thematic analysis. The analysis of interviews is ongoing. However, it is expected that participants will describe screen use as evolving significantly from childhood to adolescence, particularly with the acquisition of their first phone and the introduction of social media. By examining these experiences, this study aims to shed light on the lasting social effects of growing up amid rapid technological change, offering an underexplored perspective on how screen usage continues to influence social development and interaction today.

University Students' and Student Athletes' Perceptions of Concussion Recovery: Comparing Views on "Rest" with Current Guidelines Protocols

Presenter: Tina He

Faculty Advisor: Dr. Lynda Mainwaring & Dr. Michael Jorgensen
University of Toronto

Background: Rest is a common prescription in concussion recovery; however, not every person defines "rest" the same way leading to variable responding to medical prescriptions. Additionally, beliefs about prescribed "rest" during concussion recovery as being synonymous with strict bed rest remain prevalent despite being outdated. Current consensus guideline recommendations for recovery from concussion suggest only 24-48 hours of relative rest after injury. Unnecessarily restricting activity early in the concussion recovery process may lead to prolonged symptoms and depressed mood in youth. **Objectives:** This study aims to explore (1) how university students and student athletes define "rest" during concussion recovery and to assess (2) how these understandings align with or diverge from current evidence-based medical guidelines. It is hypothesized that the majority of participants will overestimate the necessary duration of absolute rest. **Methods:** Using a cross-sectional survey design, approximately 60-100 university students and athletes (ages 17-25) will be recruited from kinesiology courses and sports clubs at the University of Toronto. Participants will complete an anonymous online survey featuring qualitative items modified from existing literature to assess their baseline knowledge of concussion injury, personal definitions of rest, and awareness of return-to-learn and return-to-sport protocols. Descriptive statistics will be explored to identify common misconceptions, while Chi-square and t-tests will compare responses between subgroups, such as those with and without a prior concussion history. **Result:** An overview of the main findings will be presented. **Significance:** These findings will help identify current knowledge and care adherence gaps related to concussion management in university students and student athletes.

Session: IV-C
Time: 3:40 p.m.
Location: BN307

The Evolving Narrative of Media Coverage on Women's Concussion and Sports Stories

Presenter: Kelly Dao

Faculty Advisor: Kaleigh Pennock, PhD Braeden McKenzie ,PhD
University of Waterloo

Media coverage of women's sports has increased and evolved over the last 15 years. Alongside this rise, attention to women's sport-related concussions (SRCs) has also grown, with coverage emphasizing the challenges of this injury. However, how SRCs within women's sport are covered has evolved significantly, particularly through the framing of personal athlete narratives. The proposed presentation explores the shift of athlete narratives concerning SRCs by examining two distinct periods of media coverage in women's sport. Data for the study was collected from the same six major national Canadian media sources and analyzed at two different time periods: Period 1 (2010-2018) was collected in 2018, and Period 2 (2019-2025) was collected in 2025. Both sets of data were analyzed using discourse analysis with a particular emphasis on dominant narrative types, emotional tone, and language construction, to address how women athletes are perceived and how their gender is taken up relative to injury, performance, and identity. Findings indicate a shift in media representation of women athlete's personal injury narratives, moving from a fragility narrative to an emphasis on heroic return-to-sport stories. With the surge of media sources emphasizing sport "comeback" stories, concerns about the pressure, expectations, and representation being held upon women athletes are central to the analysis. The rise of SRC awareness and women's media coverage from Period 1 to Period 2 reflect a broader shift regarding athletes' health and visibility, constructing how media narratives challenge or reinforce gendered expectations. Comparing media coverage across the two distinct time periods provides important insight into contextual shifts in sport, concussion, and gender in Canada. Importantly, this language and tone can impact how women athletes are portrayed in the media and provides a critical look at how media representation may influence attitudes and behaviours concerning gender and concussion.

Exploring associations between reproductive timing and later-life cardiovascular and cognitive health outcomes in postmenopausal women

Presenter: Jaclyn Baggley

Co-author(s): Tania Pereira, Jaspreet Bhangu, Michael Borrie,
Faculty Advisor: Laura Fitzgibbon-Collins, PhD
Western University

Background: Impaired blood pressure (BP) regulation and reduced cerebral perfusion contribute to cognitive decline and increased dementia risk. Since estrogen exerts cardioprotective and vasodilatory effects and rises substantially during pregnancy, reproductive timing and pregnancy history may influence later-life cardiovascular and cognitive outcomes. **Purpose:** To determine whether reproductive timing across the lifespan is associated with BP regulation, cognitive performance, and menopause age in later life; hypothesizing that pregnancies are linked to better cardiovascular and cognitive outcomes, and that pregnancy number and timing are related to age at menopause. **Methods:** Participant data from the Canadian Consortium on Neurodegeneration in Aging (CCNA) were analyzed, including BPs at supine rest and 3-minutes of standing, reproductive history (self-reported or collected from a study partner), and cognitive function (Montreal Cognitive Assessment, MoCA). Partial correlations, controlling for age and Physical Activity Scale for the Elderly, examined associations between the change in systolic, diastolic, and mean BPs from supine-to-standing, with MoCA scores, age at menarche, menopause, first and last pregnancies. Statistical significance was set to $p \leq 0.05$. **Results:** Analysis included 395 females (72 ± 7 years, MoCA 24 ± 5). Age of menopause (49 ± 8 years) was correlated with age at first (26 ± 5 years, $p < 0.001$, $r = 0.196$) and last pregnancy (30 ± 5 years, $p = 0.003$, $r = 0.163$). The number of pregnancies was associated with age at menopause ($r = -0.111$, $p = 0.025$). Change in systolic-BP during the supine-to-stand was not significantly correlated, but had a trend, with age at first pregnancy ($p = 0.054$, $r = -0.099$). MoCA scores were not related to age of pregnancy. **Significance:** Later age at first and last pregnancy, as well as number of pregnancies, were associated with age at menopause, suggesting links between reproductive history and ovarian aging. However, reproductive timing was not associated with BP regulation or cognitive performance, indicating limited evidence that pregnancy timing independently influences later-life cardiovascular or cognitive outcomes in this cohort.

Menopausal Status and Vascular Health Markers in Women with Increased Cardiovascular Risk

Presenter: Ruonan Cao

Co-author(s): Alexander Boytar
Faculty Advisor: Amy Kirkham, PhD
University of Toronto

Background: Menopause is often simplified as just the end of menstruation, but it initiates a complex systemic shift that may silently influence cardiovascular health. Peripheral vascular measures of flow-mediated dilation (FMD), pulse wave velocity (PWV), and carotid intima-media thickness (cIMT) are established early indicators of cardiovascular disease. However, a systematic comparison of these markers across menopausal status remains limited, particularly in women with existing cardiovascular risk. This study aimed to compare FMD, PWV, and cIMT between premenopausal and postmenopausal women with increased cardiovascular risk. Method: This cross-sectional study included 80 sedentary, biologically female adults (age ≥ 30 years) categorized by self-reported menopausal status. All participants presented with ≥ 1 cardiometabolic risk factor, such as BMI ≥ 25 kg/m², self-reported hypertension, hyperglycemia, hyperlipidemia, or elevated waist circumference. The primary outcome, brachial FMD, was assessed via ultrasonography as the absolute and relative (%) changes in brachial artery diameter following an ischemic challenge. Secondary outcomes comprised segment-specific PWV (carotid-radial, carotid-femoral, and femoral-foot) by micromanometry, and cIMT via ultrasonography. Group differences were examined using independent t-tests and ANCOVA; marker associations were assessed via Pearson/Spearman correlations ($P < 0.05$). Data were reported as mean \pm standard deviation (SD). Results: Data analysis is ongoing. We hypothesize that postmenopausal women will exhibit significantly lower FMD% alongside elevated PWV and cIMT compared to premenopausal controls. We further anticipate that impaired endothelial function, reflected by reduced FMD, would be closely associated with increased arterial stiffness indices (PWV and cIMT). Conclusion: This study may demonstrate that the menopausal transition is associated with accelerated vascular aging, independent of chronological age. The integration of functional and structural vascular markers may identify a critical window for early cardiovascular risk identification in midlife women. This knowledge could inform the development of targeted preventive interventions to prevent subclinical impairment from progressing to overt disease.

Using Blood Flow Restriction in a Yoga Program to Improve Flexibility for Older Adults

Presenter: Mefrige Mikaela

Co-author(s): Emma Sarrazin-Boespflug
Faculty Advisor: Andreas Bergdahl, PhD
Concordia University

Background: Blood flow restriction (BFR) induces high intensity benefits at low loads, but its effects on flexibility remain unclear. Flexibility is a key determinant of functional mobility, balance and is associated with fall risk prevention in older adults (OA). The objective of this study was to determine whether adding BFR to a remote Yoga program improves flexibility more than Yoga alone. It is hypothesized that adding BFR to Yoga would produce greater flexibility improvements in OA. Methods: Twenty-five OA (20 female, 5 male; 69 ± 5.7 y) were randomized to Yoga with BFR (BFR; $n=13$) or Yoga-only control (CON; $n=12$). Participants completed an 8-week online Yoga study (2x/week, 60 min/session). Flexibility assessed during pre-, mid-, and post-intervention included the back scratch (BS) test for dominant (DOM) and non-dominant (N-DOM) shoulder flexibility and the trunk rotation (TR) test for dominant (DOM) and non-dominant (N-DOM) trunk flexibility. Results: Significant improvements were seen in the percent change from pre to post intervention for both the N-DOM BS ($p=0.01$) and the DOM TR ($p=0.05$) tests in the BFR group when compared to the CON group. The DOM BS test revealed that the BFR group showed trends of greater mean improvement (pre: -2.8 ± 11.3 ; mid: -1.3 ± 10.8 ; post: -1.3 ± 11.9) compared with the CON group (pre: -10.5 ± 14.9 ; mid: -10.5 ± 14.7 ; post: -10.8 ± 16.1). Changes in N-DOM TR did not differ significantly between the BFR and CON groups ($p=0.3$). Significance: These results propose that adding BFR to a Yoga program may augment flexibility adaptations in OA. If confirmed, this approach could represent a novel, practical, and accessible strategy to support functional mobility in aging populations.

Dual-Task Mobility in Older Women Following a 10-week Line Dancing Program with Blood Flow Restriction

Presenter: Rudy Grief

Co-author(s): Emma Chen, MSc, Andreas Bergdahl, PhD.
Faculty Advisor: Andreas Bergdahl, PhD
Concordia University

Introduction: Fall-related hospitalization rates have risen by 36% among older Canadians [1]. Women over 60 are particularly vulnerable to falls due to weakened gait patterns and reduced functional performance [2,3]. Line dancing is a popular form of physical activity among women as it serves to improve cognitive function and gait speed [4]. Blood Flow Restriction (BFR) training involves restricting blood flow to specific body areas, enabling low-intensity exercise to produce similar effects to high-intensity workouts. This study aimed to assess whether adding BFR to a low-intensity beginner line dancing class could improve the dual-task mobility of women aged 60+. Methods: Participants (72 ± 7.2 years) were randomized into a control group ($n=8$) and BFR group ($n=7$). They all took part in a weekly low-intensity line dancing class (90 minutes/class), over a 10-week period at a local community centre in Montréal. The BFR group wore 5cm elastic cuffs on their upper thighs at a 7/10 perceived tightness throughout the sessions. Functional mobility was assessed pre-, mid- and post- in three variations of the Timed Up and Go (TUG) test (standard, counting by 3s (TUGc), and holding a glass of water (TUGm). Friedman's test with Wilcoxon Signed-Rank post-hoc was used to assess significance ($\alpha \leq .05$). Results: There were no significant differences on the Friedman's test in either the control ($p_{TUGn}=.223$; $p_{TUGc}=.223$; $p_{TUGm}=.687$) or BFR group ($p_{TUGn}=.368$; $p_{TUGc}=.309$; $p_{TUGm}=.066$). Discussion: Ceiling effects at baseline may have constrained TUG performance and explained the lack of significance across groups. A second wave of recruitment is currently underway to expand the study. Incorporating BFR during line dancing is a fun and effective way to increase exercise intensity, promoting greater adaptations that help older women maintain independence and reduce fall risk.

Session: IV-E
Time: 2:40 p.m.
Location: WSB67

Collaborative Reflection and Co-learning: How Student Staff, Placement Student, and Volunteers Navigate Inclusive Practice Together

Presenter: Sophia Nakamura

Co-author(s): Dr. Kyoung June Yi, Dr. Uk Kim
Faculty Advisor: Dr. Kyoung June Yi Uk Kim Dr.
McMaster University

Explores how collaborative reflection and co-learning shape inclusive and person-centred practice among student staff, placement students, and volunteers at the Physical Activity Centre of Excellence (PACE), a community exercise program supporting people living with disabilities. Despite extensive evidence supporting small-group learning in graduate education, limited research has examined how these approaches translate into real-world community settings. This project aims to address that gap by examining how reflective group discussions can help pre-service practitioners identify barriers to inclusion, share strategies, and implement meaningful changes in their daily practice. Using a qualitative design, groups of five to ten PACE student staff and volunteers will participate in five 90-minute reflective discussions, as well as individual pre- and post-reflection interviews focused on learning experiences and perceived practice changes. Data from group discussions and interviews will be transcribed and analyzed thematically using NVivo to identify key patterns and themes. Through participation in collaborative reflection, participants are expected to develop increased awareness of inclusion barriers and implement meaningful practice changes at PACE. Findings will inform how community-based health and recreation programs can integrate reflective group learning into staff and volunteer training to foster inclusive, person-centred practice.

Photovoice as Resistance and Growth: Supporting Autonomy, Self-Determination, and Self-Advocacy Towards Active Living Among Older Adults with Disabilities

Presenter: Kennedy Penney

Co-author(s): Dr. Kyoung June Yi, Dr. Uk Kim

Faculty Advisor: Dr. Kyoung June Yi
McMaster University

This study explores how older adults with disabilities experience active living in their everyday lives and how personal and environmental factors come together to shape participation in physical activity. Existing research has mainly focused on professional and system-level perspectives, with limited attention to how older adults themselves experience and navigate active living. The objective of this study is to examine how intersectional factors affect active living among older adults with disabilities, and how greater autonomy, self-determination, and self-advocacy can facilitate more sustainable engagement in physical activity for older adults with disabilities. This study uses a photovoice methodology where four adults aged 65 years and older with disabilities are invited to take photographs of places, situations, and experiences in their daily lives that support or limit their ability to be active. Participant-generated photographs are discussed across a series of individual conversational interviews. Data is analyzed using qualitative descriptive analysis within NVivo to identify patterns related to personal factors such as confidence, motivation, and opportunities for autonomy, as well as environmental and social factors such as accessibility, transportation, and community supports. The expected outcomes of this study are an improved understanding of how older adults with disabilities experience active living and how autonomy, self-determination, and self-advocacy may support continued engagement in physical activity despite everyday barriers. The findings are expected to provide practical insight to support the development of more equitable, inclusive, and accessible community and health programs that better reflect the priorities, needs, and everyday realities of older adults with disabilities.

Constructing Physical Disability in Canadian K-8 Physical Education: A Critical Disability Theory Analysis of Curriculum Policy

Presenter: Monika K. Girn

Faculty Advisor: Kelly Arbour-Nicitopoulos, PhD
University of Toronto

Background. Physical Education (PE) is a compulsory component of K-8 schooling across Canada for which children's bodies and movement capacities are central to instruction, assessment and evaluation. Organized around performance, coordination and skill execution expectations, bodily movement is a primary marker of competence and belonging in PE. Thus, PE is a high-stakes context of physical activity for children with physical disabilities where movement-based assessment practice organizes, measures and ranks physical differences against dominant ability and competence norms. **Objective.** This study examines how physical disability, dominant ability norms, and adapted physical activity pedagogy are represented and conceptualised within the K-8 PE curricula in Canada. **Methods.** An environmental scan identified publicly available K-8 PE curriculum documents across Canada's provincial and territorial jurisdictions. Thirty documents meeting predefined eligibility criteria were analysed using Critical Disability Theory-informed content analysis examining constructions of ability, deficit language, accommodation discourse, and the normalisation of movement competence. Curricular text was coded inductively and synthesised through thematic analysis to examine how disability and competence are positioned within K-8 PE. Reflexive memoing, informed by the researcher's positionality as a disabled scholar, supported critical interrogation of normative assumptions embedded in the texts. **Preliminary Results.** Physical disability is largely invisible or siloed across the K-8 PE curricula, frequently subsumed under broad "special needs" categories rather than addressed as a distinct pedagogical consideration. When referenced, adaptation guidance is vague and rarely specific to physical disability, framing inclusion as reactive, individualised accommodations rather than challenging dominant movement norms embedded within curricular expectations. Further findings from the thematic analysis, along with supporting evidence from curricula text, will be discussed during the presentation. **Conclusion:** Findings indicate a need for clearer policy direction that positions physical disability as a foundational dimension of K-8 PE curriculum design rather than a supplementary accommodation.

Session: IV-E
Time: 3:25 p.m.
Location: WSB67

An Analysis of Sport for Development and Peace Programs in East Asia: Current Landscape and Barriers to Growth

Presenter: Alice Cheng

Faculty Advisor: Simon Darnell, PhD
University of Toronto

Sport for Development and Peace (SDP) programs use sport, physical activity, and play to achieve specific development and peace objectives, including the Sustainable Development Goals (SDGs). These initiatives have been expanded through the involvement of governments, non-profit organizations and various institutions, but they remain predominantly active in the Global South and primarily target youth development. Despite the growing literature on SDP with limited scholarly attention to East Asian contexts. As a result, there is a notable gap in understanding how cultural, policy, and structural factors in East Asia shape the development, implementation, and sustainability of SDP initiatives in the region. This study aims to investigate the factors that enable or prevent SDP activity in East Asia. The guiding research questions are as follows: a) What factors enable or prevent the growth of SDP programs in East Asia? b) What influences does culture, policy, and structural factors play when developing and sustaining SDP programs? c) What strategies do SDP programs utilize for long-term sustainability in East Asian settings? Participants will be adults (ages 18+) who are currently employed by or affiliated with an SDP organization in East Asia, with direct knowledge of the initiative and are advanced in English. Eligible participants that are interested in participating in the study will complete one semi-structured interview to share their experiences and perspectives regarding their organizations' structure and development. Addressing the limited presence of SDP initiatives in East Asia can provide valuable insight to inform contextually appropriate program development, sustainability, and future research in the region.

Session: IV-E
Time: 3:40 p.m.
Location: WSB67

Revising a Mental Health Educational Resource for Para Sport Coaches: A Qualitative Focus Group Study

Presenter: Nicole Tzanetakis

Co-author(s): Kelly-Arbour Nicitopoulos PhD, Roxy Helliker O'Rourke PhD
Faculty Advisor: Kelly Arbour-Nicitopoulos, PhD
University of Toronto

Background: Mental health is a critical component of athlete wellbeing, particularly among athletes with disabilities competing in high-performance para sport. Despite growing recognition of mental health needs in para athlete contexts, limited coach-specific educational resources exist. An educational tool for coaches working with para athletes has been developed but requires refinement before pilot-testing. **Objectives:** This study aims to revise the existing resource by incorporating coach feedback to enhance clarity, usability, and applied relevance. **Methods:** A qualitative descriptive study design was used to assess coaches' feedback for the purpose of enhancing the educational resource. A focus group was conducted with two para sport coaches and one para athlete to gather feedback on the draft educational resource. Audio recordings were transcribed verbatim and analyzed using thematic analysis. Coding was completed in Excel through a process: (1) transcription review, (2) generation of specific codes, (3) grouping codes into feedback and strengths categories, and (4) identification of patterns across participants. Analysis focused on perceived clarity, accessibility, and practical application within coaching contexts. **Anticipated Results:** Preliminary patterns suggest three key areas for revision: (1) need for simplification and reduced text density to improve readability and audience appeal; (2) clearer, more concise tips with reduced repetition and consistent takeaways; and (3) stronger emphasis on explicit application, including actionable next steps (e.g., "tip-apply" structure) and self-evaluation prompts for coaches. Participants highlighted that overly dense or intimidating materials may reduce implementation, whereas clear practice-based applications increase the likelihood of use. **Interpretation/Significance:** Findings will inform targeted revisions to enhance usability and practical integration of the mental health educational resource within para sport settings. Refining the tool based on coach and athlete feedback will strengthen its relevance and prepare it for future pilot-testing within high-performance para sport environments.

Session: IV-F
Time: 2:40 p.m.
Location: SS1071

The Effects of Higher versus Lower Load Resistance Training on Body Composition in Young, Healthy Females

Presenter: Yunjia Yang

Co-author(s): Derrick W. Van Every, Grace A.C Lamont, Anmol Bhinder¹, Colter Naphin¹, Stuart M. Phillips¹

Faculty Advisor: Dr. Stuart Phillips
McMaster University

Background: Resistance exercise training (RET) is widely recognized for improving muscular strength, hypertrophy, and overall health outcomes. While traditional RET guidelines emphasize higher training loads set at ~70-85% of 1-repetition maximum (1RM) to maximize hypertrophy, recent studies have shown that lower training loads performed to volitional failure produce comparable muscular adaptations; however, much of this evidence comes from males. Women remain underrepresented in exercise physiology research, limiting the generalizability of findings on RET adaptations. **Purpose:** We aimed to compare the effects of higher load (HL) vs. lower load (LL) RET on body composition using dual-energy X-ray absorptiometry (DXA) and bioelectrical impedance analysis (BIA). **Methods:** Thirty-six healthy young females (aged 24 ± 6 years; 14 untrained; 22 trained) completed a supervised full-body RET (2x/week) for 10 weeks. Participants were randomized to either the HL (8-12 repetitions ~70-85% 1RM) or LL (20-25 repetitions ~30-50% 1RM) training groups, with all sets performed to volitional failure. Body composition was assessed using DXA and BIA pre and post intervention.³ Linear-mixed effects models were employed, and equivalence was evaluated using two one-sided tests with Hedges' g and predefined bounds (± 0.20) considered as trivial. **Results:** Data collection is ongoing; however, data will be available for presentation. **Conclusion:** Findings may inform more inclusive and flexible training recommendations, supporting evidence-based exercise prescription for women across a range of loading conditions.

Lighter Weights, Big Gains: Investigating the Effects of Higher Versus Lower Load Resistance Training on Hypertrophy and Strength in Young Females

Presenter: Colter Naphin

Co-author(s): Derrick W. Van Every, Grace A.C. Lamont, Anmol Bhinder, Yunjia Yang, Reem Majjani, Stuart M. Phillips
Faculty Advisor: Stuart Phillips, PhD
McMaster University

INTRODUCTION: Resistance exercise training (RET) is a potent intervention to improve skeletal muscle health. Despite this, fewer than 1 in 5 collegiate-aged females regularly participate in RET. One major barrier to entry identified is the high perceived effort required for traditional heavy RET. While research in males suggests that hypertrophy is equally attainable irrespective of load, research in females is scarce. **PURPOSE:** The purpose of this study was to determine the effects of HIGHER versus LOWER load RET on muscle hypertrophy and strength in young, healthy females. **METHODS:** Thirty-six participants (aged 18-35) were randomized to 10 weeks of twice-weekly, full-body, supervised RET under either LOWER-load (~30-50% 1RM, 20-25 reps) or HIGHER-load (~75-85% 1RM, 8-12 reps) conditions, with all sets performed to volitional exhaustion. **OUTCOMES:** The primary outcome was the change in vastus lateralis cross-sectional area (VL-CSA) assessed via ultrasonography. Secondary outcomes included dynamic strength (leg press and chest press 1RM) and isometric strength (knee extension MVC). **STATISTICAL ANALYSIS:** Linear mixed-effects models (LMMs) and equivalence testing (TOST) were employed to evaluate between-group differences. ANCOVA was performed to assess LMM sensitivity. **HYPOTHESIS:** We hypothesized that hypertrophic and strength responses would be statistically equivalent between conditions, regardless of load. **RESULTS:** Both loading conditions produced significant hypertrophy (HIGHER: +3.80 cm²; LOWER: +3.04 cm²) with no significant between-group difference. Leg press 1RM improved substantially in both groups (HIGHER: +119.5 kg; LOWER: +107.2 kg). MVC favoured HIGHER load (+25.47 vs. +12.78 Nm), but response variability precluded significance. HIGHER load produced significantly greater chest press 1RM increases (+9.8 vs. +5.7 kg) as well. These findings show that muscle hypertrophy can be achieved across a wide range of loading in females, while reinforcing load specificity for certain strength outcomes.

Assessing Knee Extensor Strength and Power During Short-Term Bedrest in Young Adults

Presenter: Anna Robertson

Co-author(s): Thomas Tripp, Sebastian Camargos
Faculty Advisor: Chris McGlory, PhD
Queen's University

Background: Short-term physical inactivity impairs skeletal muscle function. While strength loss with disuse is well established, a more comprehensive understanding of skeletal muscle function responses to inactivity, including power and fatigability, may augment countermeasure development. This study assessed changes in knee extensor function (strength, power, and fatigability) following 5 d of bed rest in young, healthy adults. Methods: Healthy, young males (n=2) and females (n=4) participated in an ongoing bed rest study, including a 5 d lead-in and a 5 d horizontal bed rest phase. Physical activity was monitored using hip-based accelerometry. Knee extensor strength, power, and fatigability were assessed pre- and post-bed rest using a HUMAC Norm dynamometer. Three maximal voluntary isometric contractions at 60° knee flexion assessed maximal strength. Knee extensor power was measured using maximal isotonic knee extensions (~30% peak torque). Fatiguability was evaluated using repeated maximal isotonic contractions until power dropped by 35%. Preliminary Results: Bed rest caused reductions in daily energy expenditure (-75.9%; pre: 301.2 ± 186.5 vs. post 55.7 ± 28.3; p = 0.025) and moderate physical activity (-89.5%; pre: 3.25 ± 2.70 vs. post 0.27 ± 0.30; p = 0.045). Maximal isometric torque decreased by ~28% (pre: 204 ± 33.7 vs. post 146 ± 35.6 Nm; p = 0.10). Similarly, isotonic peak power (single kick) demonstrated a non-significant reduction of ~25% (pre: 462 ± 138.8 vs. post 346 ± 196.6 W; p = 0.094). Fatiguability measures were not significantly altered. Significance: Five days of bed rest induced declines in maximal muscle strength, with smaller changes in power and fatiguability. These results suggest that early strength loss during disuse may reflect neuromuscular impairments preceding substantial muscle atrophy. Quantifying these changes is critical for improving countermeasure and rehabilitation strategies during and following periods of inactivity, such as hospitalization.

MRI-derived changes in quadriceps muscle volume following 5 days of bedrest and a comparison of semi-automated and fully automated segmentation methods

Presenter: Leor Cohen

Co-author(s): Thomas Tripp, Sebastian Camargos
Faculty Advisor: Chris McGlory, PhD
Queen's University

Background: Skeletal muscle atrophy is associated with adverse health outcomes, and evidence suggests that even short periods of physical disuse can lead to significant losses in muscle volume. Bedrest is a well-established model used to investigate the detrimental effects of skeletal muscle disuse; however, much of the existing bedrest literature has examined longer durations of disuse and used head-down tilt models designed for spaceflight. These factors limit its application to short-term clinical immobilization. Therefore, the primary objective of this study is to test the hypothesis that five days of horizontal bedrest will result in a significant reduction in quadriceps muscle volume, assessed using magnetic resonance imaging (MRI). The secondary objective is to compare semi-automated (automated segmentation with manual refinement) and fully automated segmentation methods for detecting disuse-induced changes in muscle volume. **Methods:** This study represents an ongoing secondary analysis of a larger bedrest study. To date, six healthy young adults (2 males, 4 females) have completed five days of supervised horizontal bedrest following a baseline control period. Quadriceps muscle volume was assessed pre- and post-bedrest using MRI. Sample analysis is ongoing; semi-automated slice-by-slice segmentation is being performed using ITK-SNAP software across the middle 50% thigh region, with fully automated segmentation outputs generated from the same MRI datasets for comparison. **Results:** Percent change in quadriceps muscle volume will be evaluated using one-way ANOVA to compare individual quadriceps muscles, and agreement between semi-automated and fully automated segmentation methods will be assessed using Bland-Altman analyses for each scan. **Significance:** This study will characterize early quadriceps muscle atrophy during short-term bedrest and may inform intervention timing to preserve muscle during brief inactivity or hospitalization. Comparison of segmentation approaches will assess whether fully automated methods can reliably detect small changes in muscle morphology, potentially supporting more efficient muscle analysis.

Did you hear that? The Implications on Action-Effect Coupling on a Serial Movement Task

Presenter: Martina Kacan

Co-author(s): Markus Lenizky, Tim Welsh
Faculty Advisor: Tim Welsh, PhD
University of Toronto

Voluntary actions are goal-directed and shaped by their anticipated sensory outcomes. These anticipated outcomes are not merely consequences of movement but are integrated into motor planning through bidirectional action-effect associations, perceiving an effect can prime the associated movement. Action-effect coupling has been well established for discrete actions, its role in longer motor sequences remains unclear. The present study examined the implications of action-effect coupling on a motor sequence task. Participants ($n=7$) learned two distinct three-key sequences, one executed with each hand. Each sequence was initiated by a coloured square (red = right; blue = left), and each keypress produced a distinct tone. After learning, participants completed a pre-test, a red or blue square was presented alongside a tone that was either congruent (belonging to associated sequence) or incongruent. Participants executed the sequence corresponding to the square. During acquisition, participants performed sequences in response to a coloured square and heard a distinct tone following each key press, reinforcing action-effect coupling between the movement (keypress) and its sensory outcome (tone). A post-test identical to the pre-test followed. Reaction time and accuracy were recorded. It was predicted that the presentation of a tone congruent with the square, would result in shorter reaction times in the post-test, reflecting formation of action-effect coupling. Preliminary analyses revealed no statistically significant effects for both reaction time and accuracy. However, accuracy improved across conditions. In congruent trials, mean accuracy increased from 28% (pre-test) to 54% (post-test), while incongruent trials increased from 25% to 58%. Reaction times did not improve from pre- to post-test. In congruent trials, mean reaction time increased from 0.52 s to 0.67 s, while incongruent trials increased slightly, 0.58 s to 0.60 s. A larger sample size will explore whether these trends persist and if action-effect coupling can apply to complex movement sequences.

The Effect of Musical Pleasure and Groove on Motor Skill Learning

Presenter: Angel Leong

Co-author(s): Anthonia Aina, Joyce Chen
Faculty Advisor: Joyce Chen, BSc PT, PhD
University of Toronto

Groove, defined as the urge to move along with music, may contribute to the pleasurable experience reported when listening to groovy music. Prior studies showed that listening to pleasurable music improves motor skill retention. However, it remains unclear whether this improvement arises from musical pleasure, groove perception, or both. This study aimed to explore how musical pleasure and groove influence motor learning. We hypothesized that the combination of musical pleasure and groove would yield greater improvement in motor learning outcomes compared to either factor alone or when neither is present. We plan to recruit 53 participants. At present, nine participants were assigned to one of the four music groups: pleasurable-groovy, pleasurable-non-groovy, groovy-non-pleasurable, and non-pleasurable-non-groovy. Group assignment was determined by participants' ratings of perceived pleasure and groove for a list of music drawn from previous studies. An individualized playlist was curated corresponding to their ratings and group assignment. On Day 1, participants performed six blocks of the Sequential Visual Isometric Pinch Task (SVIPT) (skill acquisition) while listening to their individualized playlist. One block of the SVIPT was performed in silence at immediate retention (10 minutes after block six) and 24-hour retention (Day 2). The dependent variable is Skill, a composite measure of movement time and error rate. We will conduct a two-way repeated-measures ANOVA to analyze Skill across acquisition blocks (within-subject factor) and music groups (between-subjects factor). We will conduct two one-way ANOVAs to evaluate Skill at 10-minute retention and 24-hour retention. We predict the pleasurable-groovy group to show the most gain in Skill, followed by the pleasurable-non-groovy or the groovy-non-pleasurable group, with the non-pleasurable-non-groovy group performing worst. Disentangling the effect of musical pleasure and groove reveals how music listening enhances motor learning. Findings could inform the application of pleasurable and groovy music as an auditory intervention for learning and rehabilitation.

Investigating Conscious Access to Motor Characteristics during Reaching Movements

Presenter: Mackenzie Mrazik

Co-author(s): Jessica Leverett
Faculty Advisor: Craig Chapman, PhD
University of Alberta

BACKGROUND: Humans constantly maneuver through environments that require precise control of limb position in space. However, in spite of how successfully we execute reaching movements, conscious awareness of movement characteristics is surprisingly limited. **PURPOSE:** We sought to replicate a previous study (Oancea et al, 2025) which tested how well humans can distinguish a projection of their own reaching movement from an adjusted pathway. This study found accuracy increased with perturbation size and decreased when trajectories were adjusted at the start, as compared to the middle and end of the movement. Here, we aim to refine the methodology of the preceding study to address an issue whereby mid-path perturbations appeared as more exaggerated curves which could have inflated trajectory identification accuracy for middle perturbations. **METHODS:** Participants were seated in front of a large touch screen and asked to perform reaching movements from a designated start to end point. After each movement, participants selected which trajectory they believed was their own from two trajectories shown on the screen: their actual path taken and a perturbed trajectory that was shifted at either the start, middle, or end. To directly address the previous studies limitations, trajectories were either shown as full pathways or only the third that was perturbed. By including partial trajectory trials, visual feedback for middle perturbations was identical to the start and end perturbations. **RESULTS:** Trajectory identification accuracy increased with perturbation size, peaked in the middle third, and was lowest for start perturbations in both the full and partial condition. **CONCLUSION:** We were able to address the problematic application of middle perturbations in the initial study while also replicating the same results with the inclusion of partial trajectories providing further evidence that conscious access to movement characteristics is limited and may also vary based on the movement characteristic and/or phase.

A Tale of Two Realities: Distinct Sensorimotor Adaptation Process for Immersive Virtual Reality and Video-Passthrough Mixed Reality

Presenter: Grant Monahan

Co-author(s): Xiaoye Wang, PhD
Faculty Advisor: Timothy Welsh, PhD
University of Toronto

Virtual reality (VR) is an immersive technology that transforms various industries with its ability to simulate interactive environments that may otherwise be impractical or impossible to achieve in the physical environment. However, VR's effectiveness is often shadowed by the sensorimotor perturbations it imposes. One central example is the vergence-accommodation conflict (VAC) in head mounted displays (HMDs), which decouples vergence and accommodation demands and can produce depth compression. A prior mixed reality (MR) study on targeted movement found reduced accuracy in MR relative to unmediated reality (UR), gradual improvement with prolonged exposure, and a subsequent de-adaptation upon returning to UR characterized by an aftereffect. However, further analysis did not reveal the diagnostic depth compression of VAC in MR, but did see emergence during the initial UR de-adaptation phase. This dissociation suggests that the HMD-induced perturbation may have been partially masked or compensated in MR, while still producing latent oculomotor recalibration revealed upon returning to UR. Building on these unexpected results, this study aims to use the same HMD and a similar design to examine whether depth compression emerges during targeted manual movement in VR. Twenty right-handed participants completed pointing tasks in UR as baseline performance, in VR for the impact of VAC, and again in UR for any adaptation aftereffects. Kinematic data were recorded via an opto-electric motion tracking system and used to derive constant error and movement time. Results showed depth compression in VR and the subsequent UR washout period, consistent with VAC-related distortion and short-term adaptation. Together with the previous MR result, these findings indicate that VAC-related depth distortions are not expressed uniformly across XR modalities even when using the same HMD. Future investigation should identify the contextual and technical factors that modulate VAC's impact to define when VR can support performance and learning.

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Eshaghi, D.	University of Toronto	10:10 a.m.	BN304	Biomechanics and Exercise Interventions
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Evini, N.	University of Toronto	9:55 a.m.	BN302	Cardiovascular and Muscle Physiology
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Kalapun, E.	Western University	1:55 p.m.	BN302	Cardiovascular and Muscle Physiology
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Mathew, L.	McMaster University	11:20 a.m.	WS2007	Skeletal Muscle and Physical Activity
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Naphin, C.	McMaster University	2:55 p.m.	SS1071	Skeletal Muscle and Physical Activity
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