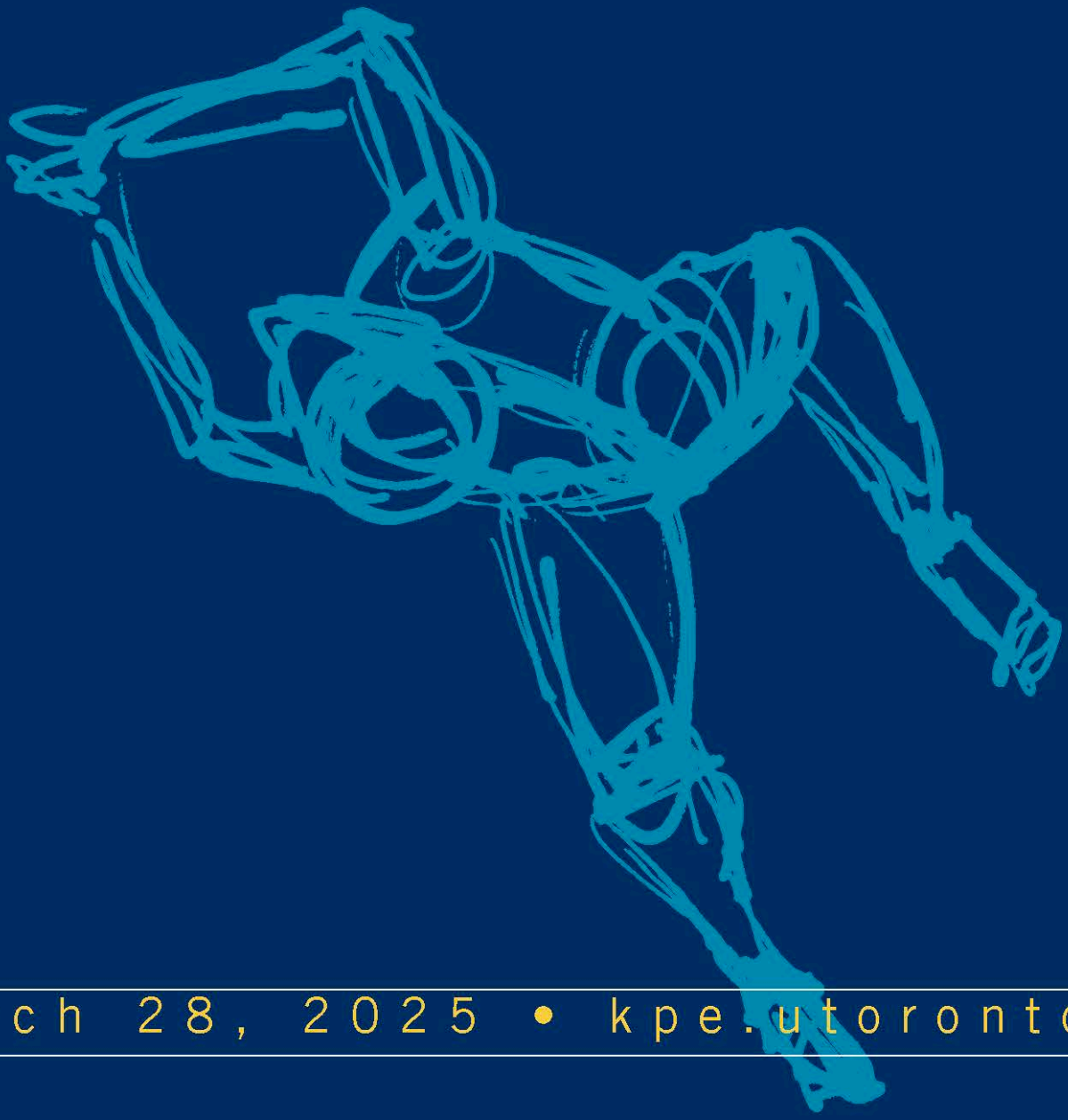
UNIVERSITY OF TORONTO
FACULTY OF KINESIOLOGY & PHYSICAL EDUCATION

THE 25th ANNUAL BERTHA ROSENSTADT

NATIONAL UNDERGRADUATE RESEARCH CONFERENCE

KINESIOLOGY AND PHYSICAL EDUCATION



March 28, 2025 • kpe.utoronto.ca

KPE @ UofT

WELCOME TO THE 25th ANNUAL BERTHA ROSENSTADT NATIONAL UNDERGRADUATE RESEARCH CONFERENCE

Table of Contents

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

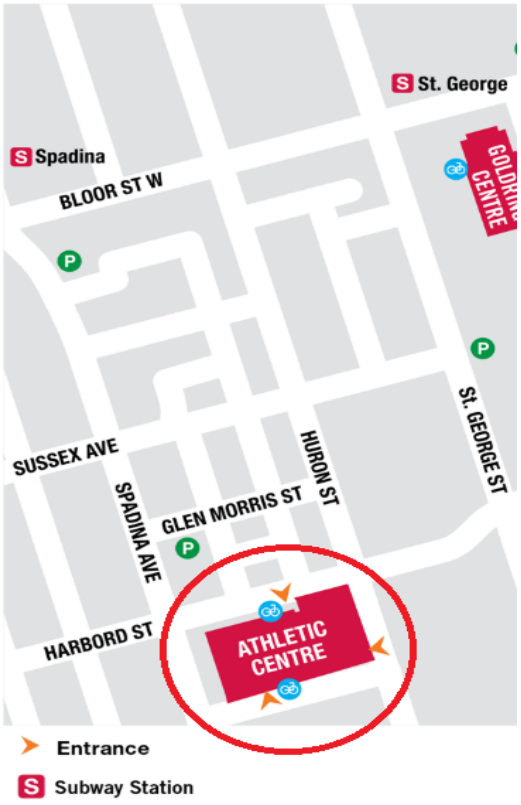
Conference Site

The conference will be held 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**. Signage will be posted throughout the building. ***The closest entrance to the Benson Lobby and Lounge, is 320 Huron Street – we recommend entering through the 320 Huron Street doors***.

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 - 1st floor at 320 Huron St.
Welcome/ Keynote / Closing Remarks	Benson 307 (BN307)
Lunch & Breaks	2nd Floor Benson Lounge
Sessions	Warren Stevens 2nd Floor (WS2007) Warren Stevens Basement (WSB67) Benson 3rd Floor (BN302, BN307, BN304)
Preparation Space	Benson 1st floor 110 (BN110)
Multi-faith Room	Benson 2nd 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 Housekeeping and Instructions, Misung Yim – BN307					
8:45 a.m. – 8:55 a.m.	BREAK- 2nd Floor Benson Lobby & Lounge					
Time	**Breakout sessions**	**Location**				
		A - BN302	**B - BN304**	**C - BN307**	**D – WS2007**	**E – WSB67**
8:55 a.m. – 10:40 a.m.	Breakout Sessions **I**	Exercise Science and Health	Cardiorespiratory and Cardiovascular Physiology	Exercise Science and Health	Skeletal Muscle Health and Physical Activity	Neurophysiology & Sensorimotor Learning
10:40 a.m. – 10:50 a.m.	BREAK - 2nd Floor Benson Lobby & Lounge					
10:50 a.m. – 12:20 p.m.	Breakout Sessions **II**	Exercise Science and Health	Cardiorespiratory and Cardiovascular Physiology	Behavioural Studies and Physical Activity	Skeletal Muscle Health and Physical Activity	Neurophysiology & Sensorimotor Learning
12:20 p.m. – 1:00 p.m.	LUNCH - 2nd Floor Benson Lobby & Lounge					
1:00 p.m. – 2:30 p.m.	Breakout Sessions **III**	Biomechanics and Exercise Intervention	Injury Rehabilitation and Exercise Interventions	Behavioural Studies and Physical Activity	Skeletal Muscle Health and Physical Activity	Neurophysiology & Sensorimotor Learning
2:30 p.m. – 2:40 p.m.	BREAK - 2nd Floor Benson Lobby & Lounge					
2:40 p.m. – 3:55 p.m.	Breakout Sessions **IV**	Biomechanics and Injury	Injury Rehabilitation and Exercise Interventions	Behavioural Studies and Physical Activity	Skeletal Muscle Health and Physical Activity	Physical Cultural Studies
3:55 p.m. – 4:05 p.m.	BREAK - 2nd Floor Benson Lobby & Lounge					
4:05 p.m. – 4:50 p.m.	**Keynote Presentation: "Indigenous Research in Physical Cultural Studies"** – **Dr. Tricia McGuire-Adams** – BN307					
4:50 p.m. – 5:00 p.m.	**Awards Presentation and Closing Remarks** – **Dr. Catherine Amara** - BN307					

List of Topics, Timing and Rooms

Topic	Time	Room	Session
Exercise Science and Health	8:55 a.m. – 10:40 a.m.	BN302	Session I - A
Cardiorespiratory and Cardiovascular Physiology	8:55 a.m. – 10:40 a.m.	BN304	Session I - B
Exercise Science and Health	8:55 a.m. – 10:40 a.m.	BN307	Session I - C
Skeletal Muscle Health and Physical Activity	8:55 a.m. – 10:40 a.m.	WS2007	Session I - D
Neurophysiology & Sensorimotor Learning	8:55 a.m. – 10:40 a.m.	WSB67	Session I - E
Exercise Science and Health	10:50 a.m. – 12:20 p.m.	BN302	Session II - A
Cardiorespiratory and Cardiovascular Physiology	10:50 a.m. – 12:20 p.m.	BN304	Session II - B
Behavioural Studies and Physical Activity	10:50 a.m. – 12:20 p.m.	BN307	Session II - C
Skeletal Muscle Health and Physical Activity	10:50 a.m. – 12:20 p.m.	WS2007	Session II - D
Neurophysiology & Sensorimotor Learning	10:50 a.m. – 12:20 p.m.	WSB67	Session II - E
Biomechanics and Exercise Intervention	1:00 p.m. – 2:30 p.m.	BN302	Session III - A
Injury Rehabilitation and Exercise Interventions	1:00 p.m. – 2:30 p.m.	BN304	Session III - B
Behavioural Studies and Physical Activity	1:00 p.m. – 2:30 p.m.	BN307	Session III - C
Skeletal Muscle Health and Physical Activity	1:00 p.m. – 2:30 p.m.	WS2007	Session III - D
Neurophysiology & Sensorimotor Learning	1:00 p.m. – 2:30 p.m.	WSB67	Session III - E
Biomechanics and Injury	2:40 p.m. – 3:55 p.m.	BN302	Session IV - A
Injury Rehabilitation and Exercise Interventions	2:40 p.m. – 3:55 p.m.	BN304	Session IV - B
Behavioural Studies and Physical Activity	2:40 p.m. – 3:55 p.m.	BN307	Session IV - C
Skeletal Muscle Health and Physical Activity	2:40 p.m. – 3:55 p.m.	WS2007	Session IV - D
Physical Cultural Studies	2:40 p.m. – 3:55 p.m.	WSB67	Session IV - E

2025 KEYNOTE SPEAKER

Indigenous Research in Physical Cultural Studies

Dr. Tricia McGuire-Adams

Time: 4:05 p.m. – 4:50 p.m. | Location: BN307

About the Keynote Speaker

Dr. Tricia McGuire-Adams, who is an Anishinaabe woman from Bingwi Neyaashi Anishinaabek, is an associate professor at the University of Toronto, Faculty of Kinesiology and Physical Education. She received her PhD from the Faculty of Health Sciences (Human Kinetics) at the University of Ottawa, from which she published a book titled Indigenous feminist gikendaasowin (knowledge): Decolonization through Physical Activity. Her research program has focused on three interconnected areas within the broad spectrum of Indigenous-informed sociocultural aspects of physical activity: Indigenous peoples' health knowledge and sovereignties; equity, diversity and inclusivity (EDI) and amplifying marginalized voices, and; Indigenous women's wellbeing.

Abstract

Indigenous-led research is essential to advancing scholarship in sport and physical cultural studies (PCS), yet the presence of Indigenous research methodologies within this field remains underexamined.

In this keynote, I explore how Indigenous knowledge and ways of being and doing have shaped sport and physical culture research across key settler-colonial contexts—New Zealand, Canada, and Australia. I begin by reflecting on my own journey in learning about Indigenous research methodologies and the challenges of locating scholarship that meaningfully engages with them in PCS. I then examine the necessity of positioning settler colonialism as a foundation for including Indigenous research methodologies in PCS.

Key debates include the role of Indigenous storytelling, Indigenous women's leadership in methodological advancements, and the positioning of non-Indigenous co-researchers. I also discuss concerns about the uncritical appropriation of Indigenous methodologies and the metaphorization of decolonization. Finally, I explore future directions for deepening Indigenous resurgence in research practices.

This keynote will provide a critical and generative space to explore how Indigenous research methodologies can reshape sport and physical cultural studies, challenging disciplinary boundaries and forging new possibilities for decolonial scholarship.

ORDER OF THE DAY

Time	Item/Topic and Location
8:00 a.m. - 8:30 a.m.	Registration - 1st floor at 320 Huron St. Refreshments - 2nd 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- 2nd Floor Benson Lobby & Lounge

Session I: 8:55 a.m. - 10:40 a.m.

Session	Room	Topic
Session I - A	BN302	Exercise Science and Health
Session I - B	BN304	Cardiorespiratory and Cardiovascular Physiology
Session I - C	BN307	Exercise Science and Health
Session I - D	WS2007	Skeletal Muscle Health and Physical Activity
Session I - E	WSB67	Neurophysiology & Sensorimotor Learning
10:40 a.m. – 10:50 a.m.	**BREAK**	**2nd Floor Benson Lounge**

Session I - A: Exercise Science and Health (BN302)

8:55 a.m.	*Session I - A in BN302* ***Evaluation of Physical Activity and Sedentary Time in Children and Adolescents with Type 1 Diabetes Using Different Accelerometry Protocols*** **Presenter: Eden Sedarous** Faculty Advisor: Joyce Obeid, PhD McMaster University
9:10 a.m.	*Session I - A in BN302* ***The Effect of Exercise-Induced Lactate on Mood*** **Presenter: Becca Liski** Faculty Advisor: Jeremy Walsh, PhD McMaster University
9:25 a.m.	*Session I - A in BN302* ***The Relationship Between Physical Activity and Growth in Pediatric Populations with Inflammatory Bowel Disease*** **Presenter: Wynter Sutchy** Faculty Advisor: Joyce Obeid, PhD McMaster University

9:40 a.m.	*Session I - A in BN302* ***Effects of Acute High-Intensity Interval Exercise on Interleukin-12 and its Implications on NK Cell Activity in Pre-Pubertal and Post-Pubertal Children*** **Presenter: Jane Yong** Faculty Advisor: Joyce Obeid, PhD McMaster University
9:55 a.m.	*Session I - A in BN302* ***The Effect of Pre-Cooling on Perceived Thermal Sensation and Exertion during Exercise in the Heat in Young Males*** **Presenter: Matthew A. Portugese** Faculty Advisor: Glen Kenny, PhD University of Ottawa
10:10 a.m.	*Session I - A in BN302* ***Impact of newly introduced initial stay times on core temperature and productivity during heavy-intensity work in the heat in young males*** **Presenter: Nathaniel Jay** Faculty Advisor: Glen Kenny, PhD University of Ottawa
10:25 a.m.	*Session I - A in BN302* ***Changes in Serum Brain-derived Neurotrophic Factor during Daylong Work in the Heat in Young and Older Adults*** **Presenter: Farah Mourad** Faculty Advisor: Glen Kenny, PhD University of Ottawa

Session I - B: Cardiorespiratory and Cardiovascular Physiology (BN304)

8:55 a.m.	*Session I - B in BN304* ***The Impact of a 12-Week Exercise Training Program on Arterial Function Following A Maximal Aerobic Exercise Bout*** **Presenter: Lindsay Wilson** Faculty Advisor: Dr. Maureen MacDonald McMaster University
9:10 a.m.	*Session I - B in BN304* ***Investigating the Influence of Hormonal Contraceptive Type on FatMax and Substrate Oxidation in Premenopausal Females*** **Presenter: Malvika Krishnamurthy** Faculty Advisor: Maureen MacDonald, PhD McMaster University

9:25 a.m.	*Session I - B in BN304* ***Effects of Sleep Duration and Timing Variability on Endothelial Function in Healthy Young Adults*** **Presenter: Rand Amer** Faculty Advisor: Maureen MacDonald, PhD McMaster University
9:40 a.m.	*Session I - B in BN304* ***Peak Oxygen Uptake and Peak Power Responses to Single-leg Interval Cycle Training: A Within-participant Randomized Controlled Trial*** **Presenter: Beatrice Yee** Faculty Advisor: Martin Gibala, PhD McMaster University
9:55 a.m.	*Session I - B in BN304* ***Quantifying the rate of in-field oxygen consumption in relation to exercise training thresholds*** **Presenter: Kim Malvin Sales** Faculty Advisor: Dr. Robert Bentley University of Toronto
10:10 a.m.	*Session I - B in BN304* ***The effect of blood flow restriction training on peripheral hemodynamics*** **Presenter: Keegan Zavits** Faculty Advisor: Dr. Robert Bentley University of Toronto

Session I - C: Exercise Science and Health (BN307)

8:55 a.m.	*Session I - C in BN307* ***Interindividual variability in menstrual cycle characteristics: Implications for phase-based training studies*** **Presenter: Roya Rahmani** Faculty Advisor: Dr. Jenna Gillen University of Toronto
9:10 a.m.	*Session I - C in BN307* ***Examining the effect of exercise training on insulin sensitivity in pre-, and post-menopausal females: A systematic review and meta-analysis*** **Presenter: Erica Petrucci** Faculty Advisor: Dr. Jenna Gillen University of Toronto
9:25 a.m.	*Session I - C in BN307* ***Lower blood lactate and higher blood glucose responses following a single session of high-intensity interval exercise in females compared to males*** **Presenter: McKinley Kennedy** Faculty Advisor: Dr. Jenna Gillen University of Toronto

9:40 a.m.	*Session I - C in BN307* ***Greater exogenous glucose oxidation in females compared to males at rest and following acute exercise*** **Presenter: Taylor Wilcox** Faculty Advisor: Dr. Jenna Gillen University of Toronto
9:55 a.m.	*Session I - C in BN307* ***Sex-based Differences in the Effects of Exercise Training on Inflammation*** **Presenter: Celina Rai** Faculty Advisor: Dr. Michaela Devries-Aboud University of Waterloo
10:10 a.m.	*Session I - C in BN307* ***Muscle Macrophage Response to Damaging Exercise*** **Presenter: Andrea Viloria Medina** Faculty Advisor: Gianni Parise, PhD McMaster University
10:25 a.m.	*Session I - C in BN307* ***Central fatigue assessment following high-intensity exercise performed in human dorsiflexor muscles*** **Presenter: Alireza Vaziri** Faculty Advisor: Dr. Arthur J. Cheng York University

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

8:55 a.m.	*Session I - D in WS2007* ***Evaluating the Effects of Protein Supplementation Coupled with Progressive Lighter Weight Resistance Training on Lean Muscle Mass and Strength in Older Overweight Men and Women*** **Presenter: Tracy Su** Faculty Advisor: Dr. Stuart Phillips McMaster University
9:10 a.m.	*Session I - D in WS2007* ***The effect of menstrual cycle phase-based training on muscular strength adaptations*** **Presenter: Lauren Roxburgh** Faculty Advisor: Dr. Stuart Phillips McMaster University
9:25 a.m.	*Session I - D in WS2007* ***The Influence of Menstrual Cycle Phase and Chronic Resistance Exercise Training on Mood, Acute Affect, and Exercise Enjoyment*** **Presenter: Anmol Bhinder** Faculty Advisor: Dr. Stuart Phillips McMaster University

9:40 a.m.	*Session I - D in WS2007* ***The Effects of Menstrual Cycle Phase-Based Training on Skeletal Muscle Hypertrophy*** **Presenter: Grace Lamont** Faculty Advisor: Dr. Stuart Phillips McMaster University
9:55 a.m.	*Session I - D in WS2007* ***The Influence of Menstrual Cycle Phase Based Training on Muscle Fiber Area and Type*** **Presenter: Anojan Suthaharan** Faculty Advisor: Dr. Stuart Phillips McMaster University
10:10 a.m.	*Session I - D in WS2007* ***Evaluating the Effects of Greek Yogurt and Exercise on Body Composition and Markers of Bone Turnover in Older Adults.*** **Presenter: Jennifer McGraw** Faculty Advisor: Panagiota Klentrou, PhD, FCSEP & Madison Bell, MSc Brock University

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

8:55 a.m.	*Session I - E in WSB67* ***"Don't Hold me Back!" Visual Delays in Virtual Reality Alter Movement Accuracy and Kinematics in Visually Guided Manual Pointing Tasks*** **Presenter: Gavin Gibbs** Faculty Advisor: Tim Welsh, PhD University of Toronto
9:10 a.m.	*Session I - E in WSB67* ***"Hey, watching this!" The effect of constant vs variable practice on novice dyads learning a putting task*** **Presenter: Martina Kacan** Faculty Advisor: Tim Welsh, PhD University of Toronto
9:25 a.m.	*Session I - E in WSB67* ***"Now you see me, now you don't": The Impact of Removing Visual Hand Feedback on the Accuracy of Aiming Movements in VR*** **Presenter: Matthew Prenevost** Faculty Advisor: Tim Welsh, PhD University of Toronto
9:40 a.m.	*Session I - E in WSB67* ***Mind and Motion: Examining Motor Imagery and Dance for Parkinson's Disease Rehabilitation Through Kinematic Analysis*** **Presenter: Melina Lavasidis** Faculty Advisor: Tim Welsh, PhD University of Toronto

9:55 a.m.	*Session I - E in WSB67* ***Repetitive Transcranial Magnetic Stimulation Paired with Augmented Reality to Alter Concussion Symptoms*** **Presenter: Ariana Blake-Parsons** Faculty Advisor: Aimee Nelson, PhD McMaster University
10:10 a.m.	*Session I - E in WSB67* ***Pain modulation in patients with fibromyalgia post 2-week cTMS intervention*** **Presenter: Ilesha Prabhudesai** Faculty Advisor: Aimee Nelson, PhD McMaster University
10:25 a.m.	*Session I - E in WSB67* ***Investigating the effects of cortico-cortico paired associative stimulation in young individuals*** **Presenter: Emillee York** Faculty Advisor: Aimee Nelson, PhD McMaster University

10:40 a.m. – 10:50 a.m.	**BREAK**	**2nd Floor Benson Lounge**

Session II: 10:50 a.m. - 12:20 p.m.

Session	Room	Topic
Session II - A	BN302	Exercise Science and Health
Session II - B	BN304	Cardiorespiratory and Cardiovascular Physiology
Session II - C	BN307	Behavioural Studies and Physical Activity
Session II - D	WS2007	Skeletal Muscle Health and Physical Activity
Session II - E	WSB67	Neurophysiology & Sensorimotor Learning
12:20 p.m. – 1:00 p.m.	**LUNCH**	**2nd Floor Benson Lounge**

Session II - A: Exercise Science and Health (BN302)

10:50 a.m.

Session II - A in BN302

The Effect of Percussive Massage on the Lower Extremity Posterior Chain of Competitive Dancers

Presenter: Alleigh-Jane Williamson
Faculty Advisor: Paolo Sanzo, DSc
Lakehead University

11:05 a.m.

Session II - A in BN302

Examining the sex-based effects of senolytics and aerobic exercise on cardiac fibrosis and function in advanced age

Presenter: Samara Al-Mfarej
Faculty Advisor: Dr. Gianni Parise
McMaster University

11:20 a.m.

Session II - A in BN302

Effects of 12-Weeks of Exercise on Sleep Quality and Glycemic Control in Young Adults with T1D: Findings from the HOMET1D Clinical Trial.

Presenter: Melina Alborzi
Faculty Advisor: Dr. Irena Rebalka
McMaster University

11:35 a.m.

Session II - A in BN302

The Effects of Exercise and Detraining on Strength and Body Composition in Individuals with and without Type 1 Diabetes

Presenter: Maya Tsipris
Faculty Advisor: Dr. Irena Rebalka
McMaster University

11:50 a.m.

Session II - A in BN302

Investigating The Relationship between Maximal Isometric Strength and Measures of Dynamic Performance in Collegiate Female Basketball Athletes

Presenter: Anaikh Randhawa
Faculty Advisor: Dylan Kobsar, PhD
McMaster University

12:05 p.m.	*Session II - A in BN302* ***Dispersed Physical Activity vs. Traditional Postprandial Exercise: Impact on Glucose Control in Breast Cancer Survivors*** **Presenter: Luceta Wut** Faculty Advisor: Amy Kirkham, PhD University of Toronto

Session II - B: Cardiorespiratory and Cardiovascular Physiology (BN304)

10:50 a.m.	*Session II - B in BN304* ***Impact of a 6-month guidelines-based exercise training program on peripheral vascular function and structure in women at risk of developing cardiometabolic disease.*** **Presenter: Emilie Daroga** Faculty Advisor: Amy Kirkham, PhD University of Toronto
11:05 a.m.	*Session II - B in BN304* ***Long-term Cardiorespiratory Fitness, Autonomic Function, and Hemodynamic Responses in Breast Cancer Survivors: A Cross-Sectional Analysis*** **Presenter: Niki Evini** Faculty Advisor: Amy Kirkham, PhD University of Toronto
11:20 a.m.	*Session II - B in BN304* ***Impact of Aromatase Inhibitors on Cognitive Function, Cerebrovascular Health, and BDNF Levels in Breast Cancer Survivors*** **Presenter: Deshnaa Murali Madhumathy** Faculty Advisor: Jennifer Williams, PhD & Amy Kirkham, PhD University of Toronto
11:35 a.m.	*Session II - B in BN304* ***Impact of Aromatase Inhibitors on Peripheral Vascular function in Breast Cancer Survivors*** **Presenter: Fajjar Aqeel** Faculty Advisor: Amy Kirkham, PhD (University of Toronto) & Baraa Al-Khazraji, PhD (McMaster University) McMaster University
11:50 a.m.	*Session II - B in BN304* ***The Effects of Contact Sport on the Cardiovascular Response to the Cold Pressor Test*** **Presenter: Gianluca Rossi** Faculty Advisor: Michael Tymko, PhD University of Guelph-Humber
12:05 p.m.	*Session II - B in BN304* ***Acute Arterial Blood Pressure Responses to Progressive Hypercapnia: The Effect of Biological Sex*** **Presenter: Anahita Sadeghi** Faculty Advisor: Dr. Devin Phillips, PhD York University

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

10:50 a.m.	*Session II - C in BN307* ***Global Safe Sport Review*** **Presenter: Lindsay Maier** Faculty Advisor: Dr. Gretchen Kerr University of Toronto
11:05 a.m.	*Session II - C in BN307* ***Perspectives on strategies to support active play for young children with disabilities: A meta-synthesis*** **Presenter: Sophie Levasseur** Faculty Advisor: Kelly Arbour-Nicitopoulos, PhD University of Toronto
11:20 a.m.	*Session II - C in BN307* ***Gaining Consensus on an Athlete Concussion Surveillance Tool in Special Olympics Sports*** **Presenter: Megan Wong** Faculty Advisor: Kelly Arbour-Nicitopoulos, PhD University of Toronto
11:35 a.m.	*Session II - C in BN307* ***Exploring Stressors and Coping Among Competitive Dancers in Emerging Adulthood*** **Presenter: Isabella Renaud** Faculty Advisor: Katherine Tamminen, PhD, MEd., RP, C.C.C., CMPC University of Toronto
11:50 a.m.	*Session II - C in BN307* ***The Sheath of the Spectacle: Examining Youth Athlete Maltreatment*** **Presenter: Georgia Lambrinos** Faculty Advisor: Dr. Amanda De Lisio York University

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

10:50 a.m.	*Session II - D in WS2007* ***The effects of skeletal muscle-specific AMPK on mitochondrial remodelling induced by exercise*** **Presenter: Kaylyn Montoya** Faculty Advisor: Vladimir Ljubicic, PhD & Robin Cameron, PhD McMaster University
11:05 a.m.	*Session II - D in WS2007* ***AMPK: A Key Player in Combating Skeletal Muscle Fibrosis in Cancer Cachexia*** **Presenter: Amber Austin** Faculty Advisor: Vladimir Ljubicic, PhD McMaster University

11:20 a.m.	*Session II - D in WS2007* ***Impact of Pharmacological AMPK Activation on Skeletal Muscle Catabolism in Cancer Cachexia*** **Presenter: Erlin Espina** Faculty Advisor: Vladimir Ljubicic, PhD McMaster University
11:35 a.m.	*Session II - D in WS2007* ***Examining Lower Leg Strength and Walking Speed in Older Adults: The Role of Plantar Flexion Strength*** **Presenter: Linah Abdelghaffar** Faculty Advisor: Catherine Amara, PhD University of Toronto
11:50 a.m.	*Session II - D in WS2007* ***Factors Influencing Heterogeneity in Muscle Strength Responses to Resistance Training in Older Adults*** **Presenter: Tammy Phung** Faculty Advisor: Catherine Amara, PhD University of Toronto

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

10:50 a.m.	*Session II - E in WSB67* ***The Influence of Calf Compression Sleeves on Online Upper-Limb Trajectory Amendments*** **Presenter: Liam Tran** Faculty Advisor: Luc Tremblay, PhD University of Toronto
11:05 a.m.	*Session II - E in WSB67* ***The influence of qualitative and quantitative knowledge of performance on the bench press performance during a fatigued state*** **Presenter: Kurt Sy** Faculty Advisor: Luc Tremblay, PhD University of Toronto
11:20 a.m.	*Session II - E in WSB67* ***Influence of self-determined KR on the weighing of visual and proprioceptive cues for upper-limb movement performance*** **Presenter: Mavis Li** Faculty Advisor: Luc Tremblay, PhD University of Toronto
11:35 a.m.	*Session II - E in WSB67* ***The Effect of Gain on Sensorimotor Integration*** **Presenter: Andrew Milner** Faculty Advisor: Luc Tremblay, PhD University of Toronto

11:50 a.m.	*Session II - E in WSB67* ***Does explicit voice training yield familiar voice benefits in the hearing impaired?*** **Presenter: Vibha Sarathy** Faculty Advisor: Manda Fischer, PhD & Ingrid Johnsrude, PhD Western University

12:20 p.m. – 1:00 p.m.	**LUNCH**	**2nd Floor Benson Lounge**

Session III: 1:00 p.m. - 2:30 p.m.

Session	Room	Topic
Session III - A	BN302	Biomechanics and Exercise Intervention
Session III - B	BN304	Injury Rehabilitation and Exercise Interventions
Session III - C	BN307	Behavioural Studies and Physical Activity
Session III - D	WS2007	Skeletal Muscle Health and Physical Activity
Session III - E	WSB67	Neurophysiology & Sensorimotor Learning
2:30 p.m. – 2:40 p.m.	**BREAK**	**2nd Floor Benson Lounge**

Session III - A: Biomechanics and Exercise Intervention (BN302)

1:00 p.m.

Session III - A in BN302

Biomechanical Determinants of Agility and Change of Direction during "dry-land" Training for Competitive Female Youth Hockey Players

Presenter: Victoria Dorion
Faculty Advisor: Dr. Eryk Przysucha, PhD, MSc
Lakehead University

1:15 p.m.

Session III - A in BN302

A Comparison of Lower Extremity Kinematics Between the Araimandi and Demi Plié Positions

Presenter: Nasya Sequeira
Faculty Advisor: Dr. Timothy Burkhart
University of Toronto

1:30 p.m.

Session III - A in BN302

Predicting Sprint Speed Using IMUs: Linear and Non-Linear Analyses in a 60m Sprint

Presenter: Shun Chen
Faculty Advisor: Dr. Timothy Burkhart & Dr. Joseph Baker
University of Toronto

1:45 p.m.

Session III - A in BN302

The HIP FLEXIR Study HIP FLEXion strength after arthroscopic Iliopsoas tendon Release

Presenter: Nicole Hoh
Faculty Advisor: Dr. Timothy Burkhart & Margaret Harrington, PhD(c)
University of Toronto

2:00 p.m.

Session III - A in BN302

The Impact of Early Specialization on Ice Hockey Goaltender Landing Kinematics

Presenter: Anna May
Faculty Advisor: Timothy Burkhart, PhD
University of Toronto

2:15 p.m.	*Session III - A in BN302* ***The effect of a novel foot orthotic on foot biomechanics in plantar fasciitis patients and healthy controls*** **Presenter: Dorsa Eshaghi** Faculty Advisor: Timothy Burkhart, PhD University of Toronto

Session III - B: Injury Rehabilitation and Exercise Interventions (BN304)

1:00 p.m.	*Session III - B in BN304* ***Mechanisms, and Clinical Presentation of Acute Sport-Related Concussions Among Canadian Interuniversity Athletes*** **Presenter: Christine Vu** Faculty Advisor: Michael Hutchison, PhD University of Toronto
1:15 p.m.	*Session III - B in BN304* ***Evaluating the Single- and Dual-Task Tandem Gait Test in Concussed and Healthy Interuniversity Athletes at One- and Two-Week Timepoints*** **Presenter: Lauren Wilcox** Faculty Advisor: Michael Hutchison, PhD University of Toronto
1:30 p.m.	*Session III - B in BN304* ***Markerless Motion Capture for Evaluating Kinematics Following Sport-Related Concussion*** **Presenter: Benjamin Dirven** Faculty Advisor: Michael Hutchison, PhD University of Toronto
1:45 p.m.	*Session III - B in BN304* ***The Cost-Effectiveness of Exercise-Based Prehabilitation Programs in Non-Cancer Sugical Population*** **Presenter: Siran Wang** Faculty Advisor: Dr. Daniel Santa Mina University of Toronto
2:00 p.m.	*Session III - B in BN304* ***Evaluating the Cost-Effectiveness of Exercise-Based Prehabilitation in Cancer Surgery*** **Presenter: Anchal Badwal** Faculty Advisor: Dr. Daniel Santa Mina & Maggie Chen, PhD(c) University of Toronto

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

1:00 p.m.	*Session III - C in BN307* ***Becoming skilled in and out of sport: Perspectives of sport-for-employability among intercollegiate swimmers*** **Presenter: Angelica Bath** Faculty Advisor: Ashley Stirling, PhD University of Toronto
1:15 p.m.	*Session III - C in BN307* ***"It just wasn't my time to be done with the sport": Collegiate athletes rediscovering joy in safe sport environments*** **Presenter: Nicole Chateau** Faculty Advisor: Ashley Stirling, PhD University of Toronto
1:30 p.m.	*Session III - C in BN307* ***Creating Safer Learning Environments: An Exploration of the Safe Dance Landscape*** **Presenter: Emily Tatham** Faculty Advisor: Ashley Stirling, PhD & Aalaya Milne, MSc University of Toronto
1:45 p.m.	*Session III - C in BN307* ***Examining the Relationship Between Important Others and Motivation to Participate in Competitive Dance Among Young Adolescent Females Using a Self-Determination Theory Lens*** **Presenter: Brianna DeAgazio** Faculty Advisor: Dr. Erin Pearson Lakehead University
2:00 p.m.	*Session III - C in BN307* ***Exploring the Relationship Between Physical Activity and Mental Health Among Children with Type 1 Diabetes Mellitus*** **Presenter: Grace Lochner** Faculty Advisor: Joyce Obeid, PhD McMaster University
2:15 p.m.	*Session III - C in BN307* ***Throwing It In vs Throwing It Away: A Comparison of Throw-In Outcomes in NWSL and OUA*** **Presenter: Madison Klaas** Faculty Advisor: Nick Wattie, PhD & Ben Csiernik Ontario Tech University

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

1:00 p.m.	*Session III - D in WS2007* ***AMPK activation partially mitigates age-associated changes in the neuromuscular junction*** **Presenter: Ricky Hong** Faculty Advisor: Vladimir Ljubicic, PhD McMaster University
1:15 p.m.	*Session III - D in WS2007* ***Assessing MK-8722 for Skeletal Muscle Regeneration in Duchenne Muscular Dystrophy*** **Presenter: Adam Sutoski** Faculty Advisor: Vladimir Ljubicic, PhD McMaster University
1:30 p.m.	*Session III - D in WS2007* ***The Effects of AMPK Activation on Aged Alpha Motor Neuron Denervation*** **Presenter: Samantha Jonker** Faculty Advisor: Vladimir Ljubicic, PhD McMaster University
1:45 p.m.	*Session III - D in WS2007* ***Investigating the Role of Skeletal Muscle-Specific AMPK in Muscle Regeneration*** **Presenter: Samara Glazer** Faculty Advisor: Vladimir Ljubicic, PhD McMaster University
2:00 p.m.	*Session III - D in WS2007* ***AMPK is not Required for Exercise-induced Angiogenesis*** **Presenter: Atta Yazdy** Faculty Advisor: Vladimir Ljubicic, PhD McMaster University
2:15 p.m.	*Session III - D in WS2007* ***Chronic AMPK Stimulation Mitigates Age-Associated Skeletal Muscle Loss.*** **Presenter: Anneliese Schall** Faculty Advisor: Vladimir Ljubicic, PhD McMaster University

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

1:00 p.m.	*Session III - E in WSB67* ***Discovering the Vestibular Contribution to Body Perception*** **Presenter: Haddie Arber Oakes** Faculty Advisor: Dr. Gerome Manson Queen's University

1:15 p.m.	*Session III - E in WSB67* ***The Influence of Vestibular Damage, Due to mTBI, on Auditory Localization and Postural Control*** **Presenter: Emma Crawford** Faculty Advisor: Dr. Gerome Manson Queen's University
1:30 p.m.	*Session III - E in WSB67* ***The Effect of Tablet Handwriting Sonification on Memory Acquisition*** **Presenter: Igor Serafini** Faculty Advisor: Dr. Gerome Manson Queen's University
1:45 p.m.	*Session III - E in WSB67* ***Validating a Novel Circle-Tracing Task by Evaluating the Role of Visual and Somatosensory Feedback in Lower Limb Motor Control.*** **Presenter: Abu Hijleh Abed** Faculty Advisor: Dr. Gerome Manson Queen's University
2:00 p.m.	*Session III - E in WSB67* ***Investigating Soccer-Specific Training on Lower Limb Dominance Using Motor Control, Stability, and Power Tasks*** **Presenter: Devon Eisen** Faculty Advisor: Dr. Gerome Manson Queen's University
2:15 p.m.	*Session III - E in WSB67* ***Voice-familiarity effects on speech perception across a delay*** **Presenter: Grace Malheiro** Faculty Advisor: Manda Fischer, PhD & Ingrid Johnsrude, PhD Western University

2:30 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	Biomechanics and Injury
Session IV - B	BN304	Injury Rehabilitation and Exercise Interventions
Session IV - C	BN307	Behavioural Studies and Physical Activity
Session IV - D	WS2007	Skeletal Muscle Health and Physical Activity
Session IV - E	WSB67	Physical Cultural Studies
3:55 p.m. – 4:05 p.m.	**BREAK**	**2nd Floor Benson Lounge**

Session IV - A: Biomechanics and Injury (BN302)

2:40 p.m.

Session IV - A in BN302

Evaluation of the Adrenalease Posture Correction Shirt for Reducing Work-Related Musculoskeletal Disorders in Ultrasound Technologists

Presenter: Tina Chen
Faculty Advisor: Dr. Timothy Burkhart
University of Toronto

2:55 p.m.

Session IV - A in BN302

The Effectiveness of Horizontal and Vertical Jump Tests to Assess Return-to-Sport Following ACL Reconstruction: A Systematic Review

Presenter: Nathan Whitney
Faculty Advisor: Timothy Burkhart, PhD
University of Toronto

3:10 p.m.

Session IV - A in BN302

Comparing performance end points to movement quality as return to activity assessments following ACL reconstruction

Presenter: Yu Tong Zeng
Faculty Advisor: Timothy Burkhart, PhD
University of Toronto

3:25 p.m.

Session IV - A in BN302

A 2D Video and In-Game Context Analysis of Non-Contact ACL Injuries in NFL Skill-Position Players

Presenter: Alan Joumaa
Faculty Advisor: Timothy Burkhart, PhD
University of Toronto

3:40 p.m.

Session IV - A in BN302

Comparison of Lower Extremity Biomechanics Between Open and Closed Kinetic Chain Exercises

Presenter: Amina Abdul Jalil
Faculty Advisor: Timothy Burkhart, PhD
University of Toronto

Session IV - B: Injury Rehabilitation and Exercise Interventions (BN304)

2:40 p.m.	*Session IV - B in BN304* ***Breaking the Cycle: Barriers and Facilitators to Reducing Sedentary Time in Prostate Cancer Survivors-A Qualitative Study*** **Presenter: Cinthia Orellana** Faculty Advisor: Dr. Linda Trinh & Dr. Hui Xiao University of Toronto
2:55 p.m.	*Session IV - B in BN304* ***Correlates of Short Physical Performance Battery and Grip Strength in Patients Referred to Prehabilitation: An Observational Sub-Study*** **Presenter: Gaven Ren** Faculty Advisor: Daniel Santa Mina, PhD University of Toronto
3:10 p.m.	*Session IV - B in BN304* ***Examining the Feasibility of High Intensity Interval Training for Individuals Post-Stroke*** **Presenter: Zahra Ali** Faculty Advisor: Ada Tang, PhD McMaster University
3:25 p.m.	*Session IV - B in BN304* ***"My confidence has really grown": Participant experiences engaging in a power-focused strength training intervention*** **Presenter: Zoe Sanvido** Faculty Advisor: Ada Tang, PhD McMaster University
3:40 p.m.	*Session IV - B in BN304* ***Blood Pressure Following High Intensity Resistance Exercise in Individuals with Stroke*** **Presenter: Juliano Abreu** Faculty Advisor: Ada Tang, PhD & Baraa Al-Khazraji, PhD McMaster University

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

2:40 p.m.	*Session IV - C in BN307* ***The Impact of Synchronous Exercise on Social Connection and Identity in Women Dyads*** **Presenter: Fengyue Xu** Faculty Advisor: Catherine Sabiston, PhD University of Toronto

2:55 p.m.	*Session IV - C in BN307* ***Parents' perceptions of body image support for their athlete daughters.*** **Presenter: Alishba Mansoor** Faculty Advisor: Catherine Sabiston, PhD University of Toronto
3:10 p.m.	*Session IV - C in BN307* ***A Scoping Review of Existing Body Image Guidelines for Parents of Youth*** **Presenter: Landyn Meadows** Faculty Advisor: Catherine Sabiston, PhD University of Toronto
3:25 p.m.	*Session IV - C in BN307* ***Systematic Evaluation of Online Resources Targeting Youth Body Image for Parents/Guardians*** **Presenter: Elise Christopoulos** Faculty Advisor: Catherine Sabiston, PhD University of Toronto
3:40 p.m.	*Session IV - C in BN307* ***Pre-breast cancer weight fluctuations and post-treatment stress processes: A secondary analysis*** **Presenter: Andrew Hernan Mathias Alvarez** Faculty Advisor: Catherine Sabiston, PhD University of Toronto

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

2:40 p.m.	*Session IV - D in WS2007* ***Examining the Anabolic Sensitivity to Dietary Protein between Healthy Pre- and Post-Menopausal Females*** **Presenter: Renee Hon** Faculty Advisor: Dr. Daniel Moore University of Toronto
2:55 p.m.	*Session IV - D in WS2007* ***Assessing the Relationship between 3-day Habitual Diet and Physical Activity on the Anabolic Sensitivity to Dietary Protein in Prepubertal Children*** **Presenter: Paia Chen** Faculty Advisor: Dr. Daniel Moore University of Toronto
3:10 p.m.	*Session IV - D in WS2007* ***Verification of sucrose dehydration in maintaining skeletal muscle integrity for immunofluorescent staining of p-RPS6*** **Presenter: Daniel Su** Faculty Advisor: Dr. Daniel Moore University of Toronto

3:25 p.m.	*Session IV - D in WS2007* ***8 Weeks of Resistance Training Increases Collagen-Molecular Chaperone, Hsp47, Expression in both Males and Females*** **Presenter: Alessia Magno** Faculty Advisor: Dr. Daniel Moore University of Toronto
3:40 p.m.	*Session IV - D in WS2007* ***The Impact of Contractile Activity on the Epigenetic Writer SUV39H1 in the Skeletal Muscle Cells and Skeletal Muscle*** **Presenter: Parmis Falahat** Faculty Advisor: Emilie Roudier, PhD York University

Session IV - E: Physical Cultural Studies (WSB67)

2:40 p.m.	*Session IV - E in WSB67* ***Barriers and Facilitators of Outdoor Recreation*** **Presenter: Abigail Ingraham** Faculty Advisor: Daniel Sailofsky, PhD University of Toronto
2:55 p.m.	*Session IV - E in WSB67* ***Navigating the Game: An Auto-Ethnographic Exploration of Race, Gender, and ADHD in Competitive Youth Sports*** **Presenter: Theepiga Mohanachandran** Faculty Advisor: Sabrina Alisha Razack, PhD University of Toronto
3:10 p.m.	*Session IV - E in WSB67* ***Investigating the Role of Sport in the Transmission of Trauma Literature Review*** **Presenter: Shivani Sivalingam** Faculty Advisor: Tricia McGuire-Adams, PhD University of Toronto
3:25 p.m.	*Session IV - E in WSB67* ***An Intersectional Analysis of Barriers and Facilitators to After-School Physical Activity Programs in Equity-Deserving Communities*** **Presenter: Isabella Tao** Faculty Advisor: Dr. Kyoung June Yi, PhD McMaster University

3:40 p.m.	*Session IV - E in WSB67* ***Enhancing Equity, Diversity, Inclusion, and Accessibility (EDIA) Excellence in Adaptive Exercise Programs*** **Presenter: Meryem Filiz** Faculty Advisor: Dr. Kyoung (David) Yi & Dr. Uk Kim McMaster University

Time	Item/Topic and Location
3:55 p.m. - 4:05 p.m.	BREAK- 2nd Floor Benson Lobby & Lounge
4:05 p.m. – 4:50 p.m.	**Keynote - Dr. Tricia McGuire-Adams** - BN307
4:50 p.m. – 5:00 p.m.	**Award Presentation and Closing Remarks – Dr. Catherine Amara** – BN307

ABSTRACTS

(By session)

Session: Session I - A
Time: 8:55 AM
Location: BN302

Evaluation of Physical Activity and Sedentary Time in Children and Adolescents with Type 1 Diabetes Using Different Accelerometry Protocols

Presenter: Eden Sedarous

Co-author(s): Elyse Letts, Madelyn M. Byra, Elizabeth Ball, Karen McAssey, Brian W. Timmons, Joyce Obeid
Faculty Advisor: Joyce Obeid, PhD
McMaster University

Background: Regular physical activity (PA) is crucial for managing Type 1 Diabetes (T1D), yet many youths fail to achieve the recommended 60 minutes of daily moderate-to-vigorous physical activity (MVPA). Device-based measurement of PA and SED (accelerometry) is limited by variability in wear time validation, epoch length, non-wear detection, and differing cut-points. With most accelerometer-based research focusing on healthy populations, it is difficult to assess how this methodological variability influences the number of children with T1D meeting PA guidelines. Objectives: This study aims to (1) compare the effects of accelerometer protocols on PA and SED estimates and (2) evaluate how these variations influence the proportion of youth with T1D meeting PA guidelines. Methods: Participants aged 7-17 years with T1D were recruited from McMaster Children's Hospital and wore an ActiGraph accelerometer on their right hip for 7 days. ActiLife software was used to classify SED, light PA, and MVPA across 12 published accelerometry protocols. A one-way repeated measures ANOVA will compare activity estimates across protocols, and Cochran's Q test will assess differences in the proportion of participants meeting PA guidelines. Results: Forty-eight participants (44% female; age: 13.7 ± 2.4 years) completed the study. Data analysis is underway, and findings will be shared during the presentation. Significance: This study addresses gaps in accelerometer-based research by identifying protocol-specific variability in activity measurement for youth with T1D. However, the absence of criterion measures limits conclusions on the accuracy of accelerometer-derived activity estimates. Future research should incorporate validation methods to strengthen methodological decisions and refine accelerometer use.

Session: Session I - A
Time: 9:10 AM
Location: BN302

The Effect of Exercise-Induced Lactate on Mood

Presenter: Becca Liski

Co-author(s): Addriana Odisho, Aedan Rourke, Stu Mladen, Ethan Danieli, Zena Manna, Grace Yu, Katelynn Ambrose, Amrit Randhawa

Faculty Advisor: Jeremy Walsh, PhD

McMaster University

Moods are relatively enduring states of emotion that impact an individual's current and subsequent affective responses. Acute exercise can positively impact mood states in humans, but the mechanism underlying this effect is unknown. Increased blood lactate is a proposed mechanism underlying improved mood following exercise as blockade of lactate in the brain prevents the beneficial effects of exercise on mood, and peripheral lactate injection improves mood in rodents. The purpose of this study is to test the hypothesis that exercise-induced blood lactate directly improves positive mood states in young adults. In a double-blinded, placebo-controlled, crossover design, 32 healthy adults aged 18-35 will be randomized to either bicarbonate or placebo conditions to manipulate blood lactate. Participants will ingest 0.4g/kg of bodyweight of sodium bicarbonate or placebo (sodium chloride) 90 minutes prior to exercise. Pre-exercise bicarbonate ingestion increases the lactate response during higher intensity exercise bouts compared to placebo. Participants will then perform 20 minutes of cycling exercise at 110% of ventilatory threshold. Blood lactate was measured in venous blood every 5 minutes during exercise using a handheld analyzer. Mood was assessed at Baseline, 30 minutes pre-, and 60 minutes post-exercise using the Profile of Mood States (POMS), which is a 65 adjective questionnaire to assess 1 positive, and 5 negative mood components. The primary outcome of this study is total mood disturbance (TMD), which is calculated by subtracting the positive component from the combined negative components. We anticipated that blood lactate will be higher during exercise with bicarbonate supplementation compared to the placebo condition, which will correspond with significantly lower TMD and higher positive mood. This would suggest that higher blood lactate, independent of exercise intensity, may underlie the improvements in mood following exercise, thus contributing to a growing body of research highlighting the positive effects of lactate on mental health.

Session: Session I - A
Time: 9:25 AM
Location: BN302

The Relationship Between Physical Activity and Growth in Pediatric Populations with Inflammatory Bowel Disease

Presenter: Wynter Sutchy

Co-author(s): Samantha A. Morin Madelyn M. Byra, Elizabeth Ball, Emily Brackenridge, Sara King-Dowling, Lee Hill, Robert M. Issenman, Nikhil Pai, Samira Samiee-Zafarghandy, Mary Sherlock, Mary Zachos, Brian W. Timmons, & Joyce Obeid

Faculty Advisor: Joyce Obeid, PhD

McMaster University

Moderate-vigorous physical activity (MVPA) is an important part of a child's daily routine as outlined by the 24-hour Canadian Movement Guidelines and may affect linear growth rates. One population that demonstrates linear growth impairments are children with inflammatory bowel disease (IBD). However, the role of MVPA in targeting the mechanisms of growth impairment is not fully understood, particularly in pediatric IBD. The study aims to compare markers of growth in children with IBD for those who do and do not meet MVPA guidelines. Children with IBD between 7-17 years old were recruited from McMaster Children's Hospital. To assess growth, participants' standing height were measured to determine height percentiles according to age and sex. Sitting height was measured to determine age at peak height velocity (PHV) along with standing height and weight. To estimate MVPA, participants wore an accelerometer around their waist for 1 week. Independent t-tests were used to determine differences between children who do and do not meet MVPA guidelines. Linear regressions were used to assess the strength of the relationship between MVPA and PHV. Thirty-eight participants (58% male; 13.2 + 2.8 years old) completed the study. Data analysis is currently ongoing and full results will be presented at the National Undergraduate Research Conference. Although no distinction between the types of MVPA could be made, the study will provide insights into the potential relationship between MVPA and growth in pediatric IBD. Future studies are needed to explore the effects of different exercise modalities on growth in children with IBD.

Session: Session I - A
Time: 9:40 AM
Location: BN302

Effects of Acute High-Intensity Interval Exercise on Interleukin-12 and its Implications on NK Cell Activity in Pre-Pubertal and Post-Pubertal Children

Presenter: Jane Yong

Co-author(s): Inna Ushcatz, Megan Lo, Madelyn M. Byra, Joyce Obeid
Faculty Advisor: Joyce Obeid, PhD
McMaster University

Background: Natural killer (NK) cells play a crucial role in the immune response to viral infections and cancer, with interleukin (IL)-12 being a key cytokine for their activation and cytotoxic activity. While high-intensity interval exercise (HIIE) influences cytokine responses in adults, its effects on IL-12 concentrations in youth remain unclear. This study aimed to evaluate changes in IL-12 concentrations and NK cell activity (NKCA) before and after an acute bout of HIIE in a pediatric population. Methods: Pre-pubertal (Tanner stage 1 or 2) and post-pubertal (Tanner stage 4 or 5) participants were recruited from the greater Hamilton community. Participants performed a bout of HIIE on a cycle ergometer consisting of 24 intervals for 15 seconds at 100% VO2peak. Venous blood samples were collected pre-exercise, immediately post-exercise, 30 min and 60 min post-exercise. Plasma IL-12 concentrations were measured using an enzyme-linked immunosorbent assay (ELISA), and NKCA was assessed via flow cytometry. A two-way repeated-measures ANOVA was used to compare IL-12 levels between time points and pubertal stages. Correlations between IL-12 and NKCA were analyzed using Pearson correlation coefficients. Results: Eleven participants (45% females; age: 13.9±3.8 years) completed this study. Data analysis is ongoing, and complete results will be presented at the NURC. Discussion: This study will provide insight into how HIIE may influence immune function in youth and whether pubertal status affects the IL-12 response. While small sample size and single exercise intensity may limit generalizability of findings; this study will lay the groundwork for investigating HIIE-induced cytokine responses in broader pediatric populations.

Session: Session I - A
Time: 9:55 AM
Location: BN302

The Effect of Pre-Cooling on Perceived Thermal Sensation and Exertion during Exercise in the Heat in Young Males

Presenter: Matthew A. Portugese

Co-author(s): Matthew A. Portugese, Kelli E. King , Archana Weerasooriya, Glen P. Kenny
Faculty Advisor: GlenKenny, PhD
University of Ottawa

Background: Thermal sensation (TS) is a fundamental determinant of behavioural thermoregulation during extreme heat exposures to prevent heat-related injuries. Exercise in the heat rapidly increases core temperature, leading to fatigue and elevated rate of perceived exertion (RPE). Thermal discomfort typically correlates with core temperature and cardiovascular strain during an exercise-induced heat stress; however, it is unclear how heat-mitigation strategies such as pre-cooling may alter this relationship. Methods: Nine young males (23±3 years) underwent 60 minutes of semi-recumbent cycling in the heat (37.5°C, 35% relative humidity) with (pre-cooling) and without (control) pre-cooling using cold-water (17°C) immersion to elicit a decrease in core (rectal) temperature by 0.5°C below resting levels. Perceptual scales were assessed at baseline and every 15 minutes of exercise for TS (0 = neutral, 7 = extremely hot) and RPE (Borg 6-20).Results: Relative to control, TS was significantly lower in the pre-cooling condition following 30 minutes (1.6±0.7 vs. 2.9±1.1, p=0.007), 45 minutes (1.7±0.9 vs. 3.2±1.2, p=0.007), and 60 minutes (2.0±1.2 vs. 3.6±1.1, p=0.013) of exercise. Further, RPE was lower at 30 minutes (11.4±0.9 vs. 12.3±0.9, p=0.047) and 45 minutes (11.0±1.5 vs. 12.3±0.9, p=0.038) of exercise relative to control, but not at 60 minutes (11.8±1.7 vs. 12.4±1.2, p=0.350). Finally, core temperature was significantly reduced in the pre-cooling relative to control, following 30 minutes (36.6±0.4°C vs. 37.4±0.2°C, p<0.001), 45 minutes (37.0±0.3°C vs. 37.4±0.2°C, p<0.001), and 60 minutes (37.3±0.3°C vs. 37.7±0.2°C, p=0.002).Conclusion: While TS was significantly higher at the end of exercise, RPE was reduced relative to control. Taken together, our findings indicate that perceptual responses to heat stress are influenced by factors beyond core temperature. Consequently, differences in perception may affect behavioral action to mitigate heat strain during exercise in the heat.

Funding: Natural Sciences and Engineering Research Council of Canada

Session: Session I - A
Time: 10:10 AM
Location: BN302

Impact of newly introduced initial stay times on core temperature and productivity during heavy-intensity work in the heat in young males

Presenter: Nathaniel Jay

Co-author(s): Sarah M. Taggart, Gil Bourgois, James J. McCormick, Katie E. Wagar, Roberto C. Harris-Mostert
Faculty Advisor: Glen Kenny, PhD
University of Ottawa

BACKGROUND: During uncompensable occupational heat stress, regulatory agencies currently recommend that heat-mitigation controls in the form of work-rest allocations be employed upon commencement of work to maintain core temperature within safe limits (≤38°C). Recently, the maximum work time that an initial continuous work bout can be performed before work-rest allocations should be employed were introduced (termed initial stay time, IST). However, it remains unclear i) if core temperature will be maintained within safe limits when the implementation of work-rest allocations is preceded by the application of the IST, and ii) if total work performed (productivity) will be impacted during prolonged work in the heat. PURPOSE: We evaluated changes in core temperature and productivity during heavy-intensity work in the heat by employing the current recommended work protocol (RWP) and a modified work protocol (MWP) integrating IST. METHODS: On separate days, 8 young males (24±4 years) completed a 240-min, heavy-intensity (260 W·m-2), intermittent treadmill walk employing 1) a 1:1 work-rest allocation starting with a 30-min work bout followed by 30-min rest, with the cycle repeated for the 240-min work period (RWP), or 2) the same work-rest allocations performed after employing the IST (MWP). RESULTS: IST exceeded 30-min in the morning (mean±SD; 73±26 min) and afternoon (33±11 min) periods. Average core temperature during the work-rest allocations did not differ between conditions (MWP; AM:37.83±0.14ºC, PM:37.89±0.19ºC; RWP; AM:37.65±0.19ºC, PM:37.95±0.24ºC) for either the morning ($p=0.087$) or afternoon work periods ($p=0.573$). While morning work volume ($p<0.001$) was greater in MWP (151±14 min) compared to RWP (120 min), no differences were observed in the afternoon ($p=0.208$). CONCLUSION: Relative to the RWP, implementing the MWP increased morning productivity while keeping core temperature within safe limits. Altogether, this information will allow employers to better manage work exposure times during prolonged work in the heat.

Funding: Workplace Safety and Insurance Board (Ontario).

Session: Session I - A
Time: 10:25 AM
Location: BN302

Changes in Serum Brain-derived Neurotrophic Factor during Daylong Work in the Heat in Young and Older Adults

Presenter: Farah Mourad

Co-author(s): James J. McCormick, Kelli E. King, Glen P. Kenny
Faculty Advisor: Glen Kenny, PhD
University of Ottawa

BACKGROUND: Brain-derived neurotrophic factor (BDNF) is a neuroprotective growth factor that plays a key role in providing neuroprotection during acute physiological stress. While circulating BDNF has been reported to increase in young adults during exposure to short bouts of passive heating, it remains unknown if similar responses are observed during exercise. Moreover, given BDNF production declines with age, it is unclear whether exercise-induced BDNF responses differ in older adults. OBJECTIVE: To assess circulating serum BDNF in young and older adults performing daylong work in the heat. METHODS: Ten young (mean [SD]: 22 [2] years) and 10 older (62 [5] years) adults (equal female) performed 240-min of moderate-intensity treadmill walking (~200 W/m2) in wet bulb globe temperatures of 26˚C. Work was continuous until core (rectal) temperature reached 38˚C, at which point work-rest allocations of 3:1 were implemented, starting with a 15 min rest break, followed by a 45 work bout which was repeated for the duration of work (bout 1). The protocol was repeated in the afternoon (following a 1-h lunch break; bout 2). Serum concentrations of BDNF were assessed at baseline and after each work bout using ELISAs. Data were analyzed via a two-way ANOVA (α=0.05). RESULTS: Despite similar elevations in core temperature by the end of the daylong work simulation in both young and older adults (~+1.0˚C), BDNF concentrations were significantly elevated from baseline after each work bout in young (bout 1: +711.3 pg/mL [258.5] and bout 2: +757.2 [116.7]; both $p \leq 0.01$) but not older adults. Further, BDNF concentrations were higher in young relative to older adults (3379.2 pg/mL [608.6] vs 2343.2 pg/mL [853.9], respectively) across all timepoints (group main effect: $p<0.01$). CONCLUSION: While serum BDNF was elevated in response to daylong work in young adults, age-related reductions in BDNF during exercise may suggest attenuated neuroprotection in older adults.

Session: Session I - B
Time: 8:55 AM
Location: BN304

The Impact of a 12-Week Exercise Training Program on Arterial Function Following A Maximal Aerobic Exercise Bout

Presenter: Lindsay Wilson

Co-author(s): Matthew Badour[1], Kyra Ball[2], Irena Rebalka[2], Thomas Hawke[2], Maureen MacDonald

[1]Department of Kinesiology, McMaster University

[2]Department of Pathology and Molecular Medicine, McMaster University

Faculty Advisor: Dr. Maureen MacDonald

McMaster University

BACKGROUND: Individuals with type 1 diabetes (T1D) are at an increased risk of developing cardiovascular disease, related to chronic exposure to hyperglycemia. Arterial pulse wave velocity (PWV) is the gold standard assessment of arterial stiffness and is increasingly used to measure arterial function post-exercise. This study examines the effects of 12-weeks of exercise training on arterial function via pre-/post-exercise PWV measurements in individuals with T1D and healthy matched controls. METHODS: Participants included individuals with T1D and healthy control cohorts who were 18-35 years and inactive. PWV and VO_2peak tests were conducted before and after exercise training (150 minutes of aerobic activity and 2-3 resistance sessions per week), with central (cfPWV) and peripheral (ffPWV) arterial stiffness measured pre- and post-VO_2peak. RESULTS: There were no differences between groups for pre-training cfPWV and ffPWV (PGroup > 0.10, F = 1.88), or pre-training cfPWV measured at 1, 10, and 20-minutes following the VO_2peak test (PTime > 0.15, F = 2.9). However, at baseline ffPWV was reduced after the VO_2peak test (PTime = 0.005, F = 5.1) with no difference between groups (PGroup = 0.65, F = 0.54). Following training, a significant effect of time on post-VO_2peak cfPWV (PTime = < 0.05, F = 3.0) and ffPWV (PTime > 0.09, F = 2.28) was observed with no differences between groups (PTime = > 0.47, F = 0.57). This suggests a uniform arterial adaptation, with post- VO_2peak PWV increasing in both T1D and control groups after 12 weeks of training. SIGNIFICANCE: This study offers insight into effective exercise prescription for individuals with T1D. Given the early onset nature of T1D pathogenesis, it is crucial to develop exercise programs that support vascular health. Further research should explore individualized approaches to promote vascular health in this population.

Funding: CIHR

Session: Session I - B
Time: 9:10 AM
Location: BN304

Investigating the Influence of Hormonal Contraceptive Type on FatMax and Substrate Oxidation in Premenopausal Females

Presenter: Malvika Krishnamurthy

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

BACKGROUND: Metabolism is influenced by hormonal fluctuations, particularly estrogen and progesterone, which are postulated to impact substrate oxidation. Oral contraceptive pills (OCPs) supress endogenous hormones while introducing synthetic hormones, which may influence substrate oxidation. However, limited research has directly investigated these effects. This study aims to investigate the influence of second (OCP2) and third generation (OCP3) OCPs on maximal fat oxidation (MFO) at FatMax. METHODS: Retrospective VO2peak data collected in the Vascular Dynamics Lab at McMaster University from young, healthy premenopausal female (18-45 years) OCP2 and OCP3 users was used along with prospective data collected from additional participants. Participants completed a VO2peak ramp test on a stationary cycle ergometer with expired oxygen and carbon dioxide concentrations measured through indirect calorimetry. Fat oxidation was calculated using VO2 and VCO2 values, with FatMax defined as the exercise intensity at MFO. A Welch's Two Sample t-test was used to analyze data. RESULTS: Data from 17 OCP2 users (mean age 21.2 ± 2.16 years; mean BMI 22.1 ± 3.20 kg/m^2) and 15 OCP3 users has been analyzed to date (mean age 20.8 ± 2.8 years; mean BMI 22.8 ± 2.2 kg/m^2). MFO was significantly higher in OCP3 users (0.61 ± 0.06 g/min) compared to OCP2 users (0.53 ± 0.13 g/min, $p = 0.03$). However, no significant differences were observed in VO_2peak (40.1 ± 6.9 vs. 38.5 ± 7.0 mL/kg/min, $p = 0.53$), FatMax (50.8 ± 8.6 vs. 51.4 ± 8.3 %VO_2peak, $p = 0.86$), or respiratory exchange ratio at MFO (0.73 ± 0.06 vs. 0.69 ± 0.05, $p = 0.07$). SIGNIFICANCE: The observed increase in MFO among OCP3 users suggests a possible influence of hormonal contraceptive generation on fat metabolism. These findings warrant further investigation, with future research assessing the clinical significance of these metabolic differences and exploring different hormonal contraception types.

Funding: NSERC

Session: Session I - B
Time: 9:25 AM
Location: BN304

Effects of Sleep Duration and Timing Variability on Endothelial Function in Healthy Young Adults

Presenter: Rand Amer

Co-author(s): Joshua Cherubini, Maureen MacDonald
Faculty Advisor: Maureen MacDonald, PhD
McMaster University

INTRODUCTION: Intra-individual variations in the timing and duration of sleep, and a diurnal preference for evening wakefulness, associate with a variety of indices of cardiometabolic dysregulation. Research also suggests that irregular sleep-wake patterns contribute to reduced endothelial function, which represents a critical determinant of cardiovascular health. Thus, an individual's sleep-wake cycle, which may be influenced by chronotypical preference for morning or evening activity, may modulate endothelial function. There exist current gaps in the understanding of interactions between habitual sleep duration variability, chronotype, and endothelial function. This study aims to examine the impact of sleep duration variability on endothelial function in healthy young adults and assess the potential moderating role of chronotype. METHODS: Healthy young adults, aged 18 to 25 (n=36; 24F, 12M), completed the Munich Chronotype Questionnaire (MCTQ) to determine their chronotype. Habitual sleep patterns were assessed over seven days of normal sleep. Habitual sleep duration variability was defined as the standard deviation of total sleep duration across the seven days, recorded subjectively using a consensus sleep diary and objectively using a Polar M430 accelerometer. Endothelial function was estimated by measuring flow-mediated dilation of the brachial artery (BA FMD) assessed via ultrasonography. EXPECTED RESULTS: Greater variability in sleep timing and duration will be associated with impaired BA FMD. Furthermore, individuals with a stronger preference for evening wakefulness will experience a greater attenuation in BA FMD following a variable sleep schedule compared to those with a stronger preference for morning wakefulness. SIGNIFICANCE: Elucidating the effects of sleep variability on endothelial function will provide a deeper understanding of how circadian rhythms influence cardiovascular function. By examining the role of sleep regularity, this study could inform potential interventions to preserve cardiovascular health.

Funding: NSERC

Session: Session I - B
Time: 9:40 AM
Location: BN304

Peak Oxygen Uptake and Peak Power Responses to Single-leg Interval Cycle Training: A Within-participant Randomized Controlled Trial

Presenter: Beatrice Yee

Co-author(s): Emileigh R. Binet
Faculty Advisor: Martin Gibala, PhD
McMaster University

BACKGROUND: Cycling-based high-intensity interval training (HIIT) increases whole-body peak oxygen uptake (VO2peak) when performed thrice weekly for at least several weeks, often to a greater extent than moderate-intensity continuous training matched for total energy expenditure. The effect of reduced frequency HIIT on skeletal muscle oxidative capacity is less clear. Interindividual differences can also confound such comparisons; this can be mitigated by using a within-participant design. OBJECTIVE: We investigated the effect of six weeks of twice-weekly single-leg (SL) HIIT on skeletal muscle oxidative capacity as measured by SL-VO2peak, mitochondrial content, and capillarization. We hypothesized that skeletal muscle oxidative capacity would increase in the exercise (EX)-leg but not the control (CON)-leg. METHODS: Sixteen healthy, recreationally active adults (6 males, 10 females; 22±3y; BMI: 24±4 kg/m2; whole-body VO2peak: 36.1±6.1 mL/kg/min) had each leg randomized to an EX or control CON condition. The EX-leg performed 12 training sessions, each involving four, 5-min bouts at 50-60% of SL peak power (Wpeak), interspersed with 30-s recovery periods at 20% SL Wpeak. SL-VO2peak and Wpeak were determined on each leg before and after training. Muscle biopsies were also collected from the vastus lateralis of each leg before and after training for the assessment of skeletal muscle oxidative capacity. RESULTS: There were no baseline differences in SL VO2peak (P=0.28) or Wpeak (P=0.19). SL-VO2peak increased similarly by ~8% (P=0.0002) in both the EX- (28.1±4.2 to 30.7±5.3mL/kg/min) and CON-legs (27.5±5.0 to 29.8±4.8). Wpeak increased (P=0.0092) after training in the EX-leg (133±29 to 145±31 W) but not the CON-leg (129±26 to 132±24). The analysis of muscle samples is ongoing. CONCLUSION: Twelve sessions of HIIT over six weeks increased SL-VO2 peak similarly in both legs but only Wpeak in the EX-leg. The divergent response may reflect differences in 'central' and 'peripheral' responses to the training stimulus.

Supported by NSERC.

Session: Session I - B
Time: 9:55 AM
Location: BN304

Quantifying the rate of in-field oxygen consumption in relation to exercise training thresholds

Presenter: Kim Malvin Sales

Co-author(s): Adam Di Salvo
Faculty Advisor: Dr. Robert Bentley
University of Toronto

Background: Cardiorespiratory fitness (peak rate of oxygen consumption; VO2peak) is a foundational component of sport-specific training. Individualized interventions unique to an athlete's physiological thresholds yield enhanced cardiorespiratory adaptations compared to standardized training intensities; however, access to threshold assessments may be challenging. Wearable technology provides an opportunity to assess pulmonary ventilation (VE) and VO2 in real-world settings to better personalize training prescription. Purpose: To quantify how an athlete's team prescribed in-field aerobic training align with thresholds related to VE and VO2 obtained in laboratory. Methods: This study was a sub-analysis of a larger study. Nine varsity athletes (21±2 years; 56% female; n=1 basketball, 2 ice hockey, 3 rowing, 2 rugby, 1 wrestling) completed three exercise sessions. One laboratory session identified VO2peak, and ventilation thresholds (VT1 and VT2) from progressive exercise to volitional exhaustion. Athletes then completed two typical, in-field aerobic exercise training (range=16.4-69.7 minutes/session). During all sessions, VE and VO2 (face mask; VO2 Master Pro) were measured. Percent session time (%ST) and exercise time (%ET) spent above VT1 and VT2 were computed alongside area under the curve (AUC). Results: Data are presented as mean±SD or minimum to maximum range. Athletes presented with a VT1 of 2.4±0.7 L/min, VT2 (n=5) of 3.3±0.7 L/min, and VO2peak of 48.8±11.6 mL/kg/min. Exercise time for both in-field sessions did not differ ($p=0.416$) and were highly correlated ($r=0.97$, $p<0.001$). %ST spent above VT1 (2-63%) and VT2 (0-13%) as well as %ET spent above VT1 (3-92%) and VT2 (0-74%) showed considerable variability across participants. A similar observation was noted for AUC at VT1 (5-137 L/min·min) and VT2 (2-215 L/min·min). Conclusion: These results demonstrate interindividual variability in athlete training intensities during standard team prescribed training sessions. Therefore, personalized training intensities using wearable technology may be incorporated to ensure an appropriate stimulus for cardiorespiratory adaptation.

Session: Session I - B
Time: 10:10 AM
Location: BN304

The effect of blood flow restriction training on peripheral hemodynamics

Presenter: Keegan Zavits

Co-author(s): Nino Nikolovski, Adam Di Salvo, Sinan Osman, and Robert Bentley
Faculty Advisor: Dr. Robert Bentley
University of Toronto

Background: Blood flow restriction (BFR) training involves pressure cuff inflation proximal to the active skeletal muscle to challenge exercising local muscle blood flow (LMBF). Prior research outlines the effects of BFR on conduit artery flow in males, though the effect of BFR on LMBF, skeletal muscle oxygen saturation (SmO2), and sex-based differences are unknown. Purpose: To quantify the effect of BFR on LMBF and SmO2 in males and females. Methods: Seven participants (23±3 years; 14% female) completed 90 seconds of rhythmic knee extension exercise (3s contraction: 3s relaxation) at 20% one-repetition maximum without BFR (control), with BFR after control (control+BFR) and BFR in isolation (isoBFR). BFR occurred at 80% occlusion pressure. SmO2 (frequency domain near-infrared spectroscopy) and LMBF (diffuse correlation spectroscopy) were measured at the right vastus lateralis (MetaOx, ISS Medical). Central hemodynamics were collected using finger photoplethysmography (Finometer MIDI, Finapres). Results: All data are presented as change from rest and mean±SD. Control elevated heart rate (HR; $p=0.007$), stroke volume (SV; $p=0.002$), cardiac output (CO; $p=0.003$), and mean arterial blood pressure (MAP; $p=0.001$). LMBF doubled ($p=0.03$) whilst SmO2 fell by 17±13 % ($p=0.01$). BFR did not impact CO ($p=0.16$) but SV decreased over 50% (both $p<0.009$). HR more than doubled in control+BFR ($p=0.042$). MAP was elevated with BFR (both $p<0.008$) with a greater pressor response in control+BFR than isoBFR ($p<0.001$). LMBF was attenuated by BFR compared to control by 44% ($p=0.09$) while SmO2 fell by a greater extent (both $p<0.009$). Conclusion: BFR alters contributions of HR and SV to CO during exercise, likely due to manipulations in afterload and preload. SmO2 declines; however, the effects on LMBF are equivocal. Additional work is required to clarify this relationship and may also explore the effect of varying BFR cuff pressures on central and peripheral hemodynamics.

Session: Session I - C
Time: 8:55 AM
Location: BN307

Interindividual variability in menstrual cycle characteristics: Implications for phase-based training studies

Presenter: Roya Rahmani

Co-author(s): Celine Bailleul, Alexa Govette, Stephanie Estafanos, McKinley Kennedy, Jenna B. Gillen
Faculty Advisor: Dr. Jenna Gillen
University of Toronto

Introduction: Emerging research has demonstrated that increasing one's exercise training frequency and volume in the low-hormone follicular phase (FP) of the menstrual cycle (MC), rather than the high-hormone luteal phase (LP), leads to superior training adaptations. However, these studies relied on the assumption that all participants had a 28-day MC with ovulation occurring precisely on day 14. This consistency seems unlikely, and we hypothesize there is considerable variability in MC characteristics among eumenorrheic women. Purpose: To retrospectively assess the interindividual variability in MC characteristics among female participants tested in our lab. Methods: Thirty naturally-cycling females (25±6yr, 22±2.5kg/m^2) reporting a 3-month MC history between 21-35 days were monitored over 1 MC. Testing included: calendar-based counting for MC length (n=30), urinary luteinizing hormone testing for ovulation (n=30) and blood and urine sampling in the FP (n=3) and LP (n=4) for estrogen and progesterone concentration. Results: MC length ranged from 23-41 days (30±4) with ovulation occurring between cycle day 11-19 (15±2). As a result, the FP ranged from 13-18 days (15±2) and the LP ranged from 9-29 days (15±4). Serum estrogen concentrations ranged from 110-223pmol/L (173±58) in the FP and 380-833pmol/L (568 ±240) in the LP, while urinary estrogen ranged from 103-254pmol/L (168±77) in the FP and 139-647pmol/L (404±229) in the LP. Serum progesterone concentrations were consistent across all participants in the FP (0.9nmol/L) and ranged from 29-50nmol/L (39±11) in the LP, while urinary progesterone ranged from 0.9-4.9ug/ml (2±2) in the FP and 11-30ug/ml (21±10) in the LP. Conclusion: There is substantial variability in MC phase characteristics among eumenorrheic women. To improve the accuracy of studies examining the impact of menstrual cycle phase on training responses, future research should, at minimum, combine calendar-based tracking with ovulation testing to identify follicular and luteal phases.

Session: Session I - C
Time: 9:10 AM
Location: BN307

Examining the effect of exercise training on insulin sensitivity in pre-, and post-menopausal females: A systematic review and meta-analysis

Presenter: Erica Petrucci

Co-author(s): Alexa Govette, Clara Rivaya Salvadores, Celine Bailleul, XinYue Li, Alfred Min, Stephanie Small, Deshnaa Murali Madhumathy, Fajjar Aqeel, Jennifer S. Williams, Amy A. Kirkham, Jenna B. Gillen
Faculty Advisor: Dr. Jenna Gillen
University of Toronto

Introduction: Enhanced insulin sensitivity promotes better blood glucose regulation and decreases risk of developing type 2 diabetes. Regular exercise is well-established to improve insulin sensitivity, but most research has focused on males. Though limited, some evidence in females suggests that exercise-induced improvements to insulin sensitivity may be diminished or absent compared to males. Furthermore, females who are post-menopausal may benefit less from exercise training than females who are pre-menopausal, but direct comparisons across menopausal stages remain limited and conflicting. Purpose: To systematically quantify the effect of exercise training on insulin sensitivity in females across the lifespan. Methods: EMBASE, MEDLINE, and Cochrane Library were searched until June 15, 2024. Eligible studies included aerobic and/or strength training interventions of 6-78 weeks in females classified as metabolically healthy, at-risk (e.g., prediabetes) or with type 2 diabetes. Assessment of insulin sensitivity (fasting and/or systemic) before and after the intervention was required. Covidence software was used for screening. Of 23,701 articles, 380 were eligible for data extraction, 100 of which reported disaggregated female data. Participant characteristics, menopausal status, exercise training descriptives, and insulin sensitivity measures were extracted. Preliminary analysis of mean differences (MD) in fasting insulin sensitivity (HOMA-IR) were compared using a network meta-analysis with random effects within RevMan. Results: Thirty-two (of 100) articles were included in this preliminary analysis. Participants (n=1316, 47±5 yr, 29.3±3.4 kg/m^2) were premenopausal (n=201/1316 (15%), 35±6yr, 26.9±3.9 kg/m^2), postmenopausal (n= 485/1316 (37%), 59±5 yr, 30.1±3.4 kg/m^2), or unreported (n= 630/1316 (48%), 43±6 yr, 29.5±3.5 kg/m^2). Exercise training significantly improved HOMA-IR regardless of menopausal status (MD: 0.35 [95% CI: 0.23, 0.47]; Z=5.54; p<0.001). Conclusion: Our preliminary analysis suggests that exercise training improves fasting insulin sensitivity in pre- and post-menopausal females. Further analysis will compare how various modes, intensities and durations of exercise influence fasting and systemic insulin sensitivity across menopausal stages.

Session: Session I - C
Time: 9:25 AM
Location: BN307

Lower blood lactate and higher blood glucose responses following a single session of high-intensity interval exercise in females compared to males

Presenter: McKinley Kennedy

Co-author(s): Celine Bailleul, Stephanie Estafanos, Taylor Wilcox, Jenna B. Gillen
Faculty Advisor: Dr. Jenna Gillen
University of Toronto

Introduction: Previous literature suggests that females rely more on fat and less on carbohydrate metabolism compared to males during moderate-intensity aerobic exercise. Additional evidence suggests that females also rely less on anaerobic carbohydrate metabolism during exercise. However, limited research has examined whether these sex differences in fuel metabolism persist during high-intensity interval exercise (HIIE), a form of exercise that relies heavily on carbohydrate for energy provision. Measuring blood glucose and lactate concentrations in response to HIIE would provide valuable insight into potential sex differences in carbohydrate metabolism. Purpose: To determine if biological sex influences the blood glucose and lactate concentrations in response to a single session of HIIE. Methods: Recreationally active males (n=12; 27±5yr, 25±3kg/m2, 52.8±6.4ml/kg FFM/min) and females (n=11; 26±7yr, 23±3kg/m2, 51.5±3.9ml/kg FFM/min) performed an acute bout of HIIE consisting of 12x1 minute intervals at 85% peak power output (PPO) interspersed with 1 minute of recovery at 20% PPO. Venous blood samples were collected pre-HIIE and 5-, 35-, 55-, 75-, and 105-minutes post-HIIE and analyzed for glucose and lactate using auto-analyzers. Results: Blood glucose concentration increased from pre- to 5-minutes post-HIIE (males: 5.2±0.5 vs. 6.6±0.9mmol/L; females: 4.9±0.3 vs. 7.6±1.4mmol/L, $p<0.01$) returning to baseline by 35-minutes post-HIIE. Blood lactate concentration increased from pre- to 5-minutes post-HIIE (males: 0.7±0.2 vs. 10.9±1.9mmol/L; females: 0.8±0.3 vs. 9.0±1.5mmol/L, $p<0.01$) and remained elevated throughout 105 minutes of recovery. The exercise-induced increase in blood lactate was greater in males compared to females (Δ10.2±1.9 vs. 8.3±1.6mmol/L, $p=0.016$), whereas the exercise-induced increase in blood glucose was greater in females compared to males (Δ2.7±1.4 vs. 1.4±0.9mmol/L, $p=0.011$). Conclusion: Our findings demonstrate that a single session of HIIE elicits a larger increase in blood glucose and smaller increase in blood lactate among females compared to males. These findings suggest a reduced reliance on anaerobic metabolism during HIIE among females.

Session: Session I - C
Time: 9:40 AM
Location: BN307

Greater exogenous glucose oxidation in females compared to males at rest and following acute exercise

Presenter: Taylor Wilcox

Co-author(s): Stephanie Estafanos, Daniel West, Celine Bailleul, McKinley Kennedy, Jenna B Gillen
Faculty Advisor: Dr. Jenna Gillen
University of Toronto

Introduction: Previous research from our lab indicates that females oxidize more ingested glucose than males during a standard 75g oral glucose tolerance test (OGTT). Since females are, on average, smaller than males, it remains unclear whether their higher glucose oxidation is due to consuming a larger relative glucose dose during the OGTT or inherent sex differences in glucose metabolism. Additionally, the impact of prior exercise on exogenous glucose oxidation during an OGTT remains unexplored. Purpose: To determine the impact of sex and acute exercise on exogenous glucose oxidation (ExoOx) during an OGTT, with glucose administered as a dose normalized to body mass. Methods: Recreationally active males (n=12; 26±5yr; 24±3kg/m^2; 52.8±6.4ml/kg FFM/min) and females (n=11; 23±7yr; 23±3kg/m^2; 51.5±3.9ml/kg FFM/min) completed two metabolic trials. Participants remained seated (CON) or performed high-intensity interval exercise involving 12x1-min cycling intervals at 85% peak power output (PPO) interspersed with 1 min of recovery at 20% PPO (HIIE). Two hours after rest or exercise, participants consumed a glucose solution (1 g/kg bodyweight) enriched with [U-$^{13}C_6$] D-glucose (0.1%). Breath samples were collected pre-ingestion and every 30 min following the OGTT for 3 h. Total ExoOx (mg/kg bodyweight) was determined via isotope ratio mass spectrometry. Results: Despite consuming less absolute carbohydrate during the OGTT (61±7 vs. 83±9g in males, $p<0.0001$), females demonstrated higher ExoOx compared to males at rest (105±17 vs. 89±17mg/kg) and following HIIE (92±11 vs. 73±6mg/kg, main effect of sex, $p<0.001$). ExoOx following HIIE was lower in both sexes compared to CON (82±9 vs. 97±17, $p<0.001$). Conclusion: ExoOx is higher in females compared to males at rest and following exercise when the OGTT dose is normalized to body mass, suggesting sex-based differences in glucose metabolism. A single session of HIIE reduces ExoOx during an OGTT, likely due to glycogen resynthesis being of increased metabolic priority.

Session: Session I - C
Time: 9:55 AM
Location: BN307

Sex-based Differences in the Effects of Exercise Training on Inflammation

Presenter: Celina Rai

Faculty Advisor: Dr. Michaela Devries-Aboud
University of Waterloo

Background: Inflammation is a key physiological response to stress, injury, and infection, playing a dual role in tissue repair and chronic disease development. While exercise has well-documented anti-inflammatory benefits, sex differences in inflammatory responses to exercise remain underexplored. Hormonal differences, such as the anti-inflammatory effects of estrogen in females and the pro-inflammatory responses observed in males, may contribute to variations in exercise-induced immune adaptations. Understanding these differences is critical for optimizing exercise prescriptions tailored to individual health needs. Methods: This study utilized a randomized, controlled trial design to assess sex-based differences in inflammatory responses to a 12-week combined aerobic and resistance training intervention. Sixty sedentary men and women (aged 20-50, BMI >25 kg/m^2) were recruited and stratified by sex. Participants completed supervised exercise sessions three times per week. Inflammatory markers-including interleukin-6 (IL-6), tumor necrosis factor-alpha (TNF-α), interleukin-10 (IL-10), and C-reactive protein (CRP)-were quantified via enzyme-linked immunosorbent assays (ELISAs) from pre- and post-intervention fasting blood samples. VO_2peak and 1-repetition maximum strength tests were used to assess training efficacy. Results: Preliminary findings indicate that while both sexes experienced reductions in baseline inflammation, males exhibited a greater initial pro-inflammatory response post-exercise, followed by a sustained decline in CRP and TNF-α. In contrast, females demonstrated an attenuated pro-inflammatory response but a more pronounced increase in IL-10, suggesting a stronger regulatory effect on inflammation. Sex-based differences were particularly evident in post-exercise cytokine recovery kinetics, with males displaying prolonged elevations in IL-6. Conclusion: These findings suggest that while exercise universally reduces systemic inflammation, the magnitude and duration of responses differ between sexes, likely mediated by hormonal and physiological factors. Understanding these distinctions can inform personalized exercise interventions to mitigate chronic inflammation and improve metabolic health in at-risk populations. Future studies should consider menstrual cycle phases and hormonal fluctuations when evaluating inflammatory responses in female participants.

Session: Session I - C
Time: 10:10 AM
Location: BN307

Muscle Macrophage Response to Damaging Exercise

Presenter: Andrea Viloria Medina

Co-author(s): Mai Wageh, Hannah Luong, Zainah Minawi, James McKendry, Changhyun Lim, Stuart M. Phillips, Gianni Parise

Faculty Advisor: Gianni Parise, PhD

McMaster University

Background: Rigorous exercise causes muscle damage, initiating an immune response characterized by the recruitment of skeletal muscle macrophages, essential phagocytic cells involved in muscle tissue repair. Macrophages exist in two primary classifications: M1 (pro-inflammatory) and M2 (anti-inflammatory), each playing different roles in muscle regeneration. Sex-based differences in the myogenic response to muscle injury have been observed, but the mechanisms driving these differences, specifically relative to macrophage expression and the subsequent inflammatory response, remain poorly understood. Purpose: To investigate sex-based differences in the inflammatory response to unaccustomed eccentric exercise. We hypothesized that females would exhibit a blunted inflammatory response compared to males, potentially due to hormonal differences. Methods: 30 healthy young males and females (n=15 per group, 21 ± 1 years [mean ± SEM]) performed 300 maximal eccentric contractions of the knee extensors on an isokinetic dynamometer. Muscle biopsies were taken at baseline (Pre), 24h, and 48h following eccentric damage. Skeletal muscle macrophage content was determined via immunohistochemistry. Results: M1 macrophages were comparable between males and females across all time points. However, a significant time x sex interaction was observed in M2 macrophages per fiber ($p = 0.04$), indicating a sex-specific divergence in the macrophage response. At 24 hours, males exhibited significantly greater M2 macrophage content per fiber (0.30 ± 0.07) compared to females (0.12 ± 0.03). Conclusion/impact: Our findings indicate that sex-based differences exist in the skeletal muscle inflammatory response following damaging exercise. Further research is needed to elucidate the underlying mechanisms driving these differences and enhance our understanding of female physiology.

Session: Session I - C
Time: 10:25 AM
Location: BN307

Central fatigue assessment following high-intensity exercise performed in human dorsiflexor muscles

Presenter: Alireza Vaziri

Co-author(s): Andrew J. Richards, Rohin Malekzadeh, Sarva Saeid
Faculty Advisor: Dr. Arthur J. Cheng
York University

Background: Central fatigue (CF) is defined as a progressive exercise-induced failure in the voluntary activation (VA) of the muscle. Muscle afferent III/IV neurons are proposed to be major contributors to central fatigue development by detecting increases in intramuscular metabolite accumulation that leads to inhibition of descending neural drive during voluntary contractions. Yet, during high-intensity exercise, few studies show evidence of central fatigue using the interpolated twitch technique. These results contradict the current hypotheses regarding the inhibitory function of group III/IV afferents on the voluntary activation of muscles. Objective: 1) To develop a method to better evaluate central fatigue during high-intensity interval exercise (HIIE). 2) To investigate the proposed influence of group III/IV metabolite receptors on central fatigue development during HIIE. Hypothesis: It was hypothesized that voluntary activation failure would be evident following metabolically-demanding HIIE by assessing central fatigue during a 60 s sustained maximal effort contraction that stresses the neural activation of muscle. Methods: Ten healthy, recreationally active adult human participants (7 M; 3 F) performed six sets of 30 s all-out isokinetic concentric dorsiflexion at 160°/s. Each bout was followed by a 60 s sustained maximal voluntary contraction (MVC) whereby twitch interpolation was performed every 10 s during the MVC to measure voluntary activation. Each set was followed by a 2-min rest. Results: No voluntary activation failure was observed during the 60 s sustained MVCs relative to first interpolated twitch within each set. Relative to the pre-exercise set, some voluntary activation failure was observed at the following sets and timepoints (VA%): Post set-1 at 20 s (93%, $p<0.05$), post set-3 at 0 s and 20 s (93% and 89%, respectively $p<0.05$), and post set-5 at 10 s (93%, $p<0.05$). Conclusion: Our study revealed that the human dorsiflexor muscles are resilient against central fatigue development during metabolically-demanding high-intensity exercise.

Session: Session I - D
Time: 8:55 AM
Location: WS2007

Evaluating the Effects of Protein Supplementation Coupled with Progressive Lighter Weight Resistance Training on Lean Muscle Mass and Strength in Older Overweight Men and Women

Presenter: Tracy Su

Co-author(s): Caroline V. Lowisz, Tom Janssen
Faculty Advisor: Dr. Stuart Phillips
McMaster University

Background: Sarcopenia, a decline in muscle mass and strength, elevates falls, disability, and mortality risks in older adults (≥60 years). Anabolic resistance, a diminished muscle protein synthesis response to dietary protein supplementation (PS) and resistance training (RT), exacerbates this age-related muscle loss. While progressive RT counters sarcopenia, the synergistic role of PS in enhancing RT-induced adaptations in overweight older persons remains understudied. Current dietary guidelines (0.8g/kg/day) may inadequately address age-related metabolic inefficiencies, and PS could optimize muscle preservation with RT. Objective: To evaluate whether augmenting progressive RT with PS improves lean body mass (LBM) and strength in overweight older adults. The secondary objective is to determine whether protein intake distribution throughout the day (even vs. skewed) differentially influences these adaptations over 12 weeks. Methods: Forty-one overweight older adults (60-85 years) completed a supervised 12-week progressive lighter-load full-body RT intervention (3x/week). All participants consumed 25g of protein twice daily, in addition to their habitual diet. LBM was assessed by dual-energy X-ray absorptiometry, and strength was measured via 5-repetition maximum (5RM), at baseline and post-intervention. Results: There was a significant main effect of time indicating that LBM and 5RM increased ($p<0.05$) for all 6 exercises. However, post hoc analyses indicated a significant increase in LBM only in the skewed-protein group ($p<0.05$), whereas there was no difference in 5RM between both groups ($p>0.05$). Significance: By evaluating the interplay of PS and progressive RT, this study aimed to advance strategies for mitigating age-related muscle loss in overweight older adults. Findings can inform revised protein guidelines and reinforce progressive RT as an intervention for increasing strength and preventing sarcopenia. Future research should explore the long-term effects of protein intake distributions (even vs. skewed), in conjunction with progressive RT, to mitigate sarcopenia and improve functional independence.

Session: Session I - D
Time: 9:10 AM
Location: WS2007

The effect of menstrual cycle phase-based training on muscular strength adaptations

Presenter: Lauren Roxburgh

Co-author(s): Alysha D'Souza, Derrick Van Every
Faculty Advisor: Dr. Stuart Phillips
McMaster University

BACKGROUND: Menstrual cycle phase-based training (MCPBT) has been proposed as a strategy to optimize resistance training adaptations in women by manipulating training volume with hormonal fluctuations. The main thesis underpinning MCPBT is that estrogen (higher in the follicular phase) is an anabolic hormone that promotes muscular adaptations. In contrast, progesterone, which is elevated in the luteal phase, is proposed to be counteract estrogen's effects, making this phase less conducive to anabolic responses. As a result, MCPBT suggests programming higher training volumes during the follicular phase and lower volume during the luteal phase. Despite its theoretical basis, current evidence remains unclear regarding the efficacy of MCPBT due to the inconsistent methodological rigour used in previous research. OBJECTIVE: Thus, the aim of this study was to examine whether an MCPBT protocol would elicit superior strength gains compared to a constant resistance training regimen using best practices. METHODS: Employing a unilateral design, twenty-four participants (aged 18-30) had each leg block-randomized to one of four training conditions: (1) LUT (higher volume in the luteal phase), (2) FOL (higher volume in the follicular phase), (3) EX (consistent, moderate volume across phases), or (4) CON (non-exercise control). Participants completed supervised resistance exercise training (RET) twice per week, performing leg press and leg extensions for a total of three menstrual cycles. Urinary ovulation tests were used to track and assess menstrual cycle phase. Maximal strength was measured pre- and post-intervention using isometric knee extension (Biodex), one-repetition maximum (1RM) leg press, and 1RM leg extension. EXPECTED RESULTS: Assuming the theory behind MCBPT is correct, we hypothesized that EX and FOL legs would show greater strength gains than LUT, and all three trained groups would show greater strength gains than CON. Statistical analysis is currently ongoing, and results will be presented at the conference.

Session: Session I - D
Time: 9:25 AM
Location: WS2007

The Influence of Menstrual Cycle Phase and Chronic Resistance Exercise Training on Mood, Acute Affect, and Exercise Enjoyment

Presenter: Anmol Bhinder

Co-author(s): Alysha D'Souza, Derrick Van Every
Faculty Advisor: Dr. Stuart Phillips
McMaster University

BACKGROUND: While research increasingly explores the effects of menstrual cycle phases on exercise performance and adaptation, little is known about their role in shaping psychological responses, such as mood and exercise enjoyment, during chronic resistance exercise training (RET). Studies have shown that women report symptoms across the menstrual cycle that may affect their engagement, enjoyment, and subjective well-being post-exercise. Additionally, the impact of chronic RET on menstrual cycle symptomology remains poorly understood. OBJECTIVE: This study aimed to examine: (1) How mood varies across the menstrual cycle and whether chronic RET influences these changes; (2) The effect of RET on acute affective responses to exercise across cycle phases; and (3) Whether menstrual cycle phase influences exercise enjoyment. METHODS: Participants (n = 24) engaged in chronic RET for 12 weeks or approximately three menstrual cycles while completing psychological questionnaires before and after training sessions. Mood was assessed using the Profile of Mood States and Premenstrual Symptoms Screening Tool, acute affect was measured with the Feeling Scale, and exercise enjoyment was evaluated using the Physical Activity Enjoyment Scale. Daily urinary ovulation tests were used to track menstrual cycle phases. HYPOTHESIS: We hypothesized that there would be adverse menstrual cycle phase-specific symptoms that would peak around menstruation and/or ovulation that may affect women's enjoyment of exercise. STATISTICAL ANALYSIS: Data will be analyzed using RStudio. Total scores for each questionnaire will be calculated per session and averaged within the follicular and luteal phases. Shapiro-Wilk tests assessed normality, and paired t-tests were used for normally distributed data. RESULTS/CONCLUSION: Data analysis is ongoing, and results will be presented at the conference.

Session: Session I - D
Time: 9:40 AM
Location: WS2007

The Effects of Menstrual Cycle Phase-Based Training on Skeletal Muscle Hypertrophy

Presenter: Grace Lamont

Co-author(s): Alysha D'Souza, Derrick Van Every
Faculty Advisor: Dr. Stuart Phillips
McMaster University

Resistance exercise training (RET) is the most potent nonpharmacological stimulus of skeletal muscle hypertrophy, hallmarked by an increase in muscle cross-sectional area (CSA). However, the influence of the menstrual cycle (MC) and the associated hormonal fluctuations hypertrophy remains unclear. Estrogen, which is elevated in the follicular phase, may have anabolic effects, whereas progesterone, at its peak in the luteal phase, is theorized to have anti-estrogenic effects. These theories have led to a concept of menstrual cycle phase-based training (MCPBT), where training volume is adjusted according to the MC phase in order to take advantage of a higher estrogenic environment and emphasize heavier loading during the follicular phase. However, research in this area remains inconclusive, and few studies used an MCPBT approach compared to a conventional continuous training approach. This study aimed to investigate the effects of MCPBT on skeletal muscle hypertrophy in young, eumenorrheic females. Twenty-four eumenorrheic and previously untrained young females (18-30 years) were recruited. Participants' legs were randomized into one of four groups (n=12 per group): follicular phase-based training (FOL), luteal phase-based training (LUT), continuous training (EX), and non-exercise control (CON). Vastus lateralis CSA was assessed via ultrasound at baseline and post-intervention. The RET intervention consisted of leg press and leg extension exercises, performed twice per week over three menstrual cycles. Training volume was adjusted by modifying the number of working sets per exercise session. FOL completed high volume during the follicular phase and low volume during the luteal phase, while LUT followed the opposite pattern. EX maintained a consistent training volume across both menstrual cycle phases. We hypothesized that EX and FOL legs would show greater hypertrophy than LUT, and all three trained groups would show greater hypertrophy than CON. Data analysis is ongoing, and the results will be presented at the conference.

Session: Session I - D
Time: 9:55 AM
Location: WS2007

The Influence of Menstrual Cycle Phase Based Training on Muscle Fiber Area and Type

Presenter: Anojan Suthaharan

Co-author(s): Alysha C. D'Souza, Derrick Van Every, Stuart M. Phillips
Faculty Advisor: Dr. Stuart Phillips
McMaster University

Background: Skeletal muscle hypertrophy is essential for improving metabolic health, increasing muscle strength, and enhancing athletic performance. However, females remain underrepresented in resistance training research, particularly regarding how hormonal fluctuations across the menstrual cycle influence hypertrophic adaptations. While some studies suggests that training responses may vary between the follicular (high estrogen) and luteal (high estrogen and progesterone) phases due to hormonal differences, other studies report no significant effect of phase-based training on hypertrophy. This inconsistency highlights a gap in understanding the optimal approach to maximize muscle growth in females. Aim: Thus, the aim of this study was to examine whether menstrual cycle phase-based resistance training (MCPBRT) leads to greater muscle hypertrophy and strength adaptations compared to traditional, non-phase-dependent training. Methods: Healthy, eumenorrheic females (18-30 years), who were recreationally active, participated in this study. Each participant had one leg randomly assigned to one of four groups: a follicular-phase training group (FOL), a luteal-phase training group (LUT), a constant-volume exercise group (EX), or a non-exercising control group (CON). The training protocol consisted of unilateral leg press and leg extension exercises performed to failure in the 8-12 rep range. The follicular-phase leg completed higher training volume (5 sets) during the follicular phase and lower volume (1 set) during the luteal phase, while the luteal-phase leg followed the opposite pattern. The constant exercise leg performed 3 sets per session throughout the cycle. Muscle biopsies were taken at baseline and post-training to assess fiber CSA and type. Hypothesis: Assuming the MCPSRT thesis is correct we hypothesize that fibre type increases should be greatest in FOL and EX vs. LUT and all greater than CON. Statistical Analysis: A linear mixed effect model will be used for statistical analysis. Results: Data analysis is ongoing, and the results will be presented at the conference.

Session: Session I - D
Time: 10:10 AM
Location: WS2007

Evaluating the Effects of Greek Yogurt and Exercise on Body Composition and Markers of Bone Turnover in Older Adults.

Presenter: Jennifer McGraw

Faculty Advisor: Panagiota Klentrou, PhD, FCSEP & Madison Bell, MSc
Brock University

Bone-related diseases like Osteoporosis and Osteopenia are on the rise worldwide and are especially prevalent in aging populations. These diseases are characterized by decreased bone mineral density, which increases the risk of fractures, leading to impaired mobility and increased recovery time. The aim of this study is to examine whether increased consumption of Greek yogurt in conjunction with regular exercise can lead to improvements in body composition and markers of bone turnover in adults over the age of 55 years. A total of 60 participants have been recruited to participate in an 8-week intervention. Based on their self-reported physical activity levels, participants have been assigned to one of three groups: Greek Yogurt with Exercise (GY+EX), Greek yogurt only (GY), and exercise only (EX). The GY+EX group consumes 175 g GY (1 serving: flavoured, 0%, 130 calories, 17 g protein, 225 g calcium) twice a day combined with an organized exercise program twice per week. Participants in the GY group only consume the 175 g GY twice a day, and participants in the EX group only participate in the exercise program twice per week. Participants complete a Food Frequency and Activity Questionnaire (FFAQ) and have their body composition measured using bioelectrical impedance analysis (BIA) at the study's commencement (week 0), and at the end of the intervention period (week 8). Fasted blood draws are also collected during weeks 0, and 8 to measure bone biomarkers (osteocalcin, P1NP, OPG, CTX, RANKL, sclerostin). It is hypothesized that participants in the GY+EX group will show the greatest improvements in body composition and a swift towards bone turnover balance, when compared to both the GY and EX groups. We anticipate that the findings of this study will provide valuable insights regarding the role of nutrition and exercise in older adults, offering practical recommendations to prevent

Session: Session I - E
Time: 8:55 AM
Location: WSB67

"Don't Hold me Back!" Visual Delays in Virtual Reality Alter Movement Accuracy and Kinematics in Visually Guided Manual Pointing Tasks

Presenter: Gavin Gibbs

Co-author(s): Michael Wang, Luc Tremblay
Faculty Advisor: Tim Welsh, PhD
University of Toronto

Virtual Reality (VR) is increasingly integrated into fields to offer innovative solutions such as surgical simulations in health care and immersive learning environments in education. The benefits of VR are especially important when physical environments are not feasible. However, motion-to-photon latency, or visual delay, remains a critical limitation in VR and affects performance as well as overall user experience. While previous research has examined the effects of latency on user experience and performance, less is known about how specific delays impact movement accuracy and kinematics in visually-guided tasks in VR. This study investigates how visual delays in VR impact movement accuracy and kinematics. To investigate the effects of visual delays in VR, participants performed visually-guided manual pointing tasks under different delay conditions between when the physical movements occurred and the motion of the virtual hand moved. Preliminary data showed that increases in visual delay up to 200ms increased constant error, with constant error plateauing from 200ms to 500ms of delay. Movement time also increased with increases in visual delay up to 200ms, but then decreased from 200ms to 500ms of delay. While the findings show movement time increases with increases in delay up to 200ms, potentially due to participants strategy of attempting to combat the mismatch between visual and proprioceptive information, by slowing down in the presence of delay. However, movement time decreases at 500ms compared to 200ms delay. As the 500ms delay is the same time as task completion time, participants potentially decouple visual and proprioceptive feedback, completing the task solely with proprioceptive feedback, not attempting to utilize online visual feedback and counteract mismatch. These findings highlight the need for effective latency compensation systems in VR applications. Understanding how visual delay affects movement can help optimize VR systems for better accuracy, responsiveness, and user performance.

Session: Session I - E
Time: 9:10 AM
Location: WSB67

“Hey, watching this!" The effect of constant vs variable practice on novice dyads learning a putting task

Presenter: Martina Kacan

Co-author(s): Sara Thompson, Ross Murray, Xiaoye (Michael) Wang, Catherine Sabiston, Tim Welsh
Faculty Advisor: Tim Welsh, PhD
University of Toronto

Dyadic practice, where two individuals alternate between performing and observing, facilitates motor learning by integrating physical execution with observational strategies. Observational learning is fundamental to motor skill acquisition, allowing individuals to refine movements by analyzing others' actions. The present study investigated the performance and psychosocial effects of dyadic practice and practice schedule variability on skill acquisition, retention, and transfer in a golf putting task. Sex-matched dyads with minimal putting experience completed a golf putting task over two consecutive days. On Day 1, dyads completed the acquisition phase in which each participant was randomly assigned to either a variable or constant practice schedule. The constant schedule entails putting consistently 200cm from the target whereas the variable schedule includes putting from 150cm, 175cm, 225cm, or 250cm away from the target. Dyads completed 50 alternating trials, enabling observational learning through observation of hand position, swing pattern, strength and putt outcome. Performance was assessed by the distance between the target and ball. On Day 2, participants completed retention and transfer test from novel distances (185cm and 215 cm) to evaluate skill consolidation and adaptability. Preliminary results indicate comparable radial error between the constant and variable practice conditions in the pretest. During the acquisition stage, both conditions demonstrated similar reductions in error with the constant practice. However, in the transfer test, participants in the constant practice condition exhibited lower radial error compared to those in the variable practice condition, suggesting that while both practice schedules improve performance during acquisition, constant practice may enhance transfer accuracy and reinforce dyadic observational learning more effectively than variable practice. Further analyses will explore whether these trends persist in retention tests and contribute to long-term adaptability in motor skill learning.

Session: Session I - E
Time: 9:25 AM
Location: WSB67

"Now you see me, now you don't": The Impact of Removing Visual Hand Feedback on the Accuracy of Aiming Movements in VR

Presenter: Matthew Prenevost

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

Virtual reality (VR) and immersive environments can simulate real-world interactions, yet inherent perceptual distortions may affect their accuracy. One such distortion, perceptual depth compression, causes the visual world in VR to appear smaller than the real physical world. This leads to underestimated target distances and potentially prolonged movement times. This study aimed to determine the temporal threshold at which visual hand feedback becomes critical for online corrections in VR, specifically examining the impact of depth compression. We hypothesized that a lack of visual feedback, particularly early in movement, would decrease pointing accuracy and induce systematic overshooting errors due to online adjustments for depth compression. To this end, eleven participants performed pointing movements in an immersive VR environment, where vision of the virtual hand was removed at six distinct time intervals after movement initiation. Participants completed 6 blocks, each containing 56 trials of pointing movement to targets at varying distances. Preliminary results indicate a significant decrease in pointing accuracy when visual hand feedback was removed, with error increasing as the amount of visual feedback of the hand decreased. The most pronounced error was observed when feedback is removed at 50ms and immediately after the start of the movement, while error plateaued when vision of the hand was removed about 100ms after movement onset. Notably, the errors were overshoot errors suggesting a potential overcorrection following initial depth compression generated by VR. These findings strongly suggest the presence of perceptual depth compression, particularly when feedback is limited early in the movement, leading to systematic errors in distance estimation and subsequent motor adjustments. Based on the current data, it is tentatively concluded that approximately 100ms is the temporal threshold at which this depth compression becomes critical for online corrections. Further data analysis is required to solidify these preliminary findings and establish the critical threshold.

Session: Session I - E
Time: 9:40 AM
Location: WSB67

Mind and Motion: Examining Motor Imagery and Dance for Parkinson's Disease Rehabilitation Through Kinematic Analysis

Presenter: Melina Lavasidis

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

BACKGROUND: Parkinson's disease (PD) is a neurodegenerative disorder characterized by motor impairments such as bradykinesia, tremor, and rigidity, along with cognitive and emotional symptoms. While pharmacological treatments are standard, alternative interventions like exercise and dance show promise in enhancing motor function and neuroplasticity. Motor imagery (MI), the mental rehearsal of movement without execution, is an additional, accessible rehabilitation method, that can be effective for those with motor limitations. This study examines the potential effects of interventions including MI and dance on motor function in individuals with PD, using kinematic analysis to assess movement outcomes. METHODS: Fifteen participants with mild to moderate PD, and five healthy older adult controls (HC) have been recruited thus far. Participants completed baseline cognitive and MI assessments. Across 2 sessions, participants observe and imitate short, seated dance sequences across two blocks of 10 trials. Dance trials were performed under conditions without MI (session 1) and with explicit MI instructions (session 2) to determine whether MI enhances movement. Performance is recorded using Theia markerless motion capture. DATA ANALYSIS: Joint angle data will be extracted from Theia markerless using Visual 3D software. Kinematic measures including movement amplitude, velocity, and smoothness, will then be compared between MI and non-MI sessions in both groups. Kinematic measures will also be analyzed in relation to baseline MI measures. IMPACT: By assessing MI as a neurorehabilitation tool, particularly when integrated with dance-based exercise, this study aims to inform accessible, non-pharmacological interventions for PD and other neurological movement disorders.

Session: Session I - E
Time: 9:55 AM
Location: WSB67

Repetitive Transcranial Magnetic Stimulation Paired with Augmented Reality to Alter Concussion Symptoms

Presenter: Ariana Blake-Parsons

Co-author(s): Daniel Soppitt (MSc Candidate)
Faculty Advisor: Aimee Nelson, PhD
McMaster University

BACKGROUND: Concussions are among the most common neurologic conditions, with an estimated 42 million people worldwide sustaining a concussion each year. Up to 25% of these individuals experience persistent post-concussion dizziness (PCD), which significantly impairs quality of life and daily function. Augmented reality sensorimotor training (ARST) offers a novel, interactive approach to reducing PCD symptoms by gamifying traditional balance exercises. The efficacy of ARST may be enhanced through repetitive transcranial magnetic stimulation (rTMS), a non-invasive brain stimulation technique that improves motor skill acquisition and balance in stroke patients when paired with motor training. We hypothesize that rTMS may enhance ARST through similar mechanisms in PCD patients. OBJECTIVE: To determine whether rTMS paired with ARST improves dizziness and other post-concussion symptoms in PCD patients compared to ARST alone. METHODS: Forty participants (aged 18-65 years) suffering from PCD for at least 3 months post-concussion will be randomly assigned to receive REAL rTMS or SHAM (placebo) rTMS delivered to left M1. rTMS will be delivered in 600-pulse blocks, separated by 15 minutes, for a total of 1800 pulses per day. Participants in both groups will engage in 5-10 minutes of the same ARST following each 600-pulse stimulation block. The intervention will occur for 14 days over 3 weeks. Dizziness disability, our primary outcome, will be evaluated via the Dizziness Handicap Inventory (DHI). Additional post-concussion symptoms will be assessed using objective and subjective measures. All outcomes will be measured at baseline (T0) and post-intervention (T1). The mean change in DHI score over time (T0, T1) will be analyzed between groups using an independent t-test (REAL, SHAM). IMPACT: This will be the first randomized controlled trial to use rTMS on PCD patients and the first to combine rTMS with ARST to improve dizziness disability in this population.

Session: Session I - E
Time: 10:10 AM
Location: WSB67

Pain modulation in patients with fibromyalgia post 2-week cTMS intervention

Presenter: Ilesha Prabhudesai

Co-author(s): Stevie Foglia (PhD), Chloe Drapeau (MSc Candidate), Jiyeon Park (MSc Candidate)
Faculty Advisor: Aimee Nelson, PhD
McMaster University

Fibromyalgia is a pain syndrome characterized by chronic, non-inflammatory, musculoskeletal pain, fatigue, joint stiffness, and sleep and cognitive disturbances. The pathophysiological cause is unknown, however, two theories- central sensitization and sensorimotor- propose possible explanations. Current treatments do not elicit sustainable, long-term analgesic effects. The literature proposes biphasic transcranial magnetic stimulation (rTMS) as a therapeutic method for chronic pain to achieve analgesic-like effects, however, its effects on fibromyalgia pain symptoms are inconclusive. Comparatively, monophasic TMS (cTMS) observes greater and longer-lasting effects on corticospinal excitability and inhibition. Primary Objective: To determine whether a two-week 10 Hz cTMS protocol will alter pain in individuals with fibromyalgia. Secondary Objective: To determine whether a two-week 10 Hz cTMS protocol will alter neurophysiological measures- motor evoked potentials, (MEPs), short-interval intracortical inhibition (SICI)- in individuals with fibromyalgia. Hypothesis: A two-week 10 Hz cTMS protocol will improve pain symptoms and increase the quality of life of individuals with fibromyalgia. An increase in excitability (MEPs) and inhibition (SICI) will be observed. Methods: Thirty participants ages 18-75 with a fibromyalgia diagnosis will be set into either the 10 Hz cTMS or sham group, blinded to their condition. Baseline assessments at T0, also replicated post-intervention at T1, include pain and function questionnaires, sensorimotor tasks, and TMS measures of MEPs and SICI. Participants will undergo 10 sessions of a 10 Hz cTMS or sham intervention. A 3-month follow-up post-T1 will record questionnaire data. Activity data from Fitbit is recorded throughout. Expected Results: A sustained increase in excitability (MEPs) and inhibition (SICI) at the corticospinal tract and decreased pain and function symptoms from questionnaire data will illustrate reduced effects of central sensitization and increased quality of life, respectively. Conclusion: This novel cTMS intervention seeks to produce analgesic effects in fibromyalgia patients, creating an avenue for pain treatment and improving their quality of life.

Session: Session I - E
Time: 10:25 AM
Location: WSB67

Investigating the effects of cortico-cortico paired associative stimulation in young individuals

Presenter: Emillee York

Co-author(s): Faith Adams
Faculty Advisor: Aimee Nelson, PhD
McMaster University

BACKGROUND: Transcallosal projections extend through the corpus callosum and facilitate communication and inhibition between right and left hemispheres-a function that is critical for many coordinated unimanual and bimanual movements. Transcallosal inhibition is where one hemisphere suppresses activity in the other hemisphere to prevent unwanted movements from occurring. We can measure transcallosal inhibition using transcranial magnetic stimulation (TMS), a form of non-invasive brain stimulation that probes neural circuits to enhance our understanding of how the brain functions. Transcallosal inhibitory circuits are altered in many clinical populations, making them valuable targets of neuromodulatory efforts. Cortico-cortico paired associative stimulation (cc-PAS) is an emerging dual-site TMS technique in which pairs of pulses are delivered to two connected cortical areas to modulate brain function. Cc-PAS has been designed to induce neuromodulation, or changes in the brain, to regulate cortical excitability, optimize brain functioning, and encourage learning. Understanding how cc-PAS impacts corticospinal excitability could have implications for future rehabilitative efforts in clinical populations with interhemispheric imbalances. AIM: We aimed to examine the effect of cc-PAS on corticospinal excitability and interhemispheric inhibition. METHODS: Cc-PAS was administered over the first dorsal interosseous (FDI) muscle representation of both motor cortices in 36 right-handed healthy male and female participants (aged 18-25). Cc-pas consisted of 180 pairs of pulses delivered 10ms apart, where the first pulse of the pair would be delivered over the right primary motor cortex. Neurophysiological measures to quantify cortical excitability were collected before and after the intervention. Our primary outcome measures were interhemispheric inhibition (IHI) and motor evoked potentials (MEPs) to assess how cortical excitability changed with cc-PAS administration. RESULTS: Preliminary results show that corticospinal excitability and motor performance increased in the left hemisphere following cc-PAS.

Session: Session II - A
Time: 10:50 AM
Location: BN302

The Effect of Percussive Massage on the Lower Extremity Posterior Chain of Competitive Dancers

Presenter: Alleigh-Jane Williamson

Faculty Advisor: Paolo Sanzo, DSc
Lakehead University

Background: Dancers require flexibility and range of motion (ROM) as crucial components for seamless performance and injury prevention. Foundational ROM movements such as turnout, high kicks, and relevé begin with training the gluteal, hamstrings, and calf muscles, where imbalances or lack of flexibility and tight muscles can lead to fatigue or injuries. Percussive massage involves applying a short burst of vibrations to the targeted muscles in order to increase ROM and improve blood flow to the targeted muscle and is often used by athletes as part of their warm-up. To date, no research has examined the effect of percussive massage ROM on competitive dancers. Objective: To examine the effect of percussive massage on the gluteal, hamstrings, and calf muscles ROM in competitive dancers. Method: Using a crossover study design with a 72-hour washout period, 11 healthy female competitive dancers aged 15-19 years completed this study. Three 5-minute unilateral percussive massages were performed on the gluteal, hamstrings, and calf muscles of the participant's dominant leg. Hip internal rotation, hip flexion, and ankle dorsiflexion were measured using a goniometer pre-and post-treatment. Descriptive statistics and a Wilcoxon Signed-Rank Test was computed for each dependent variable with $p<.05$. Results: There was no statistically significant difference for hip internal rotation ROM ($Z=.892$, $p = .372$) and ankle dorsiflexion ($Z=-1.693$, $p=.090$). However, there was a statistically significant difference in hamstring flexibility via the Straight Leg Raise Test ($Z=-2.809$, $p= .005$). Conclusion: Percussive massage used as part of a dancer's warm-up may assist with improving ROM in the hamstrings but more research with a larger sample size is required to determine the clinical utility of this.

Session: Session II - A
Time: 11:05 AM
Location: BN302

Examining the sex-based effects of senolytics and aerobic exercise on cardiac fibrosis and function in advanced age

Presenter: Samara Al-Mfarej

Co-author(s): Ryan Bevington
Faculty Advisor: Dr. Gianni Parise
McMaster University

BACKGROUND: Cellular senescence is a hallmark of aging that has been implicated in the age-related decline in cardiac functioning. Senescent cells undergo irreversible cell-cycle arrest, resulting in structural changes to the heart, such as increased myocardial fibrosis. Evidence suggests that biological sex influences factors of aging and senescence. Senolytic drugs, such as Dasatinib and Quercetin (D+Q), target and promote the clearance of senescent cells, offering an effective therapeutic strategy. Recently, aerobic exercise has also shown promise in the elimination of senescent cells. Due to sex-based physiological differences, these interventions may impact cardiac health differently in males and females. We hypothesize that combining senolytics and exercise will reduce senescence and improve cardiac function, with aged male mice demonstrating more pronounced dysfunction. METHODS: Twelve-month-old male and female mice (n=6 per group) were randomized into 1 of 4 groups: VEH (naturally aging), EX (30 min treadmill; 2x/week), SEN (biweekly D+Q administration via oral gavage) or SENEX (exercise and D+Q) for 9 months. A young healthy control group was also included. Mice received assessments for cardiac function and picrosirius red staining was used for myocardial fibrosis. RESULTS: Regarding cardiac function, the VEH group showed a significantly higher isovolumetric relaxation time and a myocardial performance index when compared to the other groups. No sex-differences in fibrosis were found between the treatment groups for the aged mice. However, male mice in the VEH, SEN and EX groups showed significant differences in fibrosis compared to the young group. For female mice, only the VEH group showed significant fibrosis differences compared to the young control. IMPLICATIONS: This study will offer insights on sex-specific healthy aging strategies and the development of effective treatments for cardiac diseases.

Session: Session II - A
Time: 11:20 AM
Location: BN302

Effects of 12-Weeks of Exercise on Sleep Quality and Glycemic Control in Young Adults with T1D: Findings from the HOMET1D Clinical Trial.

Presenter: Melina Alborzi

Faculty Advisor: Dr. Irena Rebalka
McMaster University

BACKGROUND: This study, part of the HOMET1D clinical trial, investigates the effects of a 12-week exercise intervention on sleep quality and glycemic control in young adults with Type 1 Diabetes (T1D). Given the increased risk of sleep disturbances and glycemic variability in individuals with T1D, the study examines whether adherence to Diabetes Canada's exercise guidelines, 150 minutes of moderate-to-vigorous aerobic exercise per week and two sessions of resistance training, can enhance these health outcomes. METHODS: A cohort of young adults with and without T1D participated in the intervention. Sleep parameters, including total sleep duration and time spent in REM, light, and deep sleep stages, were continuously monitored using Garmin Venu Sq devices. Glycemic control was assessed via continuous glucose monitoring (CGM) metrics (time-in-range, time above range, time below range) and blood biomarkers (fasting glucose and HbA1c). The primary analysis compared pre-to-post-intervention changes in sleep and glycemic metrics among participants with T1D. Secondary comparisons were made against a non-T1D control group, and tertiary analyses explored potential sex-based differences in responses to exercise. PRIMARY FINDINGS: Preliminary findings indicate improvements in sleep quality, including increased deep sleep, critical for metabolic regulation, and reductions in glycemic variability, suggesting improved glycemic control over 12 weeks. Further analyses and statistical tests are underway to evaluate associations between exercise intensity minutes and specific changes in sleep and glycemic outcomes. SIGNIFICANCE: This study enhances our understanding of the interplay between exercise, sleep quality, and metabolic health in young adults with T1D. The findings suggest that self-guided adherence to minimum exercise recommendations may offer a practical strategy for improving both sleep and glycemic outcomes. These insights have implications for clinical guidelines and lifestyle interventions aimed at mitigating long-term complications of T1D and enhancing quality of life.

Session: Session II - A
Time: 11:35 AM
Location: BN302

The Effects of Exercise and Detraining on Strength and Body Composition in Individuals with and without Type 1 Diabetes

Presenter: Maya Tsipris

Faculty Advisor: Dr. Irena Rebalka
McMaster University

BACKGROUND: Type 1 diabetes (T1D) is associated with impaired skeletal muscle metabolism and function due to chronic dysglycemia. These deficits contribute to reduced strength, endurance, and overall physical performance, impacting long-term health and independence. Exercise has been shown to improve mitochondrial function and muscle health, yet individuals with T1D lack tailored exercise guidelines. This study aims to evaluate the relationship between muscle strength (Biodex and handgrip dynamometer) and body composition (DXA), following exercise and detraining in individuals with and without T1D. METHODS: Participants (aged 18-35) were recruited into T1D and control groups, ensuring that all were not currently meeting Canadian exercise guidelines. Baseline assessments of body composition (fat and lean mass via DXA) and muscle strength (Biodex peak torque, handgrip dynamometry) were conducted. Participants completed a 12-week exercise program following standard Canadian guidelines (150 minutes of aerobic activity per week, biweekly resistance training), followed by one week of detraining via unilateral limb immobilization. Measurements were repeated post-training and post-detraining. Statistical analyses will compare changes in strength and body composition between groups and across time points. EXPECTED OUTCOMES: Based on existing literature, we anticipate that both groups will exhibit increased lean mass and strength following training, with attenuated gains in T1D participants. Detraining is expected to result in greater losses in strength and lean mass among the T1D group compared to controls, highlighting potential impairments in muscle plasticity and recovery. SIGNIFICANCE: This study seeks to provide insights into how exercise and detraining impact muscle health in individuals with T1D, addressing a critical gap in exercise prescription for this population. Findings may inform future guidelines tailored to improving strength and functional outcomes in T1D. Further research should investigate long-term adaptations and optimal training strategies to mitigate muscle deficits in T1D individuals.

Session: Session II - A
Time: 11:50 AM
Location: BN302

Investigating The Relationship between Maximal Isometric Strength and Measures of Dynamic Performance in Collegiate Female Basketball Athletes

Presenter: Anaikh Randhawa

Co-author(s): Anil Palanisamy, Tamar Kritzer
Faculty Advisor: Dylan Kobsar, PhD
McMaster University

Background: Lower body strength is crucial for basketball performance, impacting sprinting, jumping, and injury prevention. Traditional strength assessments, such as one-repetition maximum (1RM) tests, pose limitations regarding safety, fatigue, and force-time metric quantification. The isometric mid-thigh pull (IMTP) is a validated alternative, offering a safer and more efficient measure of maximal isometric strength. Despite extensive research on male athletes, only two studies examine the relationship between IMTP-derived metrics and dynamic performance (e.g., sprinting and jumping) in female basketball athletes. Objective: To determine whether maximal isometric strength, as measured by IMTP, correlates with dynamic performance measures in collegiate female basketball athletes. Methods: This cross-sectional study will recruit collegiate female basketball athletes (n = 15). Participants will complete an IMTP on a portable force plate system to assess peak force (PF) and rate of force development (RFD). Dynamic performance will be evaluated through peak relative propulsive power and peak jump height, as measured through the countermovement jump (CMJ), and 10-meter sprint time. Pearson correlation analysis will determine the relationships between IMTP metrics and dynamic performance outcomes. Results: It is hypothesized that PF and RFD from the IMTP will demonstrate moderate to large positive correlations with CMJ metrics, and large negative correlations with sprint time. These findings would support the use of IMTP as a predictive tool for assessing lower-body power in female basketball athletes. Conclusion: This study will provide insight into the utility of the IMTP as a performance assessment tool for female basketball players, aiding in individualized training program design. Strengths include reducing the need for 1RM testing and focusing on an underrepresented population. Limitations may include sample size constraints and the need for further validation across competitive levels. Future research should explore longitudinal changes in IMTP metrics and their predictive value in season-long performance monitoring.

Session: Session II - A
Time: 12:05 AM
Location: BN302

Dispersed Physical Activity vs. Traditional Postprandial Exercise: Impact on Glucose Control in Breast Cancer Survivors

Presenter: Luceta Wut

Co-author(s): Alfred Min, Courtney R. Chang, Amy A. Kirkham
Faculty Advisor: Amy Kirkham, PhD
University of Toronto

Postprandial glucose (PPG) excursions are linked to chronic disease risk in breast cancer survivors, which may be exacerbated by aromatase inhibitor (AI) therapy. Different physical activity (PA) implementation strategies may help counteract the negative effects of AIs on glycemic control but requires further investigation. We aimed to examine postprandial glycemic responses during three single-day conditions: no-PA control, Dispersed PA (i.e. three 10-min aerobic bouts after each main meal), and Fed PA (i.e. single 30-min post-breakfast aerobic bout). Physically inactive postmenopausal female breast cancer survivors (n=9, age 57±7 years, BMI 32.9±5.1 kg/m2, waist circumference 102±9 cm) receiving AIs (≥3-months) participated in a larger remote randomised crossover study, with data from the no-PA control, Dispersed PA, and Fed PA conditions employed for the current analysis. Following the control day, participants performed the experimental trials separated by 48-72-hour wash-out periods. Blood glucose was measured continuously at 5-minute intervals via continuous glucose monitoring (CGM) and PA parameters (i.e., step count, heart rate) was measured via PA smartwatch. Two-hour PPG mean and incremental area under the curve (iAUC) were calculated from the raw CGM output. Paired T-Tests were employed to compare PPG and PA outcomes between conditions. Step counts were significantly greater during both exercise conditions (Dispersed PA: 8079±3065 steps; Fed PA: 7026±3402 steps) compared to no-PA (4394±1446 steps; $p<0.01$ and $p=0.02$, respectively). However, no significant differences were observed in step count ($p>0.05$) nor average heart rate achieved ($p>0.05$) between the exercise conditions. Further, no significant differences were observed in 2-h PPG mean or iAUC between all three conditions (all $p>0.05$). While both exercise conditions effectively increased step counts compared to no-PA control, neither exercise trial demonstrated a significant impact on PPG responses acutely, which may be attributed to the deleterious effects of AI therapy. Further research should explore alternative regimens that may benefit cancer.

Session: Session II - B
Time: 10:50 AM
Location: BN304

Impact of a 6-month guidelines-based exercise training program on peripheral vascular function and structure in women at risk of developing cardiometabolic disease.

Presenter: Emilie Daroga

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

Background: Vascular function and structure are strong predictors of the development of cardiovascular diseases. Declines in function occur with age and menopause in women and are exacerbated by poor lifestyle habits such as physical inactivity. However, there is a paucity in the current understanding of the interaction between exercise training and changes to vascular function, specifically in women before and after menopause. The purpose of this study was to evaluate changes in vascular function and structure after a 6-month structured exercise intervention following Health Canada's recommendation of 150 minutes of moderate-to-vigorous aerobic physical activity (MVPA) and two muscle-strengthening sessions weekly. Methods: 180 women with multiple risk factors (sedentary, BMI > 25 kg/m2, one of: abdominal obesity, hypertension, pre-diabetes, dyslipidemia) will be randomized to complete 6-months of exercise training (EX) twice weekly (once in-person, once virtual) plus additional minutes of MVPA to accrue 150min/week or stretching (CON) twice weekly virtually. Participants complete vascular assessments, arterial stiffness (PWV), brachial artery flow mediated dilation (FMD), and carotid intima media thickness (cIMT), before and after a 6-month exercise training program as part of a larger study. A linear mixed model with factors group (EX vs CON) and time (pre- and post-intervention) will evaluate changes in vascular outcomes, with menopausal status incorporated as a covariate. Results: At the time of analysis, 77 women have been recruited, with 45 women presently undergoing the intervention. 5 women have completed the intervention (CON n=3, EX n=2; age: 49y; BMI: 32kg/m2). Measures of vascular function and structure following the intervention were not different between CON and EX [cIMT (p=0.53), central or peripheral PWV (p=0.64, p=0.68, p=0.15), %FMD (p=0.11)]. Conclusion: A 6-month guidelines-based exercise training program may not be sufficient to improve vascular outcomes in women; however, a larger sample size is needed to confirm these findings.

Session: Session II - B
Time: 11:05 AM
Location: BN304

Long-term Cardiorespiratory Fitness, Autonomic Function, and Hemodynamic Responses in Breast Cancer Survivors: A Cross-Sectional Analysis

Presenter: Niki Evini

Co-author(s): Bárbara de Barros Gonze, Stephanie Small, Jennifer Williams, Amy A. Kirkham
Faculty Advisor: Amy Kirkham, PhD
University of Toronto

Introduction: Breast cancer (BC) survivors often experience physiological effects in cardiovascular function and cardiorespiratory fitness (CRF) following the cancer treatment. However, there is still a gap in literature on chemotherapy and aromatase inhibitors (AIs) long-term (1-10 years) impacts on these health outcomes in BC survivors. This study aims to investigate whether there are differences in CRF, autonomic function and hemodynamic responses in BC survivors compared to age and BMI matched controls. Methods: This was a cross-sectional analyses of baseline data collected as part of a randomized controlled trial (NCT#06454864). BC survivors (n=4; 55±9 years; BMI 28.0±4.8 kg/m^2) treated with chemotherapy and AIs were matched with postmenopausal controls (n=4; 57±8 years; BMI 28.9±4.5 kg/m^2). All participants were sedentary (<30 minutes/week of moderate-to-vigorous aerobic activity). The oxygen consumption at peak exercise (VO_2max) and at anaerobic threshold (VO_2AT), oxygen pulse (VO_2/HR) and ventilatory efficiency (ventilatory equivalents for oxygen and carbon dioxide; VE/VO_2, VE/VCO_2) were determined via cardiopulmonary exercise testing using a modified Balke treadmill protocol. HR was recorded at rest (HRrest), peak exercise (HRmax), and 1 min post-exercise (HRrecovery) using a Polar HR monitor. Systolic and diastolic blood pressure (SBP, DBP) were measured using an automatic machine at rest and 2 min post-exercise. Wilcoxon test was used to compare outcomes between groups and Rank-Biserial tests assessed effect sizes. Results: No statistically significant differences were detected between groups in any of the outcomes analyzed ($p>0.05$). However, large effect sizes were observed for most cardiovascular and fitness measures, including HRrest (0.73), HRrecovery (0.91), oxygen pulse (0.73), SBP and DBP at rest and after exercise (0.91), and VO_2max and VO_2AT (0.91). HRmax, VE/VO_2 and VE/VCO_2 showed small effect sizes. Conclusion: Although no statistical differences were observed between BC survivors and controls, large effect sizes in most outcomes suggest a trend toward physiological differences between the groups.

Session: Session II - B
Time: 11:20 AM
Location: BN304

Impact of Aromatase Inhibitors on Cognitive Function, Cerebrovascular Health, and BDNF Levels in Breast Cancer Survivors

Presenter: Deshnaa Murali Madhumathy

Faculty Advisor: Jennifer Williams, PhD & Amy Kirkham, PhD
University of Toronto

BACKGROUND: Breast cancer (BC) survivors who used aromatase inhibitors (AIs) may have cognitive and cerebrovascular impairments, though evidence is inconsistent. AIs reduce estrogen levels by blocking the conversion of androgens to estrogen. Estrogen supports brain health, including enhancing memory, processing speed, and cerebrovascular function. Estrogen also regulates brain-derived neurotrophic factor (BDNF), which influences neuroplasticity and cerebrovascular function. There is limited research on the long-term effects of AIs on cognitive and cerebrovascular function. Therefore, the primary objective of this study is to compare cognitive and cerebrovascular function in BC survivors on AIs at 5- and 10-years post-diagnosis compared to non-cancer controls. The secondary objective is examining the relationship between BDNF levels and cognitive and cerebrovascular function in BC survivors and non-cancer controls. METHODS: Cross-sectional, case-control approach, with AI-treated BC patients recruited at 5-and 10-years post-diagnosis will be matched on age and BMI to non-cancer controls. Participants will complete validated cognitive assessments: the Hopkins Verbal Learning Test for verbal memory, the Trail Making Test for processing speed and executive function, and the Controlled Oral Word Association Test for verbal fluency. Cerebral blood flow velocity, a measure of cerebrovascular function, will be measured using the transcranial Doppler ultrasound during two maneuvers: supine-sit-stand and repeated sit-stands. Fasting blood samples will be collected and analyzed using ELISA kits to quantify plasma BDNF levels. ANTICIPATED RESULTS: We hypothesize that BC survivors using AIs for 10 years will exhibit lower cognitive and cerebrovascular function compared to those using AIs for 5 years, with both BC groups showing lower function than non-BC controls. We hypothesize that lower BDNF levels will correlate with poorer cognitive and cerebrovascular outcomes in both groups. SIGNIFICANCE: This research explores the long-term effects of AIs on cognitive and cerebrovascular health. The findings have potential to inform clinical guidelines for BC survivorship care.

Session: Session II - B
Time: 11:35 AM
Location: BN304

Impact of Aromatase Inhibitors on Peripheral Vascular function in Breast Cancer Survivors

Presenter: Fajjar Aqeel

Co-author(s): Jennifer Williams, PhD
Faculty Advisor: Amy Kirkham, PhD (University of Toronto) & Baraa Al-Khazraji, PhD (McMaster University)
McMaster University

Background: Breast cancer (BC) is the second most diagnosed malignancy in women and the second leading cause of all cancer-related deaths amongst Canadian women, with postmenopausal women making up 80% of patients. Hormone-positive breast cancers, which comprise 70% of diagnoses, are best targeted with adjuvant anti-estrogen therapy such as aromatase inhibitors (AIs). AIs function by suppressing estrogen to undetectable levels to stop tumour growth but may bring unwanted cardiovascular side effects. Postmenopausal women also face a slate of unique challenges due to estrogen-related changes to the vasculature during the menopause transition, suggesting that postmenopausal women who utilize AIs as an adjuvant anti-cancer therapy may face a compounded negative impact of hormone loss on the vasculature. However, the long-term impact of AIs on the peripheral vascular health of postmenopausal women has not yet been investigated. Methods: This study will utilize a cross-sectional case-control design, wherein postmenopausal BC patients at 5- and 10-year time points post-diagnosis and age- and BMI-matched control participants will be recruited. Arterial stiffness, a measure of cardiovascular health, will be measured by pulse-wave velocity using applanation tonometry centrally (carotid-femoral arteries) and peripherally (carotid-radial and femoral-dorsalis pedis arteries). Endothelial function, a functional measure of peripheral vascular health, was assessed using a brachial artery flow-mediated dilation (FMD) test. Anticipated Results: We anticipated that BC survivors utilizing AIs for 10 years will experience heightened arterial stiffness and a diminished endothelial function response as compared to BC survivors at 5 years, and both compared to the control group. These findings suggest that BC survivors may be susceptible to a combined negative impact of AI usage and menopause-related effects on vascular health. Significance: The findings of this study may be used to inform guidelines around AI prescription usage and to develop further studies regarding changes to the vasculature experienced by BC survivors.

Session: Session II - B
Time: 11:50 AM
Location: BN304

The Effects of Contact Sport on the Cardiovascular Response to the Cold Pressor Test

Presenter: Gianluca Rossi

Faculty Advisor: Michael Tymko, PhD
University of Guelph-Humber

North American football is a widely recognized sport; however, its physically demanding nature subjects players to a significant number of head impacts, which may result in long-term implications for cardiovascular health. Repeated head impacts, particularly among collegiate athletes, have been associated with disturbances in the relationship between sympathetic nerve activity and vascular function. The objective of this research was to examine the cardiovascular responses of collegiate football players before and after the completion of a full season, utilizing the cold pressor test (CPT), a stress test designed to provoke an acute increase in sympathetic nerve activity. Fourteen male football players (aged 23 ± 3 years) and a control group of non-football player athletes, matched for age and sex, participated in this study. The principal findings indicated that during the CPT, systolic blood pressure (SBP) exhibited a reduction in the first minute post-season compared to pre-season in the football athletes (P=0.3080). Furthermore, when contrasted with the control participants, post-season football players demonstrated a lower SBP response to the CPT in the first minute as well (P=0.7145). No significant differences in heart rate (HR) or cerebral blood velocity during the CPT were noted between pre-season and post-season assessments in the football athletes, nor between post-season football players and healthy controls. These results suggest that participation in a full football season attenuates the blood pressure response to the CPT. Consequently, these findings emphasize the necessity for further exploration into the long-term cardiovascular health of football players, particularly concerning the enduring effects of repeated head impacts on the sympathetic nervous system.

Session: Session II - B
Time: 12:05 AM
Location: BN304

Acute Arterial Blood Pressure Responses to Progressive Hypercapnia: The Effect of Biological Sex

Presenter: Anahita Sadeghi

Co-author(s): Christine A Darko[1], Anahita Sadeghi[1], Parsa Shekarloo[1], Ghazal Adibmoradi[1], Parsa Jamal-Zadeh[1], Heather Edgell[1,2], Devin B Phillips[1,2]

[1] School of Kinesiology and Health Science, Faculty of Health, York University, Toronto, Ontario, Canada [2] Muscle Health Research Centre, York University, Toronto, Ontario, Canada

Faculty Advisor: Dr. Devin Phillips, PhD
York University

Background: Hypercapnia (elevated arterial CO_2 tension) stimulates central chemoreceptors, triggering sympathetic nervous activity (SNA) and subsequent increases in arterial blood pressure (BP). Previous studies suggest that SNA is greater in females compared to males during hypercapnic stress. However, the impact of biological sex on the dynamic progression of BP across mild to severe hypercapnia levels remains unclear. The current proposal tests the hypothesis that females will exhibit greater BP increases compared to males during progressive hypercapnia. Methods: A cross-sectional design will be used to study 15 healthy females (18-40 years) and 15 age-matched males. Participants will undergo a modified Duffin hyperoxic (95% O_2) hypercapnic (5% CO_2) rebreathing protocol to assess dynamic BP changes to progressive hypercapnia. BP will be measured at baseline and at 1-minute intervals during rebreathing using manual auscultation of the brachial artery. Beat-by-beat heart rate will be assessed via single-lead electrocardiography. Ventilatory parameters will be assessed using metabolic measurement systems. Two-way repeated measures of analysis will compare changes in dependent variables between groups (fixed factor) throughout rebreathing (repeated factor). Significance: Identifying sex differences in BP regulation during progressive hypercapnia is essential for understanding cardiovascular adaptations to elevated CO_2. Hypercapnia is a hallmark of conditions such as obstructive sleep apnea (OSA), where repeated CO_2 retention episodes contribute to hypertension via an increase in SNS activity. This study will clarify whether BP regulation across progressive hypercapnia levels differs between sexes or if compensatory mechanisms, such as vascular reactivity and baroreflex adjustments, maintain BP homeostasis. Findings could provide novel insights into sex-specific autonomic control of BP under hypercapnic stress.

Session: Session II - C
Time: 10:50 AM
Location: BN307

Global Safe Sport Review

Presenter: Lindsay Maier

Co-author(s): Dr. Joseph Gurgis (Ontario Tech University), Thomas Leaf (University of Toronto)
Faculty Advisor: Dr. Gretchen Kerr
University of Toronto

As a result of public scrutiny, National Sport Organizations have put forward safeguarding initiatives, typically in the form of policy revisions or new policy implementation. In the meantime, "Safe Sport" emerged as a term for athlete-led advocacy attempts to voice their concerns of unsafe sport environments. Researchers began looking at Canadian sport environments, revealing shocking statistics of prevalence rates, and reporting on athletes' experiences of maltreatment. Safe sport has become a global initiative, but there still remains no understanding of globally-recognized best practices. A website search was conducted; eight countries were explored in terms of their safe sport education, safeguarding policies, complaint management mechanisms, and whether they hold a public registry for sanctioned individuals. The findings reveal substantial differences and inconsistencies across various countries. All of the countries explored had safeguarding policies in place, safe sport education programs readily available, and some avenue for athletes to report their complaints. Complaint mechanisms for five countries were independent of sport organizations, whereas the other three countries outlined internal reporting procedures making athlete anonymity difficult. Very few countries have public registries to track individuals sanctioned for misconduct; these are key features of the Canadian and U.S. initiatives to prevent 'perpetrator-hopping' between sport organizations across the country. Overall, safe sport initiatives varied in their structure and focus; for example, in the United Kingdom (UK) safe sport is embedded within child protection services, whereas in the United States (U.S.) it is connected to federal legislation. In conclusion, there is no consistency among countries' safe sport efforts. Many systems lack evaluation, and without this it is hard to justify their effectiveness at safeguarding athletes in sport. While significant progress has been made in advancing safeguarding initiatives, more research and global collaboration is needed to achieve global safe sport spaces.

Session: Session II - C
Time: 11:05 AM
Location: BN307

Perspectives on strategies to support active play for young children with disabilities: A meta-synthesis

Presenter: Sophie Levasseur

Co-author(s): Maeghan E. James, Leigh M. Vanderloo
Faculty Advisor: Kelly Arbour-Nicitopoulos, PhD
University of Toronto

Background. Active play is characterized as child-driven, unorganized physical activity that is fulfilled in a non-laboratory setting. Active play is crucial for the development of children during early childhood, as it is a principle mode of physical activity during this stage of life. There have been many individual, environmental and policy barriers to active play identified for school-aged children with disabilities. However, there is limited research on access to active play for children with disabilities in the early years. Objective. This study aimed to systematically collect and synthesize evidence on the perspectives and strategies of caregivers and early childhood educators promoting active play among young children with disabilities. Methods. As part of a larger scoping review on active play research in young children with disabilities, five databases were searched by title and abstract, and full text to identify qualitative studies (n=8) that addressed supporting strategies of active play for children in the early years (0-59 months) with diagnosed (or suspected) disabilities. Quotes and direct text from the eight studies were coded and analyzed deductively, using the six building blocks of quality participation, and inductively. Using thematic analysis, codes will be grouped to generate mega themes. Preliminary results. All six of the building blocks of quality participation (autonomy, belongingness, challenge, engagement, mastery, meaning) are represented in the codes that have been extracted from the included studies. Inductive codes that relate to the physical, social and emotional environments impacting outdoor and indoor active play have also been identified. Further findings will be discussed during the presentation. Conclusions. Results from this meta-synthesis can be used to identify strategies that, with further evaluation, caregivers or supporting others (e.g., early childhood educators) can use to support quality active play in young children with disabilities.

Session: Session II - C
Time: 11:20 AM
Location: BN307

Gaining Consensus on an Athlete Concussion Surveillance Tool in Special Olympics Sports

Presenter: Megan Wong

Co-author(s): Christina Ippolito (Dept of Occupational Science & Therapy, University of Toronto), Nick Reed (Dept of Occupational Science & Therapy, University of Toronto), Emily Bremer (Acadia University), Kelly Arbour-Nicitopoulos (Faculty of Kinesiology and Physical Education, University of Toronto)
Faculty Advisor: Kelly Arbour-Nicitopoulos, PhD
University of Toronto

Background Concussions are significant public health concerns; however, athletes with intellectual disabilities (ID) remain underrepresented. Despite a national guideline to support concussion care, there lacks a standardized concussion surveillance tool to facilitate injury recognition, reporting, and management. Objective In collaboration with Special Olympics Canada (SOC), this study aims to co-create a prototype concussion surveillance tool with coaches and medical staff. Methods This study used the nominal group technique (NGT) to gain consensus from SOC coaches and medical staff on key variables for inclusion in the concussion surveillance tool. Two questions informed the NGT process; one focused on information to collect on athletes with suspected concussions, and the second focused on items to support adherence to the national concussion guideline. Participants ranked generated ideas from 1 (least important) to 5 (most important) and were then categorized using thematic analysis. Items that reached 75% consensus (i.e., median scores ≥3.75) were added to the surveillance tool unless justified otherwise by the research team. Results Six participants (ages 41 to 80 years) took part in this study: four males in the first NGT and two females in the second NGT. Across both, question one generated 38 ideas. The ideas that reached consensus (52%) were collated into four categories: athlete details (e.g. concussion history), incident description (e.g. treatment initiation), injury specifics (e.g. athlete responsiveness), and follow-up recommendations (e.g. support with injury). Question two generated 36 main ideas with 71 subparts (76% achieving consensus), with the highest-ranking ideas (median=5) relating to verbal communication about the injury and follow-up between medical professionals, athletes, and coaches. The data from question two is currently undergoing thematic analysis. Implications This tool will be used in future SOC events to assess suspected concussion incidents. Addressing this surveillance gap will improve concussion education, tracking, and decision-making, supporting the safety of SO athletes.

Session: Session II - C
Time: 11:35 AM
Location: BN307

Exploring Stressors and Coping Among Competitive Dancers in Emerging Adulthood

Presenter: Isabella Renaud

Co-author(s): Katherine Tamminen, Abi Eke
Faculty Advisor: Katherine Tamminen, PhD, MEd., RP, C.C.C., CMPC
University of Toronto

Competitive dance, though not traditionally recognized as a sport, is an activity that requires both physical and psychological dedication. Competitive dancers often train intensely in multiple styles of dance facing physical stressors such as fatigue, injury, and burnout. Competitive dancers are not only being judged on their physical abilities but also their appearance, leading to psychological pressures related to body image and performance expectations. Professional ballet dancers specifically are vulnerable to emotional stress and stressors during training and performances, yet even how professional ballet dancers' cope with these unique stressors currently is not well understood. Although competitive dancers have similar training experiences to professional ballerinas, there is limited research on their stressors and abilities to cope. Therefore, the purpose of this research is to explore the stressors experienced by competitive dancers and the coping strategies they employ to manage these demands. The specific research questions are: (a) What are the common stressors that competitive dancers experience? (b) What are the coping strategies that dancers use to manage their stressors in competitive dance, and c) How do dancers express their experiences of stressors and coping in choreography? Participants must be over the age of 16 and have at least 3 years of competitive dance experience in more than two styles of dance. Dancers who are interested in participating will complete two semi-structured interviews exploring their experiences with stress along wither their coping strategies. After the first interview dancers will be asked to choreograph a dance that reflects their experience with stress and coping throughout their time as a competitive dancer. The second interview will explore the choreography video and what it means to the dancer. Understanding these experiences provides valuable insights for dance instructors and mental health professionals to better support competitive dancers' mental health and overall well-being

Session: Session II - C
Time: 11:50 AM
Location: BN307

The Sheath of the Spectacle: Examining Youth Athlete Maltreatment

Presenter: Georgia Lambrinos

Co-author(s): Georgia Lambrinos, Prabhtej Gharial, Liana Tran
Faculty Advisor: Dr. Amanda De Lisio
York University

It has been studied and found that youth athletes bear the burden of maltreatment in various forms of abuse. Cholewinski (2021) and Hartill (2022) have examined the global presence of sport schools and clubs for young athletes, such as those in China, Romania, and Britain, in which both studies have shown recurring instances of youth athlete maltreatment by coaches and coach-adjacent figures. The justification for abuse within sporting federations and clubs has largely been traced back to toxic winning cultures (Jacobs et al., 2017). This is where personal and national success is glorified, and the experience of competing within a large spectacle at the "highest" level is used as a vehicle to perform outside ethical and safety standards (Lindhorst, 2015). To understand how maltreatment becomes normalized, we turn to Guy Debord's (1994) concept of the spectacle. Debord (1994) theorizes on the nature of society and how the spectacle pushes us to consume constantly, distracting us from reality and creating a pseudo-reality, which alters how we view and interact with the world through it. In the context of sports, we suggest that the consumption of the spectacle distracts us from the underlying maltreatment that lies at its foundation. Although studies have examined maltreatment against athletes (Edwards, 2024), there is little literature on the connection between such abusive practices and the indirect influence of the sports spectacle. We will explore how the maltreatment of young athletes is seemingly justified within the spectacle of sport and explore strategies to combat these normalized practices. Such abusive environments may have lasting detrimental effects on these athletes' mental health and quality of life after sport. Addressing and ending the normalization of maltreatment enabled by the spectacle will help protect future generations from similar abusive practices.

Session: Session II - D
Time: 10:50 AM
Location: WS2007

The effects of skeletal muscle-specific AMPK on mitochondrial remodelling induced by exercise

Presenter: Kaylyn Montoya

Co-author(s): Kaylyn M Montoya, Andrew I Mikhail, Sean Y Ng, Stephanie R Mattina, Vladimir Ljubicic
Faculty Advisor: Vladimir Ljubicic, PhD & Robin Cameron, PhD
McMaster University

Background: AMP-activated protein kinase (AMPK) mediates various mitochondrial functions such as biogenesis, dynamics and mitophagy in response to energetic stress. However, its importance in mitochondrial adaptation following chronic exercise training remains to be fully elucidated. Previous literature has utilized transgenic mice with germline deletion of skeletal muscle AMPK, which exhibit severe exercise intolerance interfering with normal muscle adaptation and development. Thus, the purpose of this study is to investigate exercise-induced mitochondrial adaptations in a novel muscle-specific AMPK β1β2 inducible knockout (imKO) model. Methods: Male and female 16 weeks old wild-type (WT) and AMPK β1β2 imKO mice were treated with tamoxifen daily for five consecutive days. Twelve weeks after the last tamoxifen dose, WT and imKO mice were randomly assigned to sedentary and exercise groups. The exercise protocol consisted of progressive treadmill training 5 days per week for a total of 6 weeks. Subsequently, quadriceps muscles were collected for high resolution respirometry, immunoblotting and transmission electron microscopy (TEM). Results: The basal mitochondrial leak from complex I (CI) showed no significant differences between WT and imKO groups. We observed a significant increase in ADP-stimulated CI-specific and CI+II specific oxygen consumption rates in exercised WT animals. However, no differences were observed in mitochondrial respiration with treadmill training in imKO mice. We next quantified the number of IMF mitochondria using TEM. Sedentary WT and imKO mice had similar amounts of IMF mitochondria. Exercise elicited a significant increase in IMF mitochondria in exercised WT animals only relative to their sedentary counterparts. Conclusion: Collectively, these data suggest that AMPK plays a role in exercise-induced mitochondrial upregulation. Future work aims to further elucidate the impact of AMPK on mitochondrial morphology to determine its role in exercise adaptation.

Session: Session II - D
Time: 11:05 AM
Location: WS2007

AMPK: A Key Player in Combating Skeletal Muscle Fibrosis in Cancer Cachexia

Presenter: Amber Austin

Co-author(s): Magda Lesinski, Andrew I Mikhail, Saumyaa Rishi, Rozhin Raziee, Irena A Rebalka, Luca J Delfinis, Christopher GR Perry, Thomas J Hawke,
Faculty Advisor: Vladimir Ljubicic, PhD
McMaster University

Introduction: Cancer cachexia affects 50-80% of cancer patients, causing severe muscle loss, systemic inflammation, and metabolic dysregulation, which significantly reduces patient survival and quality of life. AMP-activated protein kinase (AMPK) is an energy sensing enzyme that regulates various signaling pathways that ultimately influence skeletal muscle morphology and function. Disruptions in AMPK signaling have been documented in cachectic patients suggesting a role for this kinase in maintaining skeletal muscle mass. Methods: To study the role of AMPK in this atrophic model, cancer cachexia was induced in 11-week old mice with a subcutaneous injection of 1 million Lewis Lung carcinoma (LLC) cells, with healthy controls treated with PBS. 1 week post-tumour inoculation, LLC mice began daily oral administration of the AMPK activator MK-8722 (LLCMK) or a vehicle (LLCVeh). Mice were sacrificed 4 weeks post-tumour inoculation and the extensor digitorum longus (EDL), quadriceps and blood serum were collected. Skeletal muscle fibrosis was analyzed using Picrosirius Red staining. Results: The LLCVeh group had a significantly greater percentage of collagen deposition within the EDL, compared to the control ($p<0.05$), while MK treatment decreased fibrosis to healthy levels. Serum from LLCMK mice exhibited a significant increase in C-C motif chemokine ligand 2 (CCL2) concentration ($p<0.05$) compared to the control while skeletal-muscle derived tumor necrosis factor alpha (TNF-α) mRNA was increased in the LLCMK group compared to LLCVeh ($p<0.05$). Conclusion: This study provides evidence that pharmacological AMPK activation can mitigate skeletal muscle fibrosis in cachectic mice despite concurrent increases in systemic and local cancer-related inflammatory markers.

Session: Session II - D
Time: 11:20 AM
Location: WS2007

Impact of Pharmacological AMPK Activation on Skeletal Muscle Catabolism in Cancer Cachexia

Presenter: Erlin Espina

Co-author(s): Magda Lesinski, Andrew I Mikhail, Saumyaa Rishi, Rozhin Raziee, Irena A Rebalka, Luca J Delfinis, Christopher GR Perry, Thomas J Hawke, Vladimir Ljubicic
Faculty Advisor: Vladimir Ljubicic, PhD
McMaster University

Cancer cachexia is a muscle wasting syndrome affecting more than half of people with cancer and characterized by the loss of skeletal muscle mass, adipose tissue mass, anemia, anorexia, and loss of strength. These energetic and functional deficits impact treatment efficacy, thereby worsening patient prognosis. AMP-activated protein kinase (AMPK) plays a key role in cellular energy homeostasis and muscle preservation and has been implicated in cancer cachexia. We investigated the impact of direct pharmacological AMPK activation via MK-8722 (MK) in mice inoculated subcutaneously with Lewis Lung Carcinoma (LLC) cells. LLC mice received oral administration of MK (LLCMK) or PBS (LLCPBS) starting 7-days post-LLC inoculation and tissues were collected 21-days thereafter. Skeletal muscle protein quantification with western blotting identified increases in LC3I and LC3II in LLCMK compared to LLCVeh and PBSVeh respectively, while p62 accumulated in LLCVeh but decreased in LLCMK. In response to cancer cachexia, immunofluorescent staining of the extensor digitorum longus muscle (EDL) demonstrated a significant increase in p-ATG16L puncti in LLCVeh and LLCMK compared to PBSVeh ($p=0.0027$ and $p<0.0001$, respectively), indicating phosphorylation of ATG16L by ULK1, a kinase activated by AMPK. MK treatment in LLC mice did not restore p-ATG16L levels to baseline and remained elevated. Although, cancer-related increases in MURF1 and Atrogin1 mRNA content improved with MK treatment. Collectively, the data suggests that MK treatment influences catabolic processes during cancer cachexia, as indicated by improvements in markers of autophagy and atrophy. Future aims include assessing mitochondrial morphology and mitophagy to better understand muscular adaptations in cancer cachexia.

Session: Session II - D
Time: 11:35 AM
Location: WS2007

Examining Lower Leg Strength and Walking Speed in Older Adults: The Role of Plantar Flexion Strength

Presenter: Linah Abdelghaffar

Co-author(s): Dina Katsoulis, Catherine Amara
Faculty Advisor: Catherine Amara, PhD
University of Toronto

Background: Aging has been associated with a decline in walking speed, beginning around age sixty years. Reduced walking speed has been associated with increased likelihood of falls, decreased physical function, and has been attributed, in part to the reduction of muscle strength that occurs with advancing age. While a correlation between overall leg strength and walking speed has been identified in older adults, there is some evidence that there is a disproportionality greater decline in plantar flexion strength with rates four times greater than the decrease in dorsiflexion strength. Plantar flexion muscles have been shown to be the largest contributors to forward propulsion during walking at self-paced speeds and facilitate the transition to faster speeds. Aim: the purpose of this study is to determine the influence of plantar flexion strength on self-paced walking (4-meter usual pace walk; 4MUP) and fast walking (400-meter walk; 400MW) speeds in a cohort of healthy, independently living older women. Methods: participants were forty- eight healthy older women (74.5 +/- 4.7 years). Plantar flexion torque (PFT) was measured using a Biodex isokinetic dynamometer and time to complete a 400MW and 4MUP was recorded. Results: mean data were calculated for PFT (41.5 13.8 Nm), 400MW (271.6 27.6 s), and 4MUP (3.7 0.7 s). It is hypothesized that plantar flexion strength will be correlated with both the 400MW and the 4MUP, with a stronger correlation with the 400MW. Results of this study may demonstrate the importance of improving plantar flexion strength to minimize or delay reductions in walking speeds in older adults.

Session: Session II - D
Time: 11:50 AM
Location: WS2007

Factors Influencing Heterogeneity in Muscle Strength Responses to Resistance Training in Older Adults

Presenter: Tammy Phung

Co-author(s): Konstantina Katsoulis
Faculty Advisor: Catherine Amara, PhD
University of Toronto

Background: Resistance training (RT) is an important tool in the maintenance and improvement of muscle strength for older adults. However, heterogeneity in muscle strength in response to training has been observed, with some individuals demonstrating significant increases in strength with others not achieving the same benefits of resistance exercise, and in some cases leading to their classification as non-responders. Thus, the purpose of this study was to identify factors that influence the heterogeneity in muscle strength response to RT in older adults. Methods: A literature search was conducted examining articles that included the following: older adults mean age > 55 years; knee extensor strength; RT intervention; discussion of the heterogeneity in responses. Results: Factors influencing the heterogeneity in response to RT were divided into those related to participant characteristics (e.g., intramuscular adipose tissue, insulin resistance), those related to training parameters (e.g., duration, volume, intensity), and those related to measurement (e.g., outcome variables measured, method of determining training intensity). Conclusion: No single factor emerged as predominantly explaining the heterogeneity in muscle strength response to RT in older adults. Several factors, including those unrelated to individual participant characteristics have been shown to influence the magnitude of response, and may put into question the classification of participants as responders and non-responders. Instead, results suggest the potential of tailored RT intervention and measurement design (including examination of functional outcomes) informed by participant characteristics, to increase the likelihood of meaningful responses to RT in older adults.

Session: Session II - E

Time: 10:50 AM
Location: WSB67

The Influence of Calf Compression Sleeves on Online Upper-Limb Trajectory Amendments

Presenter: Liam Tran

Faculty Advisor: Luc Tremblay, PhD
University of Toronto

BACKGROUND: Traditionally, compression garments may be worn by athletes to improve blood circulation. Interestingly, recent research shows that wearing lower limb compression garments may affect sensory feedback mechanisms, yielding higher spinal cord excitability and reducing corrective balance reaction latencies (e.g., Sun et al., 2021). Further, it has been shown that leg muscles are activated prior to arm muscles when making online, upper-limb trajectory amendments (e.g., Leonard et al., 2011), demonstrating a relationship between lower and upper limb activation for the online control of reaching movements. OBJECTIVE: This study aimed to investigate how wearing calf compression sleeves while standing influences online upper-limb trajectory amendments. METHODS: Participants performed upper-limb reaching movements to a target while standing. On some trials, the initial target disappeared, and another target appeared either closer or further from its original position (i.e., target jump). Participants were instructed to adjust their limb trajectory, to correct for any target jumps. All participants completed these trials under two conditions: with and without compression sleeves. The main dependent variables were movement time, endpoint position and time after peak velocity. A 2 condition (compression sleeve, no compression sleeve) × 3 target (no jump, jump near, jump far) repeated measures ANOVA was conducted. EXPECTED RESULTS: It was expected that amendments to limb trajectories following a target jump would result in more accurate and precise endpoint positions with the calf compression sleeves, compared to without them. Also, participants would potentially demonstrate shorter movement times in the compression garment condition, particularly when correcting for target jumps. These potential findings could contribute to evidence surrounding the use of compression garments in athletics and rehabilitation.

Session: Session II - E
Time: 11:05 AM
Location: WSB67

The influence of qualitative and quantitative knowledge of performance on the bench press performance during a fatigued state

Presenter: Kurt Sy

Co-author(s): Anthony Belza
Faculty Advisor: Luc Tremblay, PhD
University of Toronto

Background: Augmented feedback about limb trajectories has been demonstrated to aid in the integration of sensory cues, which are imperative to perform voluntary movements. Such augmented feedback of movement trajectories can be provided qualitatively (e.g. visual depictions) or quantitatively (e.g., verbally provided data). When individuals are fatigued, their movements tend to be less accurate and thus may benefit from feedback. Studying the interaction of augmented feedback in a fatigued state may benefit various practical contexts (e.g., clinical contexts) Objectives: The purpose of this study was to investigate the influence of qualitative vs. quantitative augmented feedback on barbell trajectories during bench press movements in a fatigued state. Methods: Participants performed the bench press for three blocks of 12 trials using 50% of an estimated maximum weight capacity (i.e., one repetition maximum or 1RM). The main dependent variable was the barbell tilt angle. Participants performed a first set of trials to induce some fatigue. Then, between the blocks of trials, participants were either provided with qualitative (i.e. a graphical / visual depiction of barbell trajectories) or verbal feedback (i.e. numerical feedback). The presentation order of feedback was counterbalanced across participants. Following the three blocks of trials, participants performed an additional block of trials with no feedback to assess overall acute performance improvements. The barbell tilt angle data contrasted across the trials prior to and after each feedback condition in a 3 condition (pre-feedback, after-qualitative, and after-quantitative) analysis of variance. Results: It was hypothesized barbell tilt angle after receiving visual feedback would be significantly lower than after receiving verbal feedback. These results would suggest that feedback-especially qualitative/ visual feedback-is effective to acutely mitigate the effects of fatigue on motor performance. The implications of these results propose potential acute benefits in the use of augmented feedback for participants with lower aerobic capacities.

Session: Session II - E
Time: 11:20 AM
Location: WSB67

Influence of self-determined KR on the weighing of visual and proprioceptive cues for upper-limb movement performance

Presenter: Mavis Li

Faculty Advisor: Luc Tremblay, PhD
University of Toronto

Providing augmented sensory cues can temporarily enhance performance but often leads to dependence, resulting in performance decrement when these cues are removed (i.e., guidance effects, Bested et al., 2019). However, recent work from our lab has shown that providing augmented cues intermittently, rather than continuously, can mitigate this dependence (Tremblay et al., 2024). In this study, participants practiced an arm movement toward a target under three conditions: with a laser pointer (laser), without it (no-laser), or alternating between these conditions (mixed practice, see also Bested et al., 2019). Feedback about their endpoint error was given on 50% of the acquisition trials. Afterward, all participants performed the task without the laser and without augmented feedback. Results showed that participants in the no-laser and mixed practice groups performed better than those in the laser group, suggesting that mixed practice helped reduce guidance effects and increased flexibility in using visual versus proprioceptive cues. Building on the idea that self-controlled feedback can increase autonomy and competence (e.g., Sanli et al., 2013), the current study examined the role of self-determined feedback in the weighting of visual and proprioceptive cues during upper limb movement. Participants practiced arm flexion movements using a mixed practice schedule (alternating between the laser condition and an ambient vision condition). During acquisition, they either received feedback about their endpoint error upon request (self-determined feedback [SDF]) or received feedback on the same trials as the SDF participants (Yoked). All participants completed a pre-test (10 trials), an acquisition phase (100 trials), and a post-test (10 trials). The task involved performing arm movements toward three targets (5° below horizontal, horizontal, and 5° above horizontal). It was hypothesized that the SDF group with mixed practice would perform better than the yoked group due to greater autonomy and intrinsic motivation.

Session: Session II - E
Time: 11:35 AM
Location: WSB67

The Effect of Gain on Sensorimotor Integration

Presenter: Andrew Milner

Co-author(s): Valentin Crainic
Faculty Advisor: Luc Tremblay, PhD
University of Toronto

Can the sensitivity of a computer mouse reshape how our brain weighs visual and proprioceptive cues? Gain in human-computer interactions (HCI) is the ratio between the control input (e.g. a computer mouse) and display output (e.g. a cursor). Computer mouse sensitivity is a classic example of this. Casiez et al. (2008) found that gain has a U-shaped performance curve effect in HCI. Following Ernst & Bülthoff's (2004) sensory integration theory and Proteau's (1992) specificity principle, we hypothesized that gain influences performance by altering visuoproprioceptive weighting in the brain. This study aims to examine the behavioural performance patterns of different gain ratios and infer gain's sensory weighting effects from these patterns. Eleven participants were recruited and sorted into a High or Low-Gain training group. High gain was a 2:1 cursor-to-limb displacement ratio and low gain was a 1:1 ratio. Participants performed an aiming task with a computer mouse. Participants performed a pre-test (using both gains and partial cursor vision occlusion), acquisition (using their assigned gain), and a post-test (with the same parameters as the pre-test). Independent variables included Group, Gain, and Block. The main dependent variables were Movement Time and Constant Endpoint Error. 2x2x2 repeated measures ANOVA was used for each dependent variable. Preliminary data suggests that the Low-Gain group did not improve from pre- to post-tests on low gain and performed worse from pre- to post-tests on high gain. The High-Gain group performed similarly from pre- to post-tests on low gain and improved from pre- to post-tests on high gain. If these trends continue, it will support our hypothesis that gain affects visuoproprioceptive weighting. Industries involved in HCI may need to consider this weighting effect when creating products, services, or systems. People changing their mouse sensitivities will be changing how their brain functions.

Session: Session II - E
Time: 11:50 AM
Location: WSB67

Does explicit voice training yield familiar voice benefits in the hearing impaired?

Presenter: Vibha Sarathy

Faculty Advisor: Manda Fischer, PhD & Ingrid Johnsrude, PhD
Western University

Hearing loss can impair communication, particularly in noisy environments, leading to social isolation - a risk factor for Alzheimer's disease (Ren et al., 2023). Holmes et al. (2021) showed that familiar voice training improves speech intelligibility in normal-hearing individuals, but its impact on those with hearing loss remains unclear. The current study investigates the effect of voice training on speech intelligibility in individuals with bilateral sensorineural hearing loss and normal-hearing controls. Participants (n=40-50; 20-25 per group) first listened to sentences spoken by different voices, which became familiar via repeated exposure. After training, participants completed a speech intelligibility task in which they heard two voices speaking concurrently and reported the words from one (target) while ignoring the other (masker). They also rated how clearly they understood the target voice on a 1-to-7 scale. To assess whether voice training improved both speech intelligibility and audibility for words spoken by the trained (familiar) voice compared to the novel voice (unfamiliar), we will compare word-report accuracy and audibility scores for trained (familiar) and novel voices. Given that naturally familiar voices (e.g. spouse) improved speech recognition in older adults with hearing loss (Souza et al., 2014), we hypothesize that voice training will yield comparable familiar-voice benefits for individuals with hearing loss compared to controls. Alternatively, given that McKay (2021) found no benefit of music training on speech perception in hearing-impaired listeners, voice training may show no effect. If proven effective, voice training could help address the effects of social isolation caused by hearing loss.

Session: Session III - A
Time: 1:00 PM
Location: BN302

Biomechanical Determinants of Agility and Change of Direction during "dry-land" Training for Competitive Female Youth Hockey Players

Presenter: Victoria Dorion

Faculty Advisor: Dr. Eryk Przysucha, PhD, MSc
Lakehead University

Background: Agility and change of direction are often viewed as synonymous, yet the tests implemented to examine these constructs involve different "cutting" techniques and are performed under varying perceptual constraints ("pre-planned" vs. "reactionary"). A model by Nygaard Falch and colleagues (2019) suggested that various biomechanical constructs are inter-related in their performance. This model may apply to different sports and levels of competition, including hockey. However, these issues have not be examined in youth female athletes. Objective: To determine the degree to which commonly used tests of agility and change of direction examine the same construct. Also, to delineate the degree to which speed, balance, power and force absorption relate to the performance of these field tests. Method: Eighteen female hockey players (M = 13.6, SD = 1.2) were asked to perform a T-test (agility), V-cut (Pre-planned change of direction) and a Y-test (Reactive change of direction). Also, their power (Vertec® Jump Test), linear/curvilinear speed and unilateral-force absorption and static balance control (AMTI force platform) were examined. Correlational design examined the degree of association between the variables via a series of Pearson Product Correlation coefficients. Results: The T-Test and a Reactive Test (Y-test) were only moderately correlated, while there was a weak correlation with the V-cut test. Among the biomechanical determinants, power, linear/curvilinear speed and force absorption correlated significantly with performance of T-tests and Y-test, but not V-cut test which was best predicted by force absorption task. Conclusion: The results confirmed that agility and change of direction do not represent the same domain. Also, it was evident that for youth hockey players development of different determinants of overall fitness may contribute to their off-ice capabilities. The degree to which these constructs contribute to the on-ice performance represents the next potential research question.

Session: Session III - A
Time: 1:15 PM
Location: BN302

A Comparison of Lower Extremity Kinematics Between the Araimandi and Demi Plié Positions

Presenter: Nasya Sequeira

Faculty Advisor: Dr. Timothy Burkhart
University of Toronto

Background: Despite their cultural and stylistic differences, both Bharatnatyam and Ballet involve half-squat positions termed the araimandi or demi plié, respectively. While an aesthetically and technically accurate araimandi or demi plié requires 180° of turnout (i.e., external rotation of the lower extremity), this is often unattainable for many dancers due to passive anatomical limitations or a lack of strength, coordination, or endurance in the lower extremity musculature. Consequently, dancers may "force" turnout by increasing lumbar lordosis and subtalar pronation, resulting in torsional stresses at the knee joint that can reproduce the injury mechanisms of the ligaments and menisci. While demi plié kinematics have been extensively studied, limited research has examined the biomechanical implications of the araimandi position despite the high prevalence of knee injuries among Bharatnatyam dancers. Objective: This study aims to compare hip, knee, and ankle kinematics between the araimandi and demi plié positions to identify potential knee injury risk factors. Methods: Twenty professional female dancers (10 Ballet, 10 Bharatnatyam) will perform standardized trials of their respective positions at a controlled tempo. Three-dimensional kinematic data will be collected using a markerless motion capture system (Theia3D), and vertical ground reaction forces will be measured via AMTI force plates. Joint angles, moments, and contact forces will be analyzed and compared between the two groups. Anticipated Findings: Bharatnatyam dancers are expected to demonstrate greater hip external rotation, knee flexion, and subtalar pronation moments, along with higher compressive and torsional knee forces compared to ballet dancers. The sustained nature of the araimandi position may place prolonged stress on the knee, increasing the risk of patellofemoral pain and meniscal injuries. Significance: This study will contribute to a deeper understanding of dance biomechanics and inform injury risk reduction strategies tailored to the unique demands of Bharatnatyam and Ballet.

Session: Session III - A
Time: 1:30 PM
Location: BN302

Predicting Sprint Speed Using IMUs: Linear and Non-Linear Analyses in a 60m Sprint

Presenter: Shun Chen

Co-author(s): Rumi Dolmaya, Kenta Ploch
Faculty Advisor: Dr. Timothy Burkhart & Dr. Joseph Baker
University of Toronto

Background: While previous sprinting literature highlighted the interaction of limbs in relation to producing speed, most of these studies were designed to explain lower and upper limb interactions in isolation. From a quantitative perspective, the comprehensive contributions of the movement patterns in producing speed remains unclear, specifically, which movements best predict sprinting speed. Objective: To establish a predictive model that identifies which movement pattern best predicts sprint performance. Methods: 15 competitive sprinters/jumpers above the age of 16 were recruited from the University of Toronto. Participants performed one 60-meter maximal-effort sprint in spikes starting from blocks. The kinematic data was collected from the XSens MVN, a full body joint specific inertial measurement unit (IMU) system capable of capturing time series data of multi-axis acceleration, angular velocity, and orientation at 60Hz. The data will be preprocessed through XSens Awinda and analyzed in Python. IMU data will be reconstructed through principal component analysis (PCA) to extract movement patterns that convey the sampled variance. Feature selection for significant variables will be performed on the principal components (PCs) through a stepwise regression (for linear analyses). As for non-linear analyses, the kernel lasso will shrink the non-significant loading vectors to zero. This feature selection allows us to determine the contribution of each movement pattern (reconstructed PCs) to sprint speed. Expected Results, Impact: Data collection is still in progress currently. However, we are expecting PC1 to be explained by the timing of the contralateral arm and leg swings sprint speed during the touchdown to toe-off (first and last frames of the stance foot contacting the track). Ultimately, this study is a proposal towards creating a predictive model that is practical for evaluating an athletes' sprinting capabilities.

Session: Session III - A
Time: 1:45 PM
Location: BN302

The HIP FLEXIR Study HIP FLEXion strength after arthroscopic Iliopsoas tendon Release

Presenter: Nicole Hoh

Co-author(s): Margaret Harrington
Faculty Advisor: Dr. Timothy Burkhart & Margaret Harrington, PhD(c)
University of Toronto

BACKGROUND: Hip arthroscopy is a surgical treatment for femoroacetabular impingement syndrome (FAIS) and other hip pathologies. Often, the primary hip arthroscopy includes a secondary iliopsoas tendon release (ITR) surgery if concomitant psoas tendon snapping or impingement is identified. Presently, there are mixed reports and limited empirical measures examining post-ITR hip flexion strength and kinematics. Thus, the purpose of this study is to quantify and compare hip flexion strength between FAIS patients with and without ITR. METHODS: FAIS patients (n=64) are recruited from Women's College Hospital and St. Michael's Hospital (16-50 years), with participants one to two years post arthroscopic treatment for FAIS. Cases (n=32) underwent an ITR surgery and controls (n=32) did not. Participants visit the biomechanics laboratory where they perform a maximum isometric hip flexion strength test in 90° and 0° of hip flexion on both the operative and non-operative limbs and use a six-degree- of-freedom force transducer mounted to a custom-designed test frame. Following the strength testing, dynamic hip function is assessed using five movement tasks (gait, deep squat, side-cut, countermovement jump, and lunge) measured with markerless motion tracking and ground-mounted force plates. Kinetic and kinematic data from the dynamic tasks will serve as inputs into musculoskeletal modelling in THEIA3D to calculate hip flexor muscle activations (OpenSim). Finally, PROMs (iHOT-33, HOS, VAS-pain) are recorded. EXPECTED RESULTS: To date, one case has completed the collection protocol, therefore, results remain preliminary. ITR patients are expected to have lower maximum isometric hip strength and range of motion compared to controls and between the operative and non-operative limbs. Furthermore, poorer PROMs and compensatory muscle activations are expected. IMPACT: The results from this study will bridge literature gaps concerning objective ITR outcome measures of strength and dynamic hip function and will inform clinicians, guiding surgical decision-making for potential recipients of ITR.

Session: Session III - A
Time: 2:00 PM
Location: BN302

The Impact of Early Specialization on Ice Hockey Goaltender Landing Kinematics

Presenter: Anna May

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

BACKGROUND: There is increasing concern surrounding hip and knee injuries in ice hockey goaltenders. Early specialization may increase injury risk by limiting general movement competence. Goalies who specialize early may not develop the necessary movement skills to respond to biomechanical situations that challenge their preferred movement-patterns; potentially increasing the risk of injury. They could struggle to stabilize their joints during extra-physiological abduction or knee valgus movements, which can contribute to groin, knee, or ligament injuries, respectively. To the authors knowledge there is limited research on goaltender kinematics during general athlete tasks and how their response to these movement patterns may affect injury risk. OBJECTIVE: The purpose of this cross-sectional study was to compare the hip kinematics between early specialized (ES) and not early specialized (NES) ice hockey goaltenders in a single leg drop jump movement. METHODS: This study included 12 ES and 11 NES goaltenders. Hip kinematics were quantified during drop vertical jumps. The participants stood on a 20cm high box and were instructed to step off the box with one leg. Upon contacting the ground, they were instructed to jump as high as possible while ensuring they can land on two feet and in a controlled way. Theia3D markerless technology was used to determine knee flexion, knee valgus movement, trunk flexion, trunk lateral flexion, and hip flexion angles during the initial foot contact at landing and the maximum knee flexion after landing. The drop jump variables were included based on the LESS score (landing error scoring system). Data groups will be compared using independent t-tests or Mann-Whitney U tests ($\alpha = 0.05$) that are dependent on normality. EXPECTED RESULTS: ES goalies will have greater hip internal rotation angles and knee valgus angles on landings than NES goaltenders. This may influence ES goaltenders increased risk for hip and knee injuries.

Session: Session III - A
Time: 2:15 PM
Location: BN302

The effect of a novel foot orthotic on foot biomechanics in plantar fasciitis patients and healthy controls

Presenter: Dorsa Eshaghi

Faculty Advisor: Timothy Burkhart, PhD
University of Toronto

Background: The plantar fascia is a broad connective tissue band that supports the foot's arch. It originates at the medial tubercle of the calcaneus and extends distally, dividing into five bands at the digits. While the plantar fascia serves multiple functions, its primary role is arch support. Plantar fasciitis, a prevalent musculoskeletal disorder, is characterized by inferomedial heel pain, worsened following prolonged periods of non-weightbearing. Limited ankle dorsiflexion and excessive pronation are recognized risk factors. HeelSnaps®, an innovative foot orthotic, can be worn barefoot or with open-toed shoes. Made from rigid plastic, it supports the heel and may correct biomechanical issues, however, no biomechanical testing has confirmed its effectiveness. Objective: To evaluate the effects of the HeelSnaps(R) arch-elevating orthotics on ankle joint kinematics. Methods: Thirty participants will be recruited and divided into two groups: 15 healthy controls with no diagnosis of plantar fasciitis or foot pathology, and 15 individuals diagnosed with plantar fasciitis. Each participant will perform three trials of the following tasks: (i) gait, (ii) bodyweight squat, and (iii) cutting (left and right). These tasks will be completed under two conditions: barefoot and barefoot and with HeelSnaps orthotics. Three-dimensional kinematics will be quantified using Theia markerless motion capture system and ground reaction forces will be collected using two floor embedded force plates. The kinematic and kinetic data will be collected, processed, and averaged across three trials. The kinematic analysis will focus on dorsiflexion-plantarflexion, inversion-eversion, and pronation- supination. Arch height will be measured in both conditions to determine relation between increased arch height and ankle joint kinematics. Expected Results: The use of orthotics is expected to increase ankle dorsiflexion during gait, squatting, and cutting movements while reducing ankle pronation. These changes are anticipated to correlate with an increase in arch height.

Session: Session III - B
Time: 1:00 PM
Location: BN304

Mechanisms, and Clinical Presentation of Acute Sport-Related Concussions Among Canadian Interuniversity Athletes

Presenter: Christine Vu

Co-author(s): Katelyn Mitchell, Kyla Pyndiura
Faculty Advisor: Michael Hutchison, PhD
University of Toronto

BACKGROUND: Sport-related concussions (SRC) are amongst the most common injuries sustained in Canadian interuniversity sports. However, a lack of recent research limits the understanding of the complexities of acute SRC injuries, including frequency of incidence, mechanisms of injury (MOI), and clinical presentations. Therefore, a review of acute injury characteristics and clinical evaluations may be helpful for detecting individual risk factors to inform optimal concussion management strategies for diverse athletes across varying sport environments. OBJECTIVE: This study aims to examine the mechanisms of acute concussions across a variety of interuniversity sports, along with initial and follow-up clinical presentations and symptomatology. METHODS: Fifty female and male varsity athletes across multiple sports (ages 18-30 years) diagnosed with a total of 57 SRCs between August 2022 to December 2024 at the David L. MacIntosh Sports Medicine Clinic (University of Toronto) will be evaluated. Data from an initial concussion injury report form includes MOI, initial injury management strategies, acute symptomatology, family medical history, follow-up symptom reports, and recovery trajectories. RESULTS: Analysis is currently underway, and results will be presented at the conference. IMPLICATIONS: Improved understanding of acute SRC presentations and characteristics may inform educational initiatives for health care professionals and athletes in the interuniversity sport setting to formulate sport-specific return-to-play protocols. Additionally, the findings from this study may potentially inform policy changes amongst universities to improve SRC injury risk management in various sports and mitigate risk of long-term health consequences.

Session: Session III - B
Time: 1:15 PM
Location: BN304

Evaluating the Single- and Dual-Task Tandem Gait Test in Concussed and Healthy Interuniversity Athletes at One- and Two-Week Timepoints

Presenter: Lauren Wilcox

Co-author(s): Kyla Pyndiura, Michael Hutchison
Faculty Advisor: Michael Hutchison, PhD
University of Toronto

Background: SCOAT-6 recently added the single- and dual-task tandem gait to assess dynamic balance, coordination, and multitasking. However, the duration of performance deficits following concussion remains unclear, limiting the clinical utility of the tandem gait tests in detecting post-concussion impairments. Objective: The primary aim of the study was to evaluate single- and dual-task tandem gait performance between concussed athletes at Week 1 and Week 2 post-concussion and healthy athletes at two comparable timepoints with a secondary focus on sex-based differences. Methods: This prospective longitudinal study assessed interuniversity athletes, including concussed athletes (n=23) tested at Week 1 and Week 2 post-concussion and healthy athletes (n=26) at comparable timepoints. Participants completed three trials of single- and dual-task tandem gait tests. Descriptive statistics and Wilcoxon signed-rank tests were used for group comparisons. Results: Concussed female athletes were slower than healthy females, though not statistically significant, by 3.23s in the single-task at Week 1 (healthy: 14.84s ± 2.59s, concussed: 18.07s ± 4.93s) and by 2.74s at Week 2 (healthy: 14.69s ± 2.88s, concussed: 17.43s ± 4.89s). For dual-task, females were slower by 3.13s at Week 1 (healthy: 20.60s ± 5.10s, concussed: 23.73s ± 6.84s) and by 3.25s at Week 2 (healthy: 19.57s ± 4.84s, concussed: 22.82s ± 6.46s). Among concussed athletes, females performed significantly slower than males at both weeks in the single-task (Week 1- females: 18.07s ± 4.93s, males: 15.43s ± 3.49s) and dual-task (Week 1- females: 23.73s ± 6.84s, males: 17.71s ± 2.70s). No significant sex-based differences were found within healthy athletes. Conclusion: At Week 1 and Week 2, no significant differences in tandem gait performance were observed between healthy and concussed athletes, regardless of sex. However, sex-based differences were evident in only concussed athletes, highlighting the need for further investigation into the utility of this novel assessment in detecting concussion deficits.

Session: Session III - B
Time: 1:30 PM
Location: BN304

Markerless Motion Capture for Evaluating Kinematics Following Sport-Related Concussion

Presenter: Benjamin Dirven

Co-author(s): Kristie Liu, Kyla Pyndiura, Michael Hutchison
Faculty Advisor: Michael Hutchison, PhD
University of Toronto

Background: There has been evidence of altered neuromuscular and biomechanical changes experienced post-concussion, accompanied with an increased incidence of lower extremity injury for up to 1-year post-concussion. Objective: To assess kinematic differences in squats, lunges, and hip hinges between interuniversity athletes with a history of concussion and healthy controls. Methods: Athletes with concussion (n=14) completed the multimodal exertional test (MET) near medical clearance, and their performance was compared to a group of healthy athletes (n=12). Performance metrics included mean time per rep and mean joint angles at the beginning, middle and end of each rep were compared between groups for each exercise performed during the first three MET stages. Descriptive statistics were stratified by group and Wilcoxon rank-sum tests were performed for group comparisons. Results: On average, there were no differences in completion time of each rep. In the squat task, there was significantly more dominant ankle dorsiflexion in the control group compared to the concussion group: Stage 1 (median=112º [IQR=109º-116º)] vs. 106º [IQR=98º-109º]), Stage 2 (111º [IQR=109º-114º] vs. 106º IQR=[97º-111º]), and Stage 3 (111º (IQR=109º-116º) vs. 105º (IQR=105º-109º)). Additionally, in Stage 3, the control group experienced 16º more knee flexion of the dominant limb in comparison to the concussion group (114º, [IQR=96º-121º] vs. 98º, [IQR=94º-107º]). In the hinge task, there was significantly more dominant ankle dorsiflexion in the control group compared to the concussion group: Stage 1 (93º [IQR=88º-97º] vs. 85º [IQR=79º-93º]), Stage 2 (93º [IQR=91º-98º] vs. 87º [IQR=77º-93º]), and Stage 3 (94º [IQR=90º-97º] vs. 86º [IQR=76º-91º]). Conclusion: Aligning with previous research, there were significant differences in range of motion between groups. These findings highlight that altered biomechanics may occur following concussions and may be contributing to the increased incidence of lower extremity injury.

Session: Session III - B
Time: 1:45 PM
Location: BN304

The Cost-Effectiveness of Exercise-Based Prehabilitation Programs in Non-Cancer Sugical Population

Presenter: Siran Wang

Co-author(s): Anchal Badwal, Maggie Chen
Faculty Advisor: Dr. Daniel Santa Mina
University of Toronto

Background: Exercise-based interventions have been shown to improve post-surgical outcomes, including enhancing the functional capacity of patients, decreasing the length of postoperative hospital stay, shortening recovery time, and decreasing the risks of postoperative complications. Despite the clinical benefits, the cost-effectiveness and economics behind exercise-based prehab programs remain poorly understood, leaving a knowledge gap needed to guide decision-making in healthcare. Objective: This systematic review aims to evaluate the cost-effectiveness of exercise-based prehabilitation programs for adults undergoing non-cancer surgery. Methods: A librarian-directed search was conducted across databases such as MEDLINE, Embase, CINAHL, Cochrane Library, and clinical trial registries (e.g., ClinicalTrials.gov). The inclusion criteria are as follow: (1) adults (≥18 years) undergoing planned surgery, (2) exercise-based prehabilitation intervention defined as loco-regional/function-specific exercises (e.g., inspiratory muscle training) or whole-body programs (e.g., aerobic/resistance training) with specified frequency, intensity, and duration and (3) reported cost outcomes. Results: Fifteen studies were identified and included based on the inclusion criteria. It is anticipated that pre-habilitation is a cost-effective intervention for the non-cancer surgical population. Discussion: The findings from this review will provide insights into the economic impact of exercise-based prehabilitation programs. The results are expected to provide evidence on the cost-effectiveness of integrating exercise-based prehabilitation programs into standard preoperative care. An improved understanding of cost-effectiveness will guide and facilitate the development and implementation of prehabilitation programs and assist with healthcare policy design.

Session: Session III - B
Time: 2:00 PM
Location: BN304

Evaluating the Cost-Effectiveness of Exercise-Based Prehabilitation in Cancer Surgery

Presenter: Anchal Badwal

Co-author(s): Maggie Chen PhD(c), Sam Wang
Faculty Advisor: Dr. Daniel Santa Mina & Maggie Chen, PhD(c)
University of Toronto

Background: Exercise-based interventions have been shown to improve post-surgical outcomes by enhancing functional capacity, reducing the length of postoperative hospital stays, accelerating recovery, and lowering the risk of postoperative complications. Despite these clinical benefits, the cost-effectiveness of exercise-based prehabilitation programs remains poorly understood, particularly in cancer populations. Objective: This systematic review aims to evaluate the cost-effectiveness of exercise-based prehabilitation programs for adults undergoing cancer related surgery. Methods: A librarian-guided search was conducted across MEDLINE, Embase, CINAHL, the Cochrane Library, and clinical trial registries (e.g., ClinicalTrials.gov). The following inclusion criteria: (1) adult patients (≥18 years) undergoing planned surgery, (2) exercise-based prehabilitation interventions, including loco-regional/function-specific exercises (e.g., inspiratory muscle training) or whole-body programs (e.g., aerobic/resistance training) with defined frequency, intensity, and duration, and (3) reported cost-related outcomes was used to identify papers for the review. Results: Six studies were identified and include exercise-based prehabilitation programs to improve postoperative outcomes across various cancer populations, including gastric, lung, liver, colorectal, and breast cancer. Discussion: The findings from this review will provide valuable insights into the economic impact of exercise-based prehabilitation programs in cancer care. By assessing cost-effectiveness, this study aims to inform policymakers and healthcare providers on the feasibility of integrating these programs into routine preoperative care. A clearer understanding of the economic benefits will support the development of sustainable, evidence-based prehabilitation strategies and policy recommendations.

Session: Session III - C
Time: 1:00 PM
Location: BN307

Becoming skilled in and out of sport: Perspectives of sport-for-employability among intercollegiate swimmers

Presenter: Angelica Bath

Co-author(s): Aalaya Milne, Anya Guinzbourg
Faculty Advisor: Ashley Stirling, PhD
University of Toronto

BACKGROUND: Developing employability skills such as communication, teamwork, and problem-solving is crucial for higher education graduates, and experiential learning opportunities play a key role in this development. However, intercollegiate athletes face unique challenges that may limit their participation in traditional experiential learning opportunities. Sport-for-employability frameworks currently exist but are limited and do not target the intercollegiate athlete population. This research aims to understand how involvement in intercollegiate sport contributes to developing employability skills, focusing on the perspectives of retired intercollegiate swimmers. METHODS: The participants of this study included working professionals (for 3 years minimum) who were intercollegiate swimmers for at least 2 years at a Canadian university. Data was collected through semi-structured interviews, either in-person or virtually, and analyzed using thematic analysis. Both inductive and deductive approaches were used to generate emerging themes related to employability skill development in the context of intercollegiate sport and were interpreted considering theories of employability. RESULTS: The results of this study closely align with Yorke and Knight's (2004) USEM theory of employability, with participants demonstrating the development of its four components: understanding, skills, efficacy beliefs, and metacognition. IMPLICATIONS: This research provides valuable insights about the perceived development of critical employability skills from intercollegiate swimming participation and address gaps in sport-for-employability literature. Limitations of this study include the focus on only swimming, thus future research could explore sport-for-employability using various intercollegiate sports.

Session: Session III - C
Time: 1:15 PM
Location: BN307

"It just wasn't my time to be done with the sport": Collegiate athletes rediscovering joy in safe sport environments

Presenter: Nicole Chateau

Co-author(s): Sarah McGee
Faculty Advisor: Ashley Stirling, PhD
University of Toronto

Student-athletes are transferring between institutions and athletic teams at an increasing rate (Pierce et al., 2024). While various factors contribute to these transitions (Richards et al., 2016), psychological maltreatment may be a significant yet often overlooked driver. In recent prevalence studies, psychological maltreatment has been identified as being the most commonly reported type of harm experienced by athletes in sport compared to neglect, physical, and sexual maltreatment (Hartill et al., 2023; Parent & Vaillancourt-Morel, 2021), with 80% of athletes self-reporting experiences of psychological maltreatment during their careers (U.S. Centre for SafeSport, 2024). While some athletes respond by withdrawing from sport entirely (Kavanagh, 2014), others transfer teams, seeking psychologically safer environments that allow them to continue competing (Alexander et al., 2023). Limited research has examined these non-normative (unanticipated) athletic career transitions (Henriksen et al., 2024), particularly team-to-team transfers provoked by psychologically unsafe environments. Therefore, the purpose of this study was to explore the experiences of collegiate athletes who transferred from psychologically unsafe environments to seek an abuse-free sport experience. Utilizing a constructivist approach, semi-structured interviews were conducted with collegiate athletes from diverse team sports to understand their transition experiences. Grounded in Schlossberg's Transition Model (1981, 1995), this presentation will highlight a portion of the findings from a larger study and expand on the theme of athletes' re-finding joy in sport. The presentation will conclude with applied recommendations for fostering psychologically safe sport environments and supporting athletes in non-normative transitions.

Session: Session III - C
Time: 1:30 PM
Location: BN307

Creating Safer Learning Environments: An Exploration of the Safe Dance Landscape

Presenter: Emily Tatham

Faculty Advisor: Ashley Stirling, PhD & Aalaya Milne, MSc
University of Toronto

Traditional dance pedagogies have raised significant concerns regarding dancer well-being across competitive, recreational and pre-professional settings, for this reason the safety and well-being of dancers is more critical than ever in educational and professional settings. This literature review explores current safeguarding practices, the role of dance educators in creating safe learning environments, and identifies gaps in the literature. The review focuses on existing literature highlighting physical and psychological safety measures, consent-based practices, safeguarding protocols, inclusive pedagogy, and trauma-informed teaching. This presentation also discusses characteristics of effective dance educators and strategies for integrating professional teaching standards. Considering the research landscape-to-date, future directions and literature gaps will be discussed. The need for more inclusive and safe learning spaces across various dance environments is crucial, so that moving forward, the dance community can be a place where anyone can learn and grow.

Session: Session III - C
Time: 1:45 PM
Location: BN307

Examining the Relationship Between Important Others and Motivation to Participate in Competitive Dance Among Young Adolescent Females Using a Self-Determination Theory Lens

Presenter: Brianna DeAgazio

Faculty Advisor: Dr. Erin Pearson
Lakehead University

BACKGROUND: Physical activity involvement declines around adolescence, especially among girls. This adversely affects related health benefits such as decreased anxiety, increased self-esteem, and improved psychological well-being. Competitive dance, a female-dominated sport, involves learning routines and improving fitness. Few studies on adolescent dancers' motivation exist; a critical area to study given the attrition that occurs during this timeframe. Self-determination theory (SDT), a framework to examine motivation, shows that autonomous motivation enables athletes to continue their sport. The Relationships Motivation Theory, a SDT sub-theory, examines how relationship quality impacts motivation. Studies on other sports have noted the impact of parents and teachers on participation. Few studies have examined competitive dancers through a theoretical lens. OBJECTIVE: This study examined adolescent dancers' relationships and determined the degree to which they influence motivation and involvement. A positive correlation between high-quality relationships and intrinsic motivation was anticipated. METHOD: Female competitive dancers in Thunder Bay, aged 12-14, were eligible for this non-experimental correlational study and completed validated questionnaires including the Exercise Self-Regulation Questionnaire, the Teacher-Dancer Relationship Questionnaire, and the Perceived Parental Autonomy Support Scale; these measures focus on participants' motivation style and relationship quality (e.g., dancer-teacher, dancer-parent). Descriptive statistics and Pearson correlations were applied. RESULTS: Participants (N=18) showed a mean age of 13.11 (SD=0.900) and danced a mean of 11.39 hours per week (SD=3.66). A significant positive correlation between intrinsic motivation levels of dancers and relationship quality with teachers was identified (r=.617). CONCLUSION: The results align with the study purpose and support similar studies conducted on other sports about motivation and relationships. Strong relationships have been shown to impact mental and physical wellbeing positively among athletes. Because this can translate into greater enjoyment and engagement, attention should be paid to strategies that foster such connections (e.g., effective communication, positive reinforcement, building trust, personalized coaching).

Session: Session III - C
Time: 2:00 PM
Location: BN307

Exploring the Relationship Between Physical Activity and Mental Health Among Children with Type 1 Diabetes Mellitus

Presenter: Grace Lochner

Co-author(s): Madelyn M. Byra, Elizabeth Ball, Karen McAssey, Brian W. Timmons, Joyce Obeid
Faculty Advisor: Joyce Obeid, PhD
McMaster University

Background: Children with type 1 diabetes mellitus (T1DM) may be less physically active and have poorer mental health than their healthy peers due to disease-related factors. Despite the known benefits of physical activity, the association between physical activity and mental health among children with T1DM is not well understood. Objectives: The aims of this study were to (1) compare moderate-to-vigorous physical activity (MVPA) and mental health symptoms between children with T1DM and healthy children, and (2) explore the relationship between MVPA and mental health symptoms in children with T1DM and healthy children. Methods: Children with T1DM between 7-17 years old were recruited from the McMaster Children's Hospital, and healthy children were recruited from the general community. To measure levels of MVPA, participants wore a waist-worn accelerometer for 7 days. To measure symptoms of mental health, participants completed the Centre for Epidemiological Studies Depression Scale for Children (CES-DC) and the Ontario Child Health Study (OCHS, 2014) questionnaires. Group differences were assessed using independent t-tests. Relationships were assessed using Pearson's correlations. Results: Ninety-two participants (57.6% males; age: 12.4 ± 2.8 years) were included in this study, including forty-one children with T1DM and fifty-one healthy children. Data analyses are on-going, and results will be presented at the Bertha Rosenstadt National Undergraduate Research Conference. Conclusion: This study will help us gain a broader understanding of the relationship between MVPA and mental health in children with T1DM. This is important as physical activity may serve as an accessible and effective mental health intervention among this population.

Session: Session III - C
Time: 2:15 PM
Location: BN307

Throwing It In vs Throwing It Away: A Comparison of Throw-In Outcomes in NWSL and OUA

Presenter: Madison Klaas

Co-author(s): Nick Wattie, Ben Csiernik
Faculty Advisor: Nick Wattie, PhD & Ben Csiernik
Ontario Tech University

Background: Throw-ins, one of the most common set pieces in soccer, are often overlooked in both research and training, especially compared to free kicks and corners, which are extensively studied and practiced. This is especially true in women's soccer, where limited published research exists examining throw-in tactics and outcomes. The purpose of this study was to compare possession outcomes following throw-ins in NWSL and Ontario University Athletics (OUA) matches to understand differences in tactical approaches, determine their impact on possession retention and offensive opportunities, and identify coaching strategies that could improve throw-in effectiveness in the OUA. Methods: Observational data was collected and coded from 11 publicly available OUA matches and compared with 11 publicly available NWSL matches retrieved from StatsBomb's public repository. Possession outcomes following throw-ins were categorized as opportunities created (shots or keeper interruptions), maintained possessions (new set piece opportunity) or as turnovers. Chi-square tests were used to assess differences between leagues ($p < .05$). Results: Findings suggest NWSL teams created more maintained possessions and opportunities following throw-ins than OUA teams. OUA throw-ins resulted in 44 (6.2%) opportunities, while NWSL throw-ins resulted in 47 (9.3%). Additionally, NWSL throw-ins led to longer possession chains, with a difference of 9.26 events per possession (NWSL: 14.05, OUA: 4.79). Results from Pearson's Chi-squared test ($\chi 2 = 17.20$, $p < .01$) indicate statistically significant differences in possession outcomes from throw-ins between leagues. Interpretation: These findings suggest NWSL teams may use a more tactical approach to throw-ins. By identifying significant differences in throw-in outcomes, this case study provides insights that may improve tactical approaches to throw-ins in the OUA. While additional OUA performance analyses are needed, results suggest a more tactical approach to throw-ins could improve possession retention, transition play, and offensive effectiveness, contributing to improved performance at the university level.

Session: Session III - D
Time: 1:00 PM
Location: WS2007

AMPK activation partially mitigates age-associated changes in the neuromuscular junction

Presenter: Ricky Hong

Co-author(s): Andrew I Mikhail, Sean Y Ng, Stephanie R Mattina, Magda A Lesinski, Vladimir Ljubicic
Faculty Advisor: Vladimir Ljubicic, PhD
McMaster University

Introduction: The neuromuscular junction (NMJ) facilitates the electrochemical communication between an α-motor neuron and myofiber that is crucial for the induction of a muscle contraction. Accompanying the age-related loss of muscle mass, i.e., sarcopenia, are deleterious alterations to NMJ morphology such as post-synaptic fragmentation and the polyinnervation of it. Interventions such as exercise and caloric restriction can ameliorate age-associated deficits at the NMJ due, in part, to the stimulation of many upstream proteins that are directly or indirectly regulated by AMP-activated Protein Kinase (AMPK). Hence, the purpose of this study is to investigate the effects of chronic AMPK activation on NMJ morphology and health within aged mice. Methods: Old C57BL/6 mice (n = 16) were randomized at 18-months of age to receive either a vehicle (Old-Veh) or 10 mg/kg of body weight of a small molecule AMPK agonist MK8722 (old-MK) every other day for a total of 6-months. The epitrochleoancoenus muscle was collected and stained to identify the pre- and post-synaptic compartments of the NMJ for further analysis. Young 3-month-old mice served as a healthy control. Results: Our preliminary data (n = 2-4 per group) demonstrate a significantly greater nerve terminal perimeter ($p<0.05$) in Old-Veh relative to young mice, which tended to decrease ($p=0.09$) with MK treatment. Furthermore, we observed a greater number of polyinnervated NMJs, and pre-synaptic branch length in Old-Veh mice only. Age also exacerbated post-synaptic fragmentation ($p<0.05$) which was partially decreased in old-MK mice. Conclusion: This study provides evidence implicating AMPK's role as an influential molecular regulator at the level of the NMJ, as its age-associated deficits are partially ameliorated with the protein's chronic activation. Further work is aimed to achieve a full data set to grasp the extent of this relationship.

Session: Session III - D
Time: 1:15 PM
Location: WS2007

Assessing MK-8722 for Skeletal Muscle Regeneration in Duchenne Muscular Dystrophy

Presenter: Adam Sutoski

Co-author(s): Stephanie Mattina, Sean Ng, Vladimir Ljubicic
Faculty Advisor: Vladimir Ljubicic, PhD
McMaster University

Introduction: Duchenne muscular dystrophy (DMD) is the most common form of muscular dystrophy, characterized by chronic muscle damage due to mutations in the dystrophin gene. The loss of functional dystrophin protein causes muscles to experience continuous injury and impaired regeneration, leading to the replacement of muscle by fibrous and fatty connective tissue. Pharmacological stimulation of adenosine monophosphate-activated protein kinase (AMPK) has shown promise in mitigating DMD pathology. In an acute investigation, treatment with the AMPK agonist MK-8722 (MK) promoted a slow, oxidative muscle phenotype with heightened disease resistance. Considering this finding, this study aimed to determine the therapeutic potential of MK on skeletal muscle regeneration in DMD. Methods: Five-week-old male D2.mdx and DBA/2J control mice ($n = 8$) were administered MK (5 mg/kg) or a vehicle solution daily for seven weeks via oral gavage. Following treatment, the triceps muscles were harvested for analysis of muscle regeneration. Immunofluorescence was used to investigate the presence of muscle fibres expressing embryonic myosin heavy chain (eMHC) and centrally located nuclei. Results: We found that MK treatment reduced the number of eMHC-positive fibres ($p < 0.05$) but did not significantly alter the amount of centrally nucleated fibres in the triceps muscles compared to genotype-matched, vehicle-treated mice. Conclusion: These results indicate that pharmacological AMPK activation via MK administration attenuates dystrophic muscle damage, demonstrating its potential as a therapeutic intervention for DMD. Future directions for this study will assess the role of MK on muscle quality by measuring inflammatory cell infiltration and collagen deposition.

Session: Session III - D
Time: 1:30 PM
Location: WS2007

The Effects of AMPK Activation on Aged Alpha Motor Neuron Denervation

Presenter: Samantha Jonker

Co-author(s): Andrew Mikhail, Sean Y Ng, Stephanie R Mattina, Magda A Lesinski, Vladimir Ljubicic
Faculty Advisor: Vladimir Ljubicic, PhD
McMaster University

Background: Alpha motor neurons (α-MNs) play a crucial role in voluntary motor function and coordination. Myelination surrounding the motor axons facilitates the quick propagation of signals via saltatory conduction. With ageing, denervation of the α-MNs and alterations to the myelin sheath are observed, which leads to decreased in muscle mass and strength. AMP-activated protein kinase (AMPK) is known to have preservative effects on neural tissues within various contexts of neuromuscular disease and injury. Thus, the purpose of this study is to investigate the preservative effects of AMPK activation on α-MN size and number, and myelination in aged mice. Methods: C57BL/6J mice were treated with 10mg/kg of MK8722 (Old-MK), a global AMPK activator, or a vehicle (Old-Veh) starting at 18-months-old for 6 months. The sciatic nerve and lumbar spinal cord were collected at 24 months of age as well as from young 3-month-old animals. Total neuron number, size and myelin thickness were observed using a toluidine blue stain. α-MN number and size were observed using an immunofluorescent choline acetyltransferase stain. Results: Our preliminary data (n=5) suggest lower (p=0.056) number of neurons in Old-Veh and Old-MK relative to young animals. Furthermore, aging resulted in larger axon diameters and greater g-ratio compared to axons from young mice. The number of fully degenerated axons tended (p=0.058) to increase with aging primarily in untreated old mice, but both groups demonstrated significantly greater number of partially degenerated axons. Conclusion and Future Directions: Preliminary data shows age related neuronal degeneration, axon diameter increase, and myelin loss with trends of axon diameter preservation in Old-MK. Future work aims to examine AMPK's effect on α-MN axon and cell body size and number. These findings could help point to new interventions to help delay loss of motor function and coordination affecting the health and independent living of the ageing population.

Session: Session III - D
Time: 1:45 PM
Location: WS2007

Investigating the Role of Skeletal Muscle-Specific AMPK in Muscle Regeneration

Presenter: Samara Glazer

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

Introduction: Skeletal muscle regeneration is a complex process that is critical for facilitating muscle repair following injury, and is driven by the coordinated interactions of several proteins. Adenosine monophosphate-activated protein kinase (AMPK) is an energy sensing molecule that plays a vital role in supporting muscle quality. Previous research demonstrates that AMPK expression within satellite cells and macrophages is important for regulating satellite cell proliferation, macrophage polarization towards an anti-inflammatory phenotype, and fibrosis. However, the contribution of skeletal muscle-specific AMPK during regeneration remains largely unexplored. Therefore, the purpose of this study is to investigate the role of skeletal muscle-specific AMPK in muscle repair following injury. Methods: Six-month-old wildtype (WT) and muscle-specific AMPK knockout (AMPKmKO) mice (n = 6) were injured via intramuscular injection of cardiotoxin into the tibialis anterior (TA) muscles. The contralateral hindlimb muscles were used as uninjured controls, and TA muscles were collected at 7 and 28 days post-injury (DPI). Immunofluorescence microscopy was performed to quantify markers of skeletal muscle regeneration, including centrally located nuclei (CLN) and embryonic myosin heavy chain (eMHC)-positive fibers. Results: We observed a main effect of time, where the number of CLN was significantly higher at 7 DPI compared to 28 DPI, as expected. However, no statistically significant differences in CLN were observed between injury-matched, WT and AMPKmKO mice. Furthermore, the percentage of myofibers expressing eMHC was similar between both groups at 7 DPI. Conclusion: While analysis is still ongoing, these preliminary findings indicate that skeletal muscle-specific AMPK may not be required for skeletal muscle regeneration following injury. Future directions include measuring the myofiber cross-sectional area at 7 and 28 DPI in WT and AMPKmKO animals. In summary, this study aims to further elucidate the role of AMPK in skeletal muscle regeneration and contribute to informing therapeutic strategies for treating myopathies.

Session: Session III - D
Time: 2:00 PM
Location: WS2007

AMPK is not Required for Exercise-induced Angiogenesis

Presenter: Atta Yazdy

Co-author(s): Atta Yazdy, Andrew I Mikhail, Sean Y Ng, Stephanie R Mattina, Vladimir Ljubicic
Faculty Advisor: Vladimir Ljubicic, PhD
McMaster University

Background: In skeletal muscle, capillaries act to facilitate gas exchange to provide the muscle with sufficient levels of oxygen and nutrients. This is a vital process in order to maintain skeletal muscle function, health, and performance. Exercise elicits certain mechanical and biochemical signals which act to promote angiogenesis, a process by which new capillaries are formed. AMP-activated protein kinase (AMPK) is an exercise sensitive protein that regulates several key biological pathways. Interestingly, skeletal muscle-specific deletion of AMPK results in lower vasculature and pathological characteristics. However, it remains unclear if AMPK plays a role in vascular expansion following long-term exercise. Thus, the purpose of this study is to investigate if skeletal muscle AMPK is necessary for training-induced capillarization. Methods: To elucidate AMPK-specific effects during exercise training, we utilized a novel tamoxifen (TMX)-inducible skeletal muscle-specific AMPK knockout (imKO) mouse model. Wild-type (WT) and imKO mice were treated with TMX and allocated into a sedentary group or treadmill training. The exercise protocol consisted of a progressive treadmill run 5 times per week for a total of 6 weeks. The quadriceps muscle was collected to assess mRNA and capillary density using real time-qPCR and immunofluorescence, respectively. Results: We observed a significant reduction in vascular endothelial growth factor a (Vegfa) expression in skeletal muscle of imKO animals relative to their WT sedentary counterparts. However, no differences were observed in other vasculature regulators such as platelet endothelial cell adhesion molecule-1 (Pecam1), Vegfb, angiopoietin 2 (Angpt2), and platelet-derived growth factor B (Pdgfb) in skeletal muscle of sedentary WT and imKO mice. Interestingly, exercise augment the expression of Pecam1, Vegfa, Vegfb, and Angpt2 in imKO mice. Lastly, WT ($p=0.07$) and imKO ($p<0.05$) exhibited similar increases in capillary density with chronic exercise training. Conclusion: Collectively, our data suggest that skeletal muscle AMPK is dispensable for training-induced capillarization.

Session: Session III - D
Time: 2:15 PM
Location: WS2007

Chronic AMPK Stimulation Mitigates Age-Associated Skeletal Muscle Loss.

Presenter: Anneliese Schall

Co-author(s): Andrew I Mikhail, Sean Y Ng, Stephanie R Mattina, Magda A Lesinski, Vladimir Ljubicic
Faculty Advisor: Vladimir Ljubicic, PhD
McMaster University

Background: Age associated skeletal muscle loss, which predominantly impacts glycolytic muscle fibers, can result in an increased risk of hospitalization, loss of independence and all-cause mortality. Glycolytic muscle fibers enable quick movements essential for activities of daily activities. Reduced AMP-activated protein kinase (AMPK), an enzyme that supports muscle homeostasis, may contribute to the increased deterioration of muscle fibers in older adults. Thus, the purpose of this study is to determine whether chronic AMPK activation can mitigate the age-related loss of muscle mass and cross-sectional area (CSA) in aged mice. Methods: Old (~18 months) wild-type C57BL/6J mice, were randomly assigned to receive either 10mg/kg of the small molecule AMPK activator MK8722 (Old-MK) or a vehicle (Old-Veh). Both groups received their respective doses every other day via oral gavage for a total duration of 6 months. Young 3-month-old mice were used as a control. The gastrocnemius (GAST) was then extracted, weighed and underwent immunofluorescence staining to investigate muscle fiber CSA. Results: Muscle mass of the GAST was significantly greater in MK8722 treated animals as compared to Old-Veh mice. Furthermore, we demonstrated a significant decrease in CSA and minimum feret diameter in the glycolytic regions of GAST muscle from Old-Veh mice relative to young mice, which was not observed in treated animals. These observations were due to a rightward shift in the fiber size distribution of Old-MK mice relative to Old-Veh. Lastly, oxidative fibers showed no significant difference across all groups. Conclusion: Direct AMPK activation via MK8722 may play a protective role in age-related muscle deterioration primarily through the preservation of glycolytic fiber size. Future work aims to explore the drugs effect on fiber type distribution as well as fiber type grouping.

Session: Session III - E
Time: 1:00 PM
Location: WSB67

Discovering the Vestibular Contribution to Body Perception

Presenter: Haddie Arber Oakes

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

Discovering the Vestibular Contribution to Body Perception Presenter: Haddie Oakes Co-author(s): Dr. Gerome Manson, Sadiya Abdulrabba Faculty Advisor: Dr. Gerome Manson Queen's University The vestibular system plays a crucial role in voluntary motor control, integrating sensory inputs to maintain balance, stabilize vision, and guide movement. While previous research has examined the vestibular contribution to motor control in postural and oculomotor tasks, its role in goal-directed reaching, particularly toward targets on the body, remains unclear. This study aims to investigate the role of the vestibular system in reaching accuracy toward vibrating targets on the face. Participants performed randomized reaching movements toward vibrating tactors placed on the left cheek, nose, and right cheek. They underwent three conditions: no vestibular stimulation (GVS-N), galvanic vestibular stimulation (GVS) applied to the right mastoid (GVS-R), and GVS applied to the left mastoid (GVS-L). Participants performed reaching movements both with and without visual feedback (VFB) of their body position during movement planning. Once the movement began, participants had no vision of their environment. Initial findings show that participants exhibited greater reaching error in the direction axis (x-axis) in trials where GVS was presented compared to GVS-N trials. Additionally, participants showed larger errors in the GVS-R condition when they lacked VFB of their body position compared to when VFB was available. These findings suggest that, even when reaching to targets on the body, visual feedback (VFB) of body position during motor planning can help mitigate the effects of GVS-induced errors. Understanding how vestibular signals contribute to body perception and goal-directed movement can enhance rehabilitation strategies for individuals with vestibular dysfunction. Future research should explore how visual and proprioceptive cues interact with vestibular input to inform therapies for balance and coordination impairments.

Session: Session III - E
Time: 1:15 PM
Location: WSB67

The Influence of Vestibular Damage, Due to mTBI, on Auditory Localization and Postural Control

Presenter: Emma Crawford

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

The vestibular system plays an integral role in balance, postural control, and self-orientation. Injuries that result in vestibular disruptions, such as those that occur with mild-traumatic brain injury, can impact our ability to orient ourselves. Although there is a growing body of evidence highlighting auditory processing impairments in other conditions that affect vestibular system function, such as bilateral vestibulopathy, the effect of vestibular disruptions on auditory localization remains unknown. The purpose of this experiment is to investigate if disruptions in vestibular information affects auditory localization. I used a noisy galvanic vestibular stimulation (GVS) pulse to mimic concussion symptoms in healthy participants. Participants performed reaching movements towards five speakers arranged in a semi-circular formation, under four experimental conditions: 1) GVS with eyes open, 2) GVS with eyes closed, 3) no GVS with eyes open, and 4) no GVS with eyes closed. High-resolution motion capture was used to capture reaching movement errors, measured as the angular difference between the movement trajectory and speaker position. Additionally, force plate data was utilized to evaluate the variability in participants' center of pressure across the varying experimental conditions, to assess postural control. Preliminary results showed that participants had higher errors when reaching with their eyes closed compared to their eyes open. Also, participants exhibited higher error when reaching with GVS compared to when reaching without GVS. Further, while no changes were observed in the center of pressure variability across the conditions, there was a slight increase in variability under the GVS conditions compared to the no GVS conditions. In conclusion, these findings suggest that vestibular disruptions may significantly impact auditory localization and postural control. These findings provide evidence that auditory localization ability should be monitored and assessed after conditions that result in vestibular disruption, such as mild-traumatic brain injury.

Session: Session III - E
Time: 1:30 PM
Location: WSB67

The Effect of Tablet Handwriting Sonification on Memory Acquisition

Presenter: Igor Serafini

Faculty Advisor: Dr. Gerome Manson
Queen's University

Igor Serafini, Obaida Al-Naib, Gerome Manson Memory is a fundamental component of learning, and the shift toward digital handwriting presents new challenges to the memory-learning process. While repetitive handwriting enhances memorization, writing on tablets lacks the rich multisensory feedback of traditional pen-and-paper methods, potentially impacting fluency and recall. Sonification, the transformation of movement into real-time auditory feedback, has been proposed as a means to enhance digital handwriting, yet its impact on memory retention remains unclear. This study investigates whether real-time auditory sonification during handwriting improves recognition memory. Thirty neurologically healthy participants (ages 18-25) trained by drawing 12 complex symbols under three conditions: natural sound, amplified sound, or no sound. Following each training phase, they completed a recognition memory test, identifying whether presented symbols were previously encountered ('old') or novel ('new'), along with their confidence level. Preliminary results indicate that amplified auditory feedback leads to the highest recognition accuracy and the greatest certainty in word selection, suggesting a strengthened sensorimotor integration that enhances memory encoding and retrieval. These findings have significant implications for educational technology and rehabilitation. Enhancing auditory feedback in digital handwriting may bridge the sensory gap between traditional and digital writing, optimizing learning outcomes. Furthermore, the application of sonification could support individuals with motor or cognitive impairments, providing an innovative approach to assistive learning and rehabilitation. By establishing a direct link between handwriting sonification and memory performance, this study contributes to the growing field of multimodal learning and cognitive enhancement.

Session: Session III - E
Time: 1:45 PM
Location: WSB67

Validating a Novel Circle-Tracing Task by Evaluating the Role of Visual and Somatosensory Feedback in Lower Limb Motor Control.

Presenter: Abu Hijleh Abed

Co-author(s): Igor Serafini, Jermyl A. Acuzar, Mohammad Mohammad, Gerome Manson
Faculty Advisor: Dr. Gerome Manson
Queen's University

Motor control assessments for the lower extremities, such as the shin rub test and the Lower Extremity Motor Coordination Test (LEMOCOT), are widely used in clinical settings to evaluate motor function and track disease progression in conditions like multiple sclerosis (MS). However, these tests are often qualitative and lack the sensitivity required to detect subtle motor control deficits over time. While automated versions of the LEMOCOT exist, they have yet to achieve the precision necessary for widespread clinical adoption. To address this gap, we developed a novel AI-based Circle-Tracing Task (CTT), previously validated against a gold-standard motion capture system using root-mean-square error (RMSE) as a performance metric. This study further validates the CTT by investigating the roles of visual and somatosensory information in task performance. Using blackout goggles and lower limb paresthesia stimulation (PS), participants completed eight trials of the CTT under four conditions with both legs: (1) vision, esthesia; (2) blind, esthesia; (3) vision, paresthesia; and (4) blind, paresthesia. To control for learning effects, the starting leg and condition order were randomized, with the constraint that PS was not applied consecutively. Participants also completed a body map to document paresthesia distribution and the Waterloo Footedness Questionnaire to determine leg dominance. Results showed that the dominant leg consistently exhibited higher accuracy and lower variability across all conditions. Visual information consistently improved performance and mitigated the negative impact of paresthesia. Performance changes throughout trials suggested that the CTT reliably measures lower extremity motor control without significant adaptation bias. These findings support the potential of the CTT as a sensitive and reproducible assessment tool, particularly for detecting subtle motor deficits, but may require a blind condition to properly examine somatosensory deficits.

Session: Session III - E
Time: 2:00 PM
Location: WSB67

Investigating Soccer-Specific Training on Lower Limb Dominance Using Motor Control, Stability, and Power Tasks

Presenter: Devon Eisen

Faculty Advisor: Dr. Gerome Manson
Queen's University

While extensive research has focused on hand and eye dominance, there has been comparatively little study on the existence and functional implications of lower limb dominance. Although there are methods to assess dominance in the lower limb using footedness questionnaires, few studies have investigated if these questionnaires capture differences in lower limb performance across a range of functional tasks. The objective of this research is to investigate the relationship between soccer-specific training and performance on lower limb motor control, stability, and power tasks. Neurologically-healthy participants and varsity soccer players were recruited for this study. Participants self-reported their footedness using the Waterloo Footedness Questionnaire (WFQ). Participants' handedness was self-reported using the Flinder's Handedness Survey, and eyedness was determined using the Miles Eye Dominance Test. Following these questionnaires, participants engaged in three tasks with both their right and left leg: 1) circle tracking task (CTT) in sitting and standing conditions; 2) single leg jump (SLJ); and 3) single leg stance (SLS) in eyes open, closed, and single-eye open/closed conditions. Tracing error in the CTT, jump height in the SLJ, and centre of pressure (CoP) variability was used to quantify between-leg performance in each task. Overall, participants who were classified as mixed-footed (-6 to +6 on the WFQ) had smaller between-leg differences in RMSE than participants who were right-footed (+7 to +20 on the WFQ). In addition, both mixed-footed and right-footed participants had higher jumps with their right leg. These results suggest that the WFQ may be more relevant for quantifying footedness in coordination than power tasks. Further research on lower limb motor control in other sports such as rugby, basketball, and football are needed to accurately determine the role of sport-specific training on lower limb dominance.

Session: Session III - E
Time: 2:15 PM
Location: WSB67

Voice-familiarity effects on speech perception across a delay

Presenter: Grace Malheiro

Faculty Advisor: Manda Fischer, PhD & Ingrid Johnsrude, PhD
Western University

The literature on voice training has largely focused on how a voice becomes familiar and how familiar voices affect speech intelligibility. However, little is known about how long familiar voice benefits to speech intelligibility last. Here we examine whether familiar-voice benefits, induced by explicit voice training, persist beyond immediate testing; and whether familiar voice benefits are mediated by individual differences in cognitive ability. On day one, young adults aged 18-40 years (n=25) underwent voice training and were tested on their ability to understand these trained voices in a speech intelligibility task. After a 14-day delay, participants returned for follow-up testing to examine whether any benefits to speech intelligibility persisted after immediate testing. During this visit, we also took measurements of cognitive ability. Trait-level measures of cognitive ability were collected using well-established measures of cognitive control focused on crystallized intelligence, fluid intelligence, working memory, processing speed, inhibition and media multitasking. If familiar-voice benefits persist beyond immediate testing, it is possible that sleep over the 13-15-day delay had an effect on strengthening the memory for the trained voice (Takeuchi et al., 2014). Given that individual differences in cognitive ability predict speech perception (Akeryod, 2008), we also hypothesized that cognitive ability will have a different impact on speech perception for familiar (trained) and unfamiliar voices.

Session: Session IV - A
Time: 2:40 PM
Location: BN302

Evaluation of the Adrenalease Posture Correction Shirt for Reducing Work-Related Musculoskeletal Disorders in Ultrasound Technologists

Presenter: Tina Chen

Co-author(s): Evan Curd
Faculty Advisor: Dr. Timothy Burkhart
University of Toronto

BACKGROUND: Work-related musculoskeletal disorders (WRMSDs) are prevalent among healthcare professionals, including ultrasound technologists, due to prolonged static postures and repetitive upper extremity motions during patient scans. Previous ergonomic interventions, such as workstation redesigns and posture improvement programs, have faced barriers like non-compliance and environmental constraints, limiting their effectiveness. The Adrenalease Posture Correction Shirt (PCS) is designed to improve posture by using adjustable straps that passively induce depression of the shoulders and retraction of the scapulae, promoting extension of the thoracic spine and adduction of the clavicles, thereby facilitating better alignment. OBJECTIVE: This study aims to quantify the effectiveness of the Adrenalease Posture Correction Shirt in reducing segment angle positions (e.g., excessive trunk flexion, shoulder elevation, and scapular protraction) associated with WRMSDs. METHODS: A randomized within-subject, pre-test/post-test design will be used with 15 cardiac sonographers from St. Michael's Hospital. Participants will perform simulated ultrasound scanning tasks (e.g., using a transducer to scan the chest or abdomen) while wearing the PCS and a control condition (no PCS). Kinematic data will be collected using upper body Inertial Measurement Units (IMUs) affixed to the body segments to assess posture before and after wearing the PCS. Pain and function will be measured through baseline and post-intervention questionnaires. EXPECTED RESULTS: It is expected that the Adrenalease PCS will improve upper extremity kinematics during simulated ultrasound scanning tasks by reducing shoulder elevation, trunk rotation, and other ergonomic risk factors, such as excessive wrist flexion, prolonged static postures, and improper scapular positioning. Participants are also expected to report reduced discomfort and pain, as measured by visual analogue scale (VAS) scores. SIGNIFICANCE: The results will inform the integration of ergonomic wearables into clinical practice as a feasible solution for preventing WRMSDs in healthcare workers. Limitations include the small sample size and short-term intervention duration. Future studies should explore long-term

Session: Session IV - A
Time: 2:55 PM
Location: BN302

The Effectiveness of Horizontal and Vertical Jump Tests to Assess Return-to-Sport Following ACL Reconstruction: A Systematic Review

Presenter: Nathan Whitney

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

BACKGROUND: Anterior cruciate ligament (ACL) tears are among the most common knee injuries in sports, often caused by excessive anterior tibial translation during rapid decelerations, landing, or sudden direction changes. ACL reconstruction (ACLR) is the primary treatment, followed by six to 12 months of rehabilitation. A return-to-sport (RTS) protocol involving functional movement tests (e.g., horizontal jump tests) and self-reported assessments is then used to determine if the knee has sufficiently recovered. Despite passing current RTS guidelines and receiving medical clearance, ACL reinjury rates up to 15% have been reported. Therefore, the purpose of this systematic review is to assess the effectiveness of current RTS guidelines, emphasizing functional jump tests. METHODS: We searched MEDLINE, EMBASE, CINAHL, SPORTDiscus, and Cochrane. Search terms include "anterior cruciate ligament," "ACL reconstruction," "return to sport," and "jump". Eligible studies included longitudinal, prospective, and randomized controlled trials with a prospective design that observed athletes (age=18-35 years) who underwent ACLR for a primary ACL injury and were medically cleared to RTS. Studies lacking follow-up data are excluded. Data extraction will include demographics, anthropometrics, sport type and level, reconstruction type, RTS protocol (jump assessments), performance (kinematics/limb symmetry), follow-up duration, reinjury rate and mechanism, RTS success rate, time to RTS, competition level, and participation status for ACLR athletes followed for reinjury. EXPECTED RESULTS: The search has returned 6524 articles. Title and abstract review is underway. It is expected that vertical jumps may be a better RTS assessment due to their similarity to sport-specific movements, like those in basketball or soccer, which involve rapid decelerations, high-impact landings, and ACL stress. SIGNIFICANCE & LIMITATIONS: Assessing jump-based RTS tests may refine protocols to minimize reinjury risk. However, limitations include variations in jump protocols, sport demands, and competition levels. Future research should explore unilateral vs. bilateral jumps and sport-specific variations to improve RTS assessments.

Session: Session IV - A
Time: 3:10 PM
Location: BN302

Comparing performance end points to movement quality as return to activity assessments following ACL reconstruction

Presenter: Yu Tong Zeng

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

Introduction: Anterior cruciate ligament (ACL) injuries are prevalent in athletes. For individuals aiming to return to pre-injury activity level, ACL reconstruction (ACLR) remains the most popular treatment. However, deficits in strength and biomechanical performance remain despite being cleared to return to sport (RTS). Current RTS criteria and assessments are limited as they only use a single endpoint and overlook possible bilateral changes in strength. Objective: To quantify and identify strength and muscle activation patterns produced by the lower extremities in response to standard RTS assessments. Methods: The ACLR group (n=25) comprised patients who were cleared to RTS by an orthopaedic surgeon following ACLR and the control group (n=25) comprised healthy individuals who matched according to age, sex, and pre-injury activity level. Bilateral surface electromyography (sEMG) data was collected from 16 sensors placed bilaterally on the lower extremities. Participants were instructed to complete a series of common assessment and sports tasks (stop jump, two-foot vertical jump, one-foot vertical jump, single hop, triple jump, sidestep cut, bodyweight squat) with all unilateral tasks completed on both sides. Isometric knee joint strength was collected from a Biodex dynamometer with the limb positioned at 90° flexion. The sEMG data was recorded using Qualysis software. A paired t-test will be used to determine biomechanical differences between controls and ACLR patients. One-tailed paired t-test will be used to determine statistical differences between the involved and uninvolved legs. Expected Results: Strength deficits are expected between the ACLR limb and both the contralateral limb and controls. Differences in muscle activation are also expected between the involved and uninvolved limbs, as well between ACLR and control groups. These results will support the need to implement RTS assessments focusing on how athletes achieve performance endpoints, rather than the endpoints themselves.

Session: Session IV - A
Time: 3:25 PM
Location: BN302

A 2D Video and In-Game Context Analysis of Non-Contact ACL Injuries in NFL Skill-Position Players

Presenter: Alan Joumaa

Faculty Advisor: Timothy Burkhart, PhD
University of Toronto

Background. Non-contact anterior cruciate ligament (ACL) injuries remain a critical concern among NFL skill-position players, as they frequently engage in rapid cutting, pivoting, and acceleration. Existing research often isolates biomechanical or situational factors, overlooking the multifactorial nature of these injuries. The purpose of this study was to identify key biomechanical and contextual risk factors contributing to non-contact ACL injuries in NFL skill-position players by applying a two-dimensional (2D) video analysis protocol. Methods. Ten publicly available video clips of confirmed non-contact ACL injuries were collected from official NFL broadcasts, each offering either frontal or sagittal views in the critical window of 0-100 milliseconds after ground contact. Kinovea software was used to quantify knee flexion/extension (sagittal) and knee valgus/varus (frontal). Player anthropometrics (age, height, weight), prior ACL history, quarter of injury, and movement type (e.g., cutting, pivoting) were also recorded. Results. The mean (SD) flexion angle was 135.1° (24.5°), and the mean (SD) frontal-plane knee angle was (<180°). One case presented a varus angle of (240°) and corresponded to a recurrent ACL tear. Notably, injuries tended to occur early in explosive drives or late in games, potentially reflecting acute loads or fatigue. Interpretation. These findings underscore the interplay between biomechanical positioning, specifically knee flexion and valgus, and in-game factors in non-contact ACL injuries. While the small sample size limits the generalizability of the results, they highlight how a combined 2D and contextual analysis can inform targeted prevention strategies and encourage further research, such as 3D motion capture and larger sample cohorts.

Session: Session IV - A
Time: 3:40 PM
Location: BN302

Comparison of Lower Extremity Biomechanics Between Open and Closed Kinetic Chain Exercises

Presenter: Amina Abdul Jalil

Co-author(s): Tiffany Tiu, Colin O'dwyer
Faculty Advisor: Timothy Burkhart, PhD
University of Toronto

BACKGROUND: Anterior cruciate ligament (ACL) injuries are common, with over 200,000 cases reported annually in North America. Rehabilitation of quadriceps strength following Anterior Cruciate Ligament Reconstruction (ACLR) involves both open kinetic chain (OKC) and closed kinetic chain (CKC) exercises to restore quadriceps strength and neuromuscular coordination. Questions concerning the safety of OKC exercises post-ACLR are raised due to the strain it can exert on the ACL graft. However, proponents of OKC exercises argue its necessity to isolate the quadriceps. No studies have shown the differences in how OKC and CKC train the quadriceps. OBJECTIVE: To quantify and compare quadriceps muscle activation between OKC and CKC exercises in healthy adults. METHODS: Forty healthy adults (20 males, 20 females) without lower limb injuries are being recruited. Each participant will perform three tasks: i) knee extension (KE); ii) squat (SQ); and iii) step-up (SU). Each is performed at body weight, 10% body weight, and 25% body weight. Muscle activation of the rectus femoris (RF), vastus lateralis (VL), and vastus medialis (VM) will be assessed using surface electromyography. Additionally, Theia marker-less motion tracking will allow for the quantification of three-dimensional knee joint kinematics, and force plates will measure ground reaction forces. EXPECTED RESULTS: To date, data from 13 participants have been collected. It is expected that OKC exercises will result in greater RF activation, while CKC exercises will result in greater VL and VM activation. Determining if there is a CKC exercise and load that stimulates the quadriceps in a similar way to OKC may allow for the optimization of rehabilitation protocols. As such, the findings from this study will help to inform rehabilitation regimens for patients recovering from ACL surgery by understanding the functions of CKC and OKC workouts in controlling ACL strain and muscle activation.

Session: Session IV - B
Time: 2:40 PM
Location: BN304

Breaking the Cycle: Barriers and Facilitators to Reducing Sedentary Time in Prostate Cancer Survivors-A Qualitative Study

Presenter: Cinthia Orellana

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

Background: Prostate cancer is the most common cancer in men, resulting in a growing number of prostate cancer survivors (PCS) that will experience treatment-related side effect. Sedentary behavior (SED) is associated with adverse health outcomes (e.g., fatigue, depression, anxiety) in PCS. Few interventions target reducing SED, and thus understanding the factors influencing SED remain unclear. Purpose: To explore barriers and facilitators in reducing SED among PCS. Methods: This qualitative study, guided by Grounded Theory principles, recruited participants from an existing study database, community organizations, and referrals. Eligibility included 18+ years, having localized or asymptomatic metastatic prostate cancer, not currently undergoing radiation or chemotherapy, being proficient in English, and having access to a webcam-enabled device with reliable internet. Nineteen semi-structured interviews were conducted via Zoom between November 2024 and February 2025. Data was transcribed, and analyzed using inductive thematic analysis. Results: Nineteen PCS (Mage= 72.2 ± 7.1 years, months since diagnosis=92.6±64.0 months) were interviewed. Thematic analysis identified three core themes: 1) Perceptions, awareness, and personal meaning for reducing SED; 2) Navigating barriers and facilitators to reducing SED; 3) Motivation and social reinforcement. While participants were aware of SED, they struggled to implement meaningful changes, revealing a gap between awareness and action. Key barriers to reducing SED included sleep disturbances, fatigue, aging concerns, chronic conditions (e.g., osteoporosis, plantar fasciitis), reducing testosterone levels, and rising prostate-specific antigen (PSA) levels, and additonally, participants with strong social connections via physical activity community groups reported greater adherence to physical activiy, suggesting that social support and accountability enhance motivation, thereby easier to reduce SED. Conclusions: These findings identifies key barriers such as fatigue and presense of chronic conditions, as well as facilitators such as social support, which are important targets to inform SED interventions for better health outcomes.

Session: Session IV - B
Time: 2:55 PM
Location: BN304

Correlates of Short Physical Performance Battery and Grip Strength in Patients Referred to Prehabilitation: An Observational Sub-Study

Presenter: Gaven Ren

Co-author(s): Daniel Sibley
Faculty Advisor: Daniel Santa Mina, PhD
University of Toronto

Background: Prehabilitation refers to preoperative interventions that seek to optimize patient health to improve treatment outcomes. Key outcomes measured in prehabilitation programs include functional capacity, which describes how patients handle activities of daily living. Identifying correlates of poor functional capacity pre-operatively can enhance program efficiency by shortening assessment duration through the greater use of surrogate measures that serve multiple purposes, which is paramount considering the increasing demand for prehabilitation. This study examines baseline patient characteristics associated with three measures of functional capacity: Short Physical Performance Battery (SPPB), the six-minute walk test (6MWT) and grip strength scores among patients in a clinical prehabilitation setting. Methods: This retrospective, cross-sectional, observational study analyzes data from participants enrolled in the University Health Network Prehabilitation Program participating in a larger trial observing prehabilitation's effects on sleep health. Patients were eligible if they met the larger study's inclusion criteria, which included impaired functional capacity and attendance of at least one in-person assessment. Before enrollment, participants completed a baseline assessment by a registered kinesiologist that included handheld dynamometry, 6MWT, and SPPB, which is comprised of the 5 Times Sit to Stand, balance and gait speed tests. Participants then initiated standard-of-care, personalized prehabilitation. 55 participants were included in correlational analyses used to assess correlates of poor SPPB, 6MWT and grip strength performance. Expected Results: Measures of functional capacity are significantly correlated with one other in addition to patient-reported outcomes such as the Perceived Stress Scale and PROMIS (Patient-Reported Outcomes Measurement Information System). Implications: Clinical exercise tests utilized in the program measure physical qualities closely tied to one another, which may support reducing redundancy and improving time-cost efficiency by removing certain tests from assessments when appropriate. Through further optimization of the assessment procedure, continued scaling of patient volume in a stressed healthcare system can improve access to prehabilitation.

Session: Session IV - B
Time: 3:10 PM
Location: BN304

Examining the Feasibility of High Intensity Interval Training for Individuals Post-Stroke

Presenter: Zahra Ali

Co-author(s): Kevin Moncion
Faculty Advisor: Ada Tang, PhD
McMaster University

Background Aerobic exercise is critical for post-stroke rehabilitation, improving cardiorespiratory fitness and mobility. High-intensity interval training (HIIT) has shown promise in stroke populations, demonstrating safety and feasibility in protocols with exercise intensities up to 80% of heart rate reserve (HRR). However, limited evidence exists on the feasibility of progressive HIIT protocols targeting HRR >80%, and the impact of demographic factors on adherence. Objectives This study aims to evaluate the feasibility of a 12-week progressive short-interval HIIT program in individuals post-stroke. Feasibility outcomes include: (1) achieving target HRR for ≥80% of high-intensity intervals, (2) reaching target ratings of perceived exertion (RPE) for ≥80% of high-intensity intervals, (3) maintaining ≥80% attendance, and (4) absence of serious or nonserious adverse events. A secondary objective is to explore the relationship between demographic factors, such as age and sex, and feasibility outcomes. Methods A secondary analysis was conducted using data from a randomized controlled trial. Participants engaged in a HIIT program using recumbent steppers, performing 60-second high-intensity intervals interspersed with 60-second low-intensity bouts. The high-intensity target started at 80% HRR and progressed by 10% every four weeks, reaching 100% HRR. Linear mixed models were used to assess each feasibility measure independently. Additional linear mixed models were conducted to analyze the influence of demographic factors on feasibility measures. Hypothesis It is hypothesized that participants will achieve feasibility thresholds, consistent with non-stroke populations demonstrating adherence to progressive short-interval HIIT. Additionally, feasibility may vary by age and sex, with older individuals and women potentially exhibiting lower adherence. Conclusion While this secondary analysis is limited to one randomized controlled trial, findings will provide insight into the feasibility of progressive short-interval HIIT in post-stroke rehabilitation. The findings of this study may also clarify how demographic factors influence adherence and inform future HIIT protocol designs for individuals post-stroke.

Session: Session IV - B
Time: 3:25 PM
Location: BN304

"My confidence has really grown": Participant experiences engaging in a power-focused strength training intervention

Presenter: Zoe Sanvido

Co-author(s): Victrine Tseung, Kenneth S Noguchi, Giulia Coletta
Faculty Advisor: Ada Tang, PhD
McMaster University

Background: Strength training plays an integral role in post-stroke rehabilitation and can improve physical fitness, emotional wellbeing, and cognitive function. Power training is a form of strength training that aims to improve the rate of force development in addition to strength, but few studies have examined this form of exercise after stroke. There is a specific research gap in understanding the experiences of individuals with stroke completing these programs. Objectives: This study aimed to understand (1) the perceived barriers and facilitators influencing participation in Power Exercise for Stroke Recovery (POWER) by individuals with stroke, and (2) the impact of POWER on participants' perceived health. Methods: We recruited twelve individuals (age 39-76 years, 1-9 years post-stroke) who previously engaged in the 10-week POWER intervention. These participants engaged in semi-structured interviews that were analysed using inductive thematic analysis using Dedoose. Results: Four key themes for barriers and facilitators to POWER were: (1) Low cost enabled continued participation in POWER; (2) POWER was an individualized exercise challenge based on ability and skill level; (3) Social support was an essential part of POWER, including support from friends, family, and staff, while healthcare provider doubt was a barrier; and (4) the environment made POWER a positive experience by providing a sense of belonging through accessible facilities. Two key themes emerged regarding the impacts of POWER: Participation in POWER (1) showed participants they were more capable than they anticipated, and (2) resulted in improvements beyond strength and function, leading to a desire for increased session frequency and duration. Participants also believed that the perceived benefits outweighed the costs of participating. Conclusion: Identifying barriers, facilitators and impacts of exercise programs on participants perceived health is key to increasing engagement for those with stroke.

Session: Session IV - B
Time: 3:40 PM
Location: BN304

Blood Pressure Following High Intensity Resistance Exercise in Individuals with Stroke

Presenter: Juliano Abreu

Co-author(s): Elric Allison, Kenneth Noguchi
Faculty Advisor: Ada Tang, PhD & Baraa Al-Khazraji, PhD
McMaster University

For people with stroke, blood pressure is an important risk factor for a recurrent stroke. Following a stroke, autonomic regulation may be impaired, leading to exaggerated fluctuations in blood pressure in response to exercise. Current evidence supports the role of exercise in stroke recovery, wherein higher intensities lead to superior benefits. However, there are concerns among people living with stroke regarding the safety and feasibility of high intensity resistance exercise, particularly due to the risk of acute fluctuations in blood pressure. Also of concern is post-exercise hypotension (PEH), characterized by large drops in blood pressure immediately following exercise. The impacts of PEH can be concerning for people with stroke due to the risk of faints and falls after exercise cessation. While people with stroke experience an increased PEH response following aerobic exercise, little is known about the extent of this response during resistance training. Therefore, the purpose of this study was to compare the post-exercise blood pressure response following a single bout of high intensity resistance exercise between people with and without stroke. Twelve individuals living with stroke (age 39-76, 5 female, time post-stroke 1-9 years) and twelve sex-matched recreationally active controls (age 18-35) participated in this study. Brachial artery blood pressure was measured at rest and within 2 minutes following 2-3 sets on a leg-press at a target rating of perceived exertion of 5-7/10. The difference between resting blood pressure and post-leg press blood pressure will be calculated and compared between groups using an analysis of covariance. Insight from this project will help inform the extent of the PEH response in stroke populations, to better understand how to safely prescribe resistance training after stroke.

Session: Session IV - C
Time: 2:40 PM
Location: BN307

The Impact of Synchronous Exercise on Social Connection and Identity in Women Dyads

Presenter: Fengyue Xu

Co-author(s): Ross M. Murray, Madison F. Vani, Catherine M. Sabiston
Faculty Advisor: Catherine Sabiston, PhD
University of Toronto

BACKGROUND: Social connection and identity are important for enjoyment and commitment to exercise. However, it is unclear whether these social factors can be amplified experimentally. PURPOSE: This study examined whether engaging in synchronous exercise increases social connection between two unfamiliar women. METHOD: Participants (N = 32 women, M(SD)age = 26.78(8.61)) were randomly assigned to either a synchronous or asynchronous exercise condition. Each pair completed a 10-minute light-intensity cycling session using a SciFit PRO2 hand and foot pedal bike in a controlled lab environment. In the synchronous condition, dyads were instructed to synchronize their movements; in the asynchronous condition, they exercised simultaneously without synchronization instructions. Participants were unfamiliar with their partner prior to the study. Before and after exercise, they completed questionnaires assessing partner connection, social identity, and session enjoyment. RESULTS: After controlling for pre-exercise social identity, a linear regression indicated that post-exercise social identity was significantly lower in the asynchronous condition ($b = -0.84$, $SE = 0.35$, $p = .024$). This suggests that synchronizing movements during exercise may enhance social identity. Participants in the synchronous condition reported greater session enjoyment ($M = 5.96$, $SD = 0.98$) compared to those in the asynchronous condition ($M = 5.26$, $SD = 1.03$), $d = 0.71$. CONCLUSION: Although synchronous exercise did not significantly improve partner connection, it appeared to enhance social identity and enjoyment. Future research should explore long-term effects and individual factors influencing social benefits in dyadic exercise.

Session: Session IV - C
Time: 2:55 PM
Location: BN307

Parents' perceptions of body image support for their athlete daughters.

Presenter: Alishba Mansoor

Co-author(s): Elise Christopoulos, Fengyue Xu Landyn Meadows, Madison F. Vani (PhD), Catherine M. Sabiston (PhD)

Faculty Advisor: Catherine Sabiston, PhD

University of Toronto

Background: Body image concerns significantly influence poor sport experiences for many adolescent girls. Given the major role parents have in supporting young athletes, their perceptions of body image in girls' sports are important yet understudied. Purpose: This qualitative description study explored parents' perceptions of adolescent girls' body image experiences in sport. Methods: Semi-structured interviews were conducted with ten parents (ages 45-54; 50% female) of adolescent female athletes, which were analyzed using an inductive thematic analysis. Results: Parents had a limited understanding of body image, often linking it to athletes' nutritional habits and focusing on weight gain as a concern. Parents also struggled to recognize body image issues in their children, however, they identified these issues in other athletes. Five key themes emerged: (1) Parental concerns about pressures on their daughters' body image (i.e., pressure from social media, peers, and sports environments), (2) Sport shapes body image - parents acknowledged both positive (confidence, strength) and negative (weight-focused comments) influences of sport, (3) Social influences (media and peers) - parents felt unprepared to address exposure to idealized online image, (4) Expressed the important role of coaches on positive body image and reported experiences of body shaming, (5) Parent strategies for support - parents attempted open discussions but struggled to encourage health promotion without reinforcing body-related pressures. Conclusion: This study revealed parents' challenges in recognizing and defining negative body experiences in sports, which may significantly impact young girls' athletic experiences. Further research is needed to explore ways to improve parents' understanding, identification, and management of negative body experiences in youth sports.

Session: Session IV - C
Time: 3:10 PM
Location: BN307

A Scoping Review of Existing Body Image Guidelines for Parents of Youth

Presenter: Landyn Meadows

Co-author(s): Elise Christopoulos, Fengyue Xu, Alishba Mansoor, Madison F. Vani, Catherine M. Sabiston
Faculty Advisor: Catherine Sabiston, PhD
University of Toronto

Body image concerns are commonly experienced by youth in sport, are associated with lower sport commitment and enjoyment, and are cited as a reason for dropout from sport. Parents, guardians, and caregivers (here forth termed 'parents') play an important role in their child's sport experience as they are positioned to ensure the sport environment is safe and positive for their child's wellbeing. However, parents often feel ill-equipped to help their children with body image concerns. Equipping parents with the proper tools to support their children is needed. To develop parent-focused body image in sport guidelines, a comprehensive synthesis of parent resources for fostering an adaptive body image among youth is needed. The purpose of this scoping review was to examine the available guidelines and/or recommendations for parents on youth's body image. Drawing on Sabiston et al. (2022) eight-step methodological framework, the main research question was: What guidelines and/or recommendations exist for parents regarding their child's body image? The protocol was pre-registered (https://osf.io/9hq78). Articles were included if the recommendation or guideline was created for parents and focuses on their youth's ages 4 to 18 years body image. Electronic databases that were searched included: Embase, PsycINFO, Social Work Abstracts, and MEDLINE via OVID, CINAHL, Gender Studies, and SportDiscus via EBSCO, and ERIC and Sociological Abstracts via ProQuest. All qualitative, quantitative, mixed methods, and review studies were included if they were written in English, published in the last 10 years, included recommendations or guidelines developed for parents of children aged 4-18 years, and focused on body image. The search yielded 13,204 articles. After duplicates were removed, 7,828 were screened in duplicate by four reviewers using eligibility criteria. The matched articles will be further synthesized by extrapolating current recommendations through a full-text screening process.

Session: Session IV - C
Time: 3:25 PM
Location: BN307

Systematic Evaluation of Online Resources Targeting Youth Body Image for Parents/Guardians

Presenter: Elise Christopoulos

Co-author(s): Alishba Mansoor, Fengyue Xu, Landyn Meadows, Madison F. Vani, Catherine M. Sabiston
Faculty Advisor: Catherine Sabiston, PhD
University of Toronto

Adolescence is a critical period for body image development, characterized by heightened self-awareness and vulnerability to external evaluations. In sport, where comparison and social judgment are prevalent, body image concerns have been identified as a key barrier to youth participation. Parents/guardians can play a critical role in supporting body image for their children, as well as creating supportive body positive environments in sport for all athletes. However, there is evidence that parents/guardians offer negative commentary, advice, and support. To help understand what information exists for parents of youth sport athletes, a systematic search of digital resources is needed. The purpose of this study was to conduct a targeted online environmental scan of recommendations and guidelines on body image for parents/guardians. To conduct this study, the steps included: (1) consulting with a librarian to define the search scope and strategy; (2) identifying key topics, search parameters, and terms; (3) selecting eligible sources from the first ten pages of various Google searches; and (4) synthesizing findings by summarizing recommendations and gaps in resources. Two independent raters coded eligible resources based on source characteristics, quality, and body image-specific content. The analysis included materials developed by hospitals, organizations, and universities etc., that provided strategies for modeling positive body image behaviours and appropriate verbal commentary. However, evaluations revealed that resources often lacked a clear purpose, target audience, or were outdated, with few offering evidence-based recommendations for sport contexts. As such, the availability of high-quality, evidence-based resources aimed at parent/guardian leadership in preventing and reducing body image concerns in sport is vastly limited. Greater knowledge translation and mobilization efforts are needed to disseminate evidence-based practice for targeting body image concerns, with a broader goal of improving the sport experiences and participation rates for children and youth.

Session: Session IV - C
Time: 3:40 PM
Location: BN307

Pre-breast cancer weight fluctuations and post-treatment stress processes: A secondary analysis

Presenter: Andrew Hernan Mathias Alvarez

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

BACKGROUND: There is evidence that weight cycling leads to poor physiological outcomes such as increased risks for diabetes and decreased cardiovascular function, though little is known about the effects of weight cycling on psychosocial and behavioural outcomes such as physical activity. OBJECTIVE: The purpose of this study was to test the relationship between weight fluctuations among women pre-breast cancer diagnosis and stress outcomes and physical activity after cancer treatment. Stress was considered as constructs of general stress, weight-related stress, and cancer-specific stress. METHODS: Women (N = 199; Mage = 55 years; MBMI = 26 kg/m2) previously diagnosed with breast cancer who had completed primary treatment were recruited to complete a survey every 3 months for one year post-treatment. Surveys included measures of stress specific to general, weight-related, and cancer-specific facets of stress. Physical activity behaviour was assessed using GT3X accelerometers and self-report. Data were explored in T-Test and ANOVA models comparing women with and without weight cycling histories. RESULTS: 39% of women reported weight cycling pre-breast cancer diagnosis. Weight cycling groups differed significantly ($p < .05$) on stress scores, shame and guilt, and cancer worries. Specifically, a history of weight cycling led to poorer reports of stress. Physical activity did not differ by weight cycling group. CONCLUSION: Based on these findings, the detrimental effects of weight cycling on perceptions of various types of stress should be highlighted in lifestyle management programs for women's health and explored in future research. Limitations with retrospective self-reporting, population of interest, and use of PA monitors. Future directions may include investigating the personal, lived experiences of breast cancer survivors, and work towards building tailored and multifaceted interventions to help navigate and accomodate for the physical, psychological, and social components of cancer recovery.

Session: Session IV - D
Time: 2:40 PM
Location: WS2007

Examining the Anabolic Sensitivity to Dietary Protein between Healthy Pre- and Post-Menopausal Females

Presenter: Renee Hon

Co-author(s): Hugo J.W. Fung, Paia Chen, Daniel W.D. West, Daniel R. Moore
Faculty Advisor: Dr. Daniel Moore
University of Toronto

Introduction: Menopause, a marker of aging, is linked to lean body mass (LBM) decline, affecting metabolic health. Anabolic sensitivity-the body's ability to synthesize protein in response to dietary amino acid (AA) intake-may decline with age. Since dietary AAs are primarily used for LBM synthesis or oxidation, determining their metabolic fate can identify those with anabolic resistance and inform LBM preserving strategies. Purpose: We aim to assess differences in whole-body post-prandial leucine retention between pre- (YF) versus post-menopausal females (OF) and whether habitual physical activity (PA) levels and/or diet affects the metabolic fate of this essential amino acid. Hypothesis: We hypothesize YF to exhibit lower leucine oxidation than OF (indicating greater anabolic sensitivity). We expect higher habitual PA levels, regardless of age, to positively correlate with anabolic sensitivity. Methods: Following three days of habitual activity tracking (HA) of diet and PA, 20 females (10 YF,10 OF) completed a metabolic trial ingesting a test drink (0.75 g/kg/BM of carbohydrates, 0.25 g/kg/BM egg protein modelled from crystalline amino acids, 5% enriched L-[1-13C]leucine). Protein metabolism was assessed via -[13C]-leucine oxidation from breath samples every 20-30min over 360min. Leucine retention was calculated as intake minus total oxidation. Results: Preliminary analyses (YF: n = 7; OF: n = 4) show no significant differences in BMI, body mass, fat-free mass, and body fat % ($p>0.05$). Leucine retention (n=2 YF, n=3 OF) was similar (YF:10.34±6.4 mg/kg; OF:10.33±5.8mg/kg, $p=0.98$), but peak oxidation was delayed in OF (106min vs. 90 min), suggesting a slower metabolic response. Despite similar caloric intake ($p>0.05$), OF had 22.5% higher energy expenditure (OF: 1090±124kcal; YF: 887±199kcal). Conclusion: Despite delayed leucine oxidation in OF, preliminary results reveal no age-related differences in leucine retention, potentially related in part to higher PA levels in OF compared to YF. Data collection and analyses are ongoing.

Session: Session IV - D
Time: 2:55 PM
Location: WS2007

Assessing the Relationship between 3-day Habitual Diet and Physical Activity on the Anabolic Sensitivity to Dietary Protein in Prepubertal Children

Presenter: Paia Chen

Co-author(s): Hugo J.W. Fung, Renee Hon, Daniel W.D. West, Daniel R. Moore
Faculty Advisor: Dr. Daniel Moore
University of Toronto

Introduction: Lean body mass (LBM) can be enhanced by growth stimuli such as protein ingestion, which provide the amino acid (AA) building blocks, and physical activity (PA). Dietary AA not used for protein synthesis are oxidized and used as energy, which is often considered the fate of AA not efficiently used for protein synthesis. While children experience linear somatic growth, active children exhibit greater LBM than inactive children, suggesting they may be more efficient at utilizing dietary AA for protein synthesis. This study aims to assess the relationship between habitual diet and PA levels on the retention of the essential AA, leucine, for protein synthesis as determined through a non-invasive [13C]leucine 'breath test'. Methods: Using a correlational observational design, maturity offset determined by age from peak height velocity was used to estimate biological age in 20 healthy pre-pubertal children (10M/10F) who underwent three days of habitual living while tracking diet, PA (i.e. step count, moderate-vigorous PA; MVPA, energy balance), and sleep. Participants then ingested 0.25g/kg/body mass (BM) of egg protein modelled from crystalline amino acids with 5% enriched L-[1-13C]leucine, and 0.75g/kg/BM carbohydrates. Breath samples were collected over a 6h postprandial to determine dietary leucine oxidation in order to measure leucine retention (RET: difference between total intake and oxidation). Results: Presently, one male (10yrs, 34kg, 16.8%BF) and one female (10yrs, 32.8kg, 18.9%BF) have completed the study. The female had ~450mins more MVPA, ~3000 more daily steps, 140kcal higher energy balance, and 0.69mg/kg higher RET than the male. Conclusion: Data collection and analysis are ongoing; however, if preliminary results are supported, then these results would be consistent with a greater ability to retain dietary amino acids for LBM growth in active prepubertal children.

Session: Session IV - D
Time: 3:10 PM
Location: WS2007

Verification of sucrose dehydration in maintaining skeletal muscle integrity for immunofluorescent staining of p-RPS6

Presenter: Daniel Su

Co-author(s): Cassidy T. Tinline-Goodfellow, Marius Locke, Daniel R. Moore
Faculty Advisor: Dr. Daniel Moore
University of Toronto

Insights into the intracellular signals associated with resistance exercise are increasingly growing, with current research beginning to focus on the subcellular regions where anabolism is occurring. One such example is the mechanistic target of rapamycin complex 1 (mTORC1), which translocates to the cell periphery to initiate signaling events that include the downstream protein ribosomal protein S6 (RPS6). Methods to study the subcellular localization of proteins require tissue free from preparation artifacts (e.g. freeze fracture). Sucrose dehydration of skeletal muscle tissue prior to snap-freezing can reduce freeze fracture by removing water in the tissue. However, it is unclear how sucrose dehydration methods may influence the subcellular localization of proteins. To determine if sucrose dehydration influences subcellular localization of mTORC1-mediated phosphorylation events, the present study investigates the localization of phosphorylated (p-)RPS6 in mouse skeletal muscle following contractions and at rest. Twelve mice were subjected to 10 sets of unilateral hindlimb contraction with muscle collected on both hindlimbs 3 hours later. Biopsies (n = 6) were then submerged in OCT and snap-frozen immediately or (n = 6) fixed in 4% PFA for 16h and then dehydrated using 15% and 30% sucrose for 24h each before OCT mounting and snap freezing. Standard Western blotting of p-RPS6 S240/244 was performed as a readout of mTORC1 activity with immunofluorescence of p-RPS6 to determine subcellular localization. Preliminary results (n = 3) demonstrate ~63% greater peripheral/central p-RPS6 fluorescence intensity in exercise compared to rested limbs in cryopreserved samples, which is consistent with increased subcellular anabolism indicative of maintained localization of subcellular anabolism. We hypothesize that further analysis will reveal similar periphery/central p-RPS6 fluorescence intensity in both cryoprotected samples and snap-freeze only samples but that the fidelity of dehydrated samples will be more robust for identification of subcellular events.

Session: Session IV - D
Time: 3:25 PM
Location: WS2007

8 Weeks of Resistance Training Increases Collagen-Molecular Chaperone, Hsp47, Expression in both Males and Females

Presenter: Alessia Magno

Co-author(s): Paul Babits
Faculty Advisor: Dr. Daniel Moore
University of Toronto

The extracellular matrix (ECM) is an essential component of skeletal muscle structure that transfers mechanical force between myofibers and across the whole muscle. Collagens are the main structural protein of the ECM and undergo remodeling, primarily mediated by fibroblasts, to adapt to mechanical stress (e.g., resistance exercise). Heat shock protein 47 (Hsp47) is a molecular chaperone that binds to immature collagen (i.e., procollagen) in the fibroblast and maintains its triple helix structure. As Hsp47 is essential for procollagen synthesis, its expression may be used as a marker of collagen synthesis. Therefore, the objective of this study was to assess the acute effect of resistance exercise before and after 8 weeks of resistance training on Hsp47 expression. Using a within-subject design, 14-young untrained adults, (7 males 23±4yr, 75.9±11.7kg, 18.3±7.9% BF; 7 females 25±5yr, 64.1±10.7kg, 24.2±8.6% BF), performed whole-body resistance exercise 3 days a week, for 8-weeks, with muscle biopsies taken prior-to, 24, and 48h following the first and last training bouts. Following the exclusion of two outliers (1M, 1F) whose values exceeded 3 standard deviations from the mean, we observed a main effect of training status ($p<0.05$) with a ~74% increase in Hsp47 expression after training. There was no main or interactive effects of sex or acute exercise on Hsp47 expression ($p\geq0.36$). These results suggest Hsp47 expression is increased by resistance training and may point to enhanced capacity for collagen remodeling in the muscle ECM with chronic loading. This may have implications on exploring a dose-response relationship with exercise intensity or volume on collagen remodeling as an adaptive response to strengthen the ECM with exercise training.

Session: Session IV - D
Time: 3:40 PM
Location: WS2007

The Impact of Contractile Activity on the Epigenetic Writer SUV39H1 in the Skeletal Muscle Cells and Skeletal Muscle

Presenter: Parmis Falahat

Co-author(s): Pierre Lemieux, Brian Lam, Emilie Roudier
Faculty Advisor: Emilie Roudier, PhD
York University

BACKGROUND: Most research related to exercise-driven muscle angiogenesis focuses on the impact of activating histone marks, with little information on silencing marks. By trimethylating lysine 9 of H3 (i.e. H3K9me3), SUV39H1 (Suppressor of Variegation 3-9 Homolog 1) acts as a silencing epigenetic writer, reducing the transcription of nearby genes. Knocking-out SUV39h1 increases capillary density in the murine muscle during ischemia, suggesting that SUV39H1 has anti-angiogenic properties. Yet, it remains unknown whether contractile activity can limit SUV39H1 function. As a first step, we aim to explore whether muscle contractile activity alters SUV39H1 expression. METHODS: In-vitro, we exposed C2C12 myotubes to electrical pulse stimulation (EPS) for 1 or 2 hours followed by 2 hours of recovery (R) (n=5 per group). In-vivo, C57Bl6 mice remained sedentary or were trained for 14 consecutive days using a running treadmill (1h, 5% incline, max 24m/min). Mice were further divided into three subgroups (n=6 per group): control, acute exercise (1h, 24 m/min, 5% incline), acute exercise followed by 3h of recovery. Western blotting assessed SUV39H1 protein levels in myotubes and plantaris muscles. Two-way ANOVA tested differences in our in-vivo and in-vitro models. RESULTS: In-vitro, the duration of electric pulse stimulation enhanced SUV39H1 expression levels in C2C12 myotubes ($p=0.0134$). After recovery, SUV39H1 protein was significantly greater compared to immediately post EPS. 14-days of training increased SUV39H1 protein levels the plantaris muscle (training effect, $p<0.0001$). When comparing trained mice to sedentary mice, greater levels of SUV39H1 were observed in muscles collected before exercise and after recovery. There was no difference for muscles collected immediately post exercise. I NTERPRETATION: Mechanisms occurring during recovery augment SUV39H1 protein. Repeated exposure to contractile activity increases basal level of SUV39H1. Next, we will investigate whether the exercise-sensitive E3 ubiquitin ligase MDM2 (Murine Double Minute 2) regulates SUV39H1 protein stability in this context.

Session: Session IV - E
Time: 2:40 PM
Location: WSB67

Barriers and Facilitators of Outdoor Recreation

Presenter: Abigail Ingraham

Faculty Advisor: Daniel Sailofsky, PhD
University of Toronto

It is generally understood that being in, and recreating in the outdoors has significant benefits for both physical and mental health, even beyond the benefits from physical activity indoors. Despite this, people are seemingly spending less and less time outdoors, and protected natural areas are becoming more and more developed. The purpose of this project is to explore the major barriers and facilitators related to outdoor recreation as observed and or experienced by experts in the field. The goal of this research was to learn more about the main issues causing people to avoid spending time outdoors, and what aspects help encourage engagement in the outdoors with the intention to increase participation in outdoor recreation as a lifelong pursuit. Through semi-structured interviews qualitative data was collected from 6 experts of varying backgrounds connected to outdoor recreation. This data was then analyzed utilizing an inductive approach to identify the main themes across all the interviews. The main barriers identified were financial constraints both at the individual level and at the organizational level, and self-imposed and societally imposed expectations of individuals capabilities in the outdoors. The main facilitators identified were access to community, and positive associations to the outdoors. Overall, these findings show that when barriers and facilitators intersect on the same problem, such as with finances and economic constraints, targeted interventions to improve this aspect of outdoor programming may be especially beneficial in increasing participation.

Session: Session IV - E
Time: 2:55 PM
Location: WSB67

Navigating the Game: An Auto-Ethnographic Exploration of Race, Gender, and ADHD in Competitive Youth Sports

Presenter: Theepiga Mohanachandran

Faculty Advisor: Sabrina Alisha Razack, PhD
University of Toronto

This research explores how intersecting identities, such as ADHD, race, and gender, shape inclusion and participation in competitive youth sports. Middle childhood is a pivotal stage for identity development, with competitive sports providing a space for all aspects of health (Huston & Ripke, 2006). However, youth athletes who are neurodivergent, racialized, and female often face ridicule and barriers that influence their participation and sense of belonging. Although existing research has presented findings of exclusionary practices in youth sports, there is a limited exploration of how intersecting identities such as race, gender, and ADHD influence these experiences. This research utilizes an auto-ethnographic approach to examine my lived experiences as a South Asian female athlete with ADHD who navigated competitive sports growing up. Through personal reflection and critical analysis, this study examines how stereotypes and biases influence access to opportunities, interactions with teammates and coaches, and self-perception as an athlete (Kuntz & Moorfield, 2024). Drawing from personal narratives, the research emphasizes how prevalent expectations of athleticism, discipline, and gendered behaviour create structural barriers that disadvantage racialized female athletes with ADHD. Findings suggest that common symptoms of ADHD, such as inattentiveness or lack of discipline, intersect with racial and gender biases to dictate coaching decisions, team dynamics, and perceptions of skill. These complex barriers contribute to preferential practices, harming athlete development and participation. This research significantly contributes to conversations on inclusion and equity in youth sports by using lived experiences. It challenges harmful narratives and calls for action to ensure that an intersectional approach to coaching, policy, and representation is implemented to support all athletes, regardless of identity.

Session: Session IV - E
Time: 3:10 PM
Location: WSB67

Investigating the Role of Sport in the Transmission of Trauma Literature Review

Presenter: Shivani Sivalingam

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

Indigenous communities within the lands more commonly known as Canada and the United States of America have showcased tremendous resilience from the adverse effects of colonization. The detrimental events, including biological and cultural genocide, confiscation of sacred land, transmissible disease, and assimilation policies that affect various facets of Indigenous health and well-being, have been shown to have a trans-generational impact on subsequent generations. Historically, sport has been perceived as a dual tool-a tool to perpetuate further colonial agendas and as a form to resist and heal from on-going trauma. This qualitative study investigated the niche literature to understand the role of sport in the transmission of trauma among Indigenous peoples within Canada and the United States of America. The primary focus of this literature review is centered around traditional Indigenous practice, intergenerational interactions, and underlying mechanisms of trauma recovery in a sporting context. The literature review explored twenty-seven studies, which were thoroughly annotated using Google Documents to identify recurring themes that discuss the effects of sport in the transmission of trauma. A thematic analysis was conducted, emerging five themes: Integration of Traditional Indigenous Practices, Bridging the Intergenerational Divide Amongst Indigenous Communities in Sport, The Emphasis on Trauma Outcomes Overlooking Underlying Mechanisms, Limitations in the Geographical Populations of Indigenous Peoples and Gender Difference. These findings allude to the potential of sport as an avenue to connect young Indigenous peoples to cultural identity and community while promoting resilience relative to Western sports. Intertwining traditional practices and fostering intergenerational relationships could transform sport as an assimilation tool toward cultural identity reclamation, thereby enabling trauma to be addressed. These findings highlight the importance of integrating traditional Indigenous sport and cultivating relationships across generations into trauma recovery. The limitations of this study were the geographical scope of Indigenous studies that predominantly focus on Australia and

Session: Session IV - E
Time: 3:25 PM
Location: WSB67

An Intersectional Analysis of Barriers and Facilitators to After-School Physical Activity Programs in Equity-Deserving Communities

Presenter: Isabella Tao

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

Increasing access to after-school physical activity programs (ASPAPs) is essential for improving equitable opportunities for youth. However, a lack of understanding persists when viewed through an intersectional lens, which explores how various aspects of identity interact to shape unique experiences of oppression and privilege, leaving gaps in understanding how multiple marginalizations affect participation. This study aims to identify the intersectional barriers and facilitators to ASPAPs in equity-deserving communities. Using a qualitative approach, semi-structured interviews were conducted with various members of Ontario communities, including students, parents, teachers, and instructors/coaches. The interviews were guided by open-ended questions, with topics including barriers and facilitators to participation, perceptions of existing programs, suggestions for improvement, and any additional factors influencing engagement in physical activity. Thematic analysis was employed using the NVivo 15 qualitative data analysis software to examine the interview data. A preliminary analysis revealed the intersectional impacts of socioeconomic status, racialized identities, and social environments contributing to students' participation, motivation, access, and experiences in ASPAPs. Additionally, preliminary themes highlighted key barriers contributing to student participation and access, including financial constraints, lack of resources, transportation issues, communication barriers, and inadequate support and awareness. By uncovering these factors, the study seeks to promote health equity, inform policy, and provide insights to develop effective interventions that improve access to physical activity opportunities for all students, ultimately contributing to creating healthier communities.

Session: Session IV - E
Time: 3:40 PM
Location: WSB67

Enhancing Equity, Diversity, Inclusion, and Accessibility (EDIA) Excellence in Adaptive Exercise Programs

Presenter: Meryem Filiz

Co-author(s): Tasnia Noshin, BSc, Megan Chow, Evelyn Li, Olivia Luo, Ka-Yee Quach
Faculty Advisor: Dr. Kyoung(David) Yi & Dr. Uk Kim
McMaster University

BACKGROUND: Adaptive exercise programs are designed to meet the unique needs of people with disabilities. However, multilevel barriers continue to limit their full impact. Although principles of Equity, Diversity, Inclusion, and Accessibility (EDIA) are foundational to adaptive exercise programs, there remains an opportunity to enhance inclusivity and effectiveness further. This study is among the first to critically examine adaptive exercise programs, moving beyond identifying barriers to developing tangible solutions. Drawing on unique insights from individuals with disabilities, their family members, and program staff, we aim to optimize adaptive exercise programs to ensure they better serve all participants. METHODS: An interpretive, intersectional approach will be employed. To gather insights, 30 semi-structured online or in-person interviews will be conducted with individuals with disabilities (n=15) and staff and family members/caregivers involved in adaptive exercise (n=15). Transcription, qualitative coding, and thematic analysis of interviews will be completed using NVivo 14. EXPECTED RESULTS: Preliminary findings reveal persistent barriers in equity, diversity, inclusion, accessibility, and intersectionality within adaptive exercise programs. Financial constraints, transportation issues, and limited adaptive equipment hinder access, while outreach to underrepresented communities remains insufficient. Inclusion efforts, such as staff training and motivational support, are beneficial but could improve with structured training. Accessibility challenges, including space limitations, long waitlists, and high costs, further restrict participation. CONCLUSION: Adaptive exercise programs are designed to be EDIA-incorporated, yet our findings reveal persistent barriers in financial accessibility, outreach, and infrastructure that limit true inclusivity. Addressing these challenges is crucial for ensuring equitable participation. This study is limited by the exclusive use of English-speaking participants and potential variability in NVivo coding interpretations. Future research should include multilingual participants, implement systematic coding protocols, and assess improvements across community fitness programs to enhance EDIA practices and program impact.

LIST OF PRESENTATIONS

(By last name of presenter)

Presenter (by last name)	University	Time	Room	Topic
Abdelghaffar, L.	University of Toronto	11:35 a.m.	WS2007	Skeletal Muscle Health and Physical Activity
Abdul Jalil, A.	University of Toronto	3:40 p.m.	BN302	Biomechanics and Injury
Abed, A.	Queen's University	1:45 p.m.	WSB67	Neurophysiology & Sensorimotor Learning
Abreu, J.	McMaster University	3:40 p.m.	BN304	Injury Rehabilitation and Exercise Interventions
Alborzi, M.	McMaster University	11:20 a.m.	BN302	Exercise Science and Health
Ali, Z.	McMaster University	3:10 p.m.	BN304	Injury Rehabilitation and Exercise Interventions
Al-Mfarej, S.	McMaster University	11:05 a.m.	BN302	Exercise Science and Health
Alvarez, A.	University of Toronto	3:40 p.m.	BN307	Behavioural Studies and Physical Activity
Amer, R.	McMaster University	9:25 a.m.	BN304	Cardiorespiratory and Cardiovascular Physiology
Aqeel, F.	McMaster University	11:35 a.m.	BN304	Cardiorespiratory and Cardiovascular Physiology
Austin , A.	McMaster University	11:05 a.m.	WS2007	Skeletal Muscle Health and Physical Activity
Badwal, A.	University of Toronto	2:00 p.m.	BN304	Injury Rehabilitation and Exercise Interventions
Bath, A.	University of Toronto	1:00 p.m.	BN307	Behavioural Studies and Physical Activity
Bhinder, A.	McMaster University	9:25 a.m.	WS2007	Skeletal Muscle Health and Physical Activity
Blake-Parsons, A.	McMaster University	9:55 a.m.	WSB67	Neurophysiology & Sensorimotor Learning
Chateau, N.	University of Toronto	1:15 p.m.	BN307	Behavioural Studies and Physical Activity
Chen, P.	University of Toronto	2:55 p.m.	WS2007	Skeletal Muscle Health and Physical Activity
Chen, S.	University of Toronto	1:30 p.m.	BN302	Biomechanics and Exercise Intervention
Chen, T.	University of Toronto	2:40 p.m.	BN302	Biomechanics and Injury
Christopoulos, E.	University of Toronto	3:25 p.m.	BN307	Behavioural Studies and Physical Activity
Crawford, E.	Queen's University	1:15 p.m.	WSB67	Neurophysiology & Sensorimotor Learning
Daroga, E.	University of Toronto	10:50 a.m.	BN304	Cardiorespiratory and Cardiovascular Physiology
DeAgazio, B.	Lakehead University	1:45 p.m.	BN307	Behavioural Studies and Physical Activity
Dirven, B.	University of Toronto	1:30 p.m.	BN304	Injury Rehabilitation and Exercise Interventions
Dorion, V.	Lakehead University	1:00 p.m.	BN302	Biomechanics and Exercise Intervention
Eisen, D.	Queen's University	2:00 p.m.	WSB67	Neurophysiology & Sensorimotor Learning
Eshaghi, D.	University of Toronto	2:15 p.m.	BN302	Biomechanics and Exercise Intervention
Espina, E.	McMaster University	11:20 a.m.	WS2007	Skeletal Muscle Health and Physical Activity
Evini , N.	University of Toronto	11:05 a.m.	BN304	Cardiorespiratory and Cardiovascular Physiology
Falahat, P.	York University	3:40 p.m.	WS2007	Skeletal Muscle Health and Physical Activity
Filiz, M.	McMaster University	3:40 p.m.	WSB67	Physical Cultural Studies
Gibbs, G.	University of Toronto	8:55 a.m.	WSB67	Neurophysiology & Sensorimotor Learning
Glazer, S.	McMaster University	1:45 p.m.	WS2007	Skeletal Muscle Health and Physical Activity
Hoh, N.	University of Toronto	1:45 p.m.	BN302	Biomechanics and Exercise Intervention
Hon, R.	University of Toronto	2:40 p.m.	WS2007	Skeletal Muscle Health and Physical Activity
Hong , R.	McMaster University	1:00 p.m.	WS2007	Skeletal Muscle Health and Physical Activity
Ingraham, A.	University of Toronto	2:40 p.m.	WSB67	Physical Cultural Studies

Presenter (by last name)	University	Time	Room	Topic
Jay, N.	University of Ottawa	10:10 a.m.	BN302	Exercise Science and Health
Jonker, S.	McMaster University	1:30 p.m.	WS2007	Skeletal Muscle Health and Physical Activity
Joumaa, A.	University of Toronto	3:25 p.m.	BN302	Biomechanics and Injury
Kacan, M.	University of Toronto	9:10 a.m.	WSB67	Neurophysiology & Sensorimotor Learning
Kennedy, M.	University of Toronto	9:25 a.m.	BN307	Exercise Science and Health
Klaas, M.	Ontario Tech University	2:15 p.m.	BN307	Behavioural Studies and Physical Activity
Krishnamurthy, M.	McMaster University	9:10 a.m.	BN304	Cardiorespiratory and Cardiovascular Physiology
Lambrinos, G.	York University	11:50 a.m.	BN307	Behavioural Studies and Physical Activity
Lamont, G.	McMaster University	9:40 a.m.	WS2007	Skeletal Muscle Health and Physical Activity
Lavasidis, M.	University of Toronto	9:40 a.m.	WSB67	Neurophysiology & Sensorimotor Learning
Levasseur, S.	University of Toronto	11:05 a.m.	BN307	Behavioural Studies and Physical Activity
Li, M.	University of Toronto	11:35 a.m.	WSB67	Neurophysiology & Sensorimotor Learning
Liski, B.	McMaster University	9:10 a.m.	BN302	Exercise Science and Health
Lochner, G.	McMaster University	2:00 p.m.	BN307	Behavioural Studies and Physical Activity
Magno, A.	University of Toronto	3:25 p.m.	WS2007	Skeletal Muscle Health and Physical Activity
Maier, L.	University of Toronto	10:50 a.m.	BN307	Behavioural Studies and Physical Activity
Malheiro, G.	Western University	2:15 p.m.	WSB67	Neurophysiology & Sensorimotor Learning
Mansoor, A.	University of Toronto	2:55 p.m.	BN307	Behavioural Studies and Physical Activity
May, A.	University of Toronto	2:00 p.m.	BN302	Biomechanics and Exercise Intervention
McGraw, J.	Brock University	10:10 a.m.	WS2007	Skeletal Muscle Health and Physical Activity
Meadows, L.	University of Toronto	3:10 p.m.	BN307	Behavioural Studies and Physical Activity
Milner, A.	University of Toronto	11:35 a.m.	WSB67	Neurophysiology & Sensorimotor Learning
Mohanachandran, T.	University of Toronto	2:55 p.m.	WSB67	Physical Cultural Studies
Montoya, K.	McMaster University	10:50 a.m.	WS2007	Skeletal Muscle Health and Physical Activity
Mourad, F.	University of Ottawa	10:25 a.m.	BN302	Exercise Science and Health
Murali Madhumathy, D.	University of Toronto	11:20 a.m.	BN304	Cardiorespiratory and Cardiovascular Physiology
Oakes, H.	Queen's University	1:00 p.m.	WSB67	Neurophysiology & Sensorimotor Learning
Orellana, C.	University of Toronto	2:40 p.m.	BN304	Injury Rehabilitation and Exercise Interventions
Petrucci, E.	University of Toronto	9:10 a.m.	BN307	Exercise Science and Health
Phung, T.	University of Toronto	11:50 a.m.	WS2007	Skeletal Muscle Health and Physical Activity
Portugese, M.	University of Ottawa	9:55 a.m.	BN302	Exercise Science and Health
Prabhudesai, I.	McMaster University	10:10 a.m.	WSB67	Neurophysiology & Sensorimotor Learning
Prenevost, M.	University of Toronto	9:25 a.m.	WSB67	Neurophysiology & Sensorimotor Learning
Rahmani, R.	University of Toronto	8:55 a.m.	BN307	Exercise Science and Health
Rai, C.	University of Waterloo	9:55 a.m.	BN307	Exercise Science and Health
Randhawa, A.	McMaster University	11:50 a.m.	BN302	Exercise Science and Health
Ren, G.	University of Toronto	2:55 p.m.	BN304	Injury Rehabilitation and Exercise Interventions
Renaud, I.	University of Toronto	11:35 a.m.	BN307	Behavioural Studies and Physical Activity

Presenter (by last name)	University	Time	Room	Topic
Rossi, G.	University of Guelph-Humber	11:50 a.m.	BN304	Cardiorespiratory and Cardiovascular Physiology
Roxburgh, L.	McMaster University	9:10 a.m.	WS2007	Skeletal Muscle Health and Physical Activity
Sadeghi, A.	York University	12:05 p.m.	BN304	Cardiorespiratory and Cardiovascular Physiology
Sales, K.	University of Toronto	9:55 a.m.	BN304	Cardiorespiratory and Cardiovascular Physiology
Sanvido, Z.	McMaster University	3:25 p.m.	BN304	Injury Rehabilitation and Exercise Interventions
Sarathy, V.	Western University	11:50 a.m.	WSB67	Neurophysiology & Sensorimotor Learning
Schall, A.	McMaster University	2:15 p.m.	WS2007	Skeletal Muscle Health and Physical Activity
Sedarous, E.	McMaster University	8:55 a.m.	BN302	Exercise Science and Health
Sequeira, N.	University of Toronto	1:15 p.m.	BN302	Biomechanics and Exercise Intervention
Serafini, I.	Queen's University	1:30 p.m.	WSB67	Neurophysiology & Sensorimotor Learning
Sivalingam , S.	University of Toronto	3:10 p.m.	WSB67	Physical Cultural Studies
Su, D.	University of Toronto	3:10 p.m.	WS2007	Skeletal Muscle Health and Physical Activity
Su, T.	McMaster University	8:55 a.m.	WS2007	Skeletal Muscle Health and Physical Activity
Sutchy, W.	McMaster University	9:25 a.m.	BN302	Exercise Science and Health
Suthaharan, A.	McMaster University	9:55 a.m.	WS2007	Skeletal Muscle Health and Physical Activity
Sutoski, A.	McMaster University	1:15 p.m.	WS2007	Skeletal Muscle Health and Physical Activity
Sy, K.	University of Toronto	11:05 a.m.	WSB67	Neurophysiology & Sensorimotor Learning
Tao, I.	McMaster University	3:25 p.m.	WSB67	Physical Cultural Studies
Tatham, E.	University of Toronto	1:30 p.m.	BN307	Behavioural Studies and Physical Activity
Tran, L.	University of Toronto	10:50 a.m.	WSB67	Neurophysiology & Sensorimotor Learning
Tsipris, M.	McMaster University	11:35 a.m.	BN302	Exercise Science and Health
Vaziri, A.	York University	10:25 a.m.	BN307	Exercise Science and Health
Viloria Medina, A.	McMaster University	10:10 a.m.	BN307	Exercise Science and Health
Vu, C.	University of Toronto	1:00 p.m.	BN304	Injury Rehabilitation and Exercise Interventions
Wang, S.	University of Toronto	1:45 p.m.	BN304	Injury Rehabilitation and Exercise Interventions
Whitney, N.	University of Toronto	2:55 p.m.	BN302	Biomechanics and Injury
Wilcox, L.	University of Toronto	1:15 p.m.	BN304	Injury Rehabilitation and Exercise Interventions
Wilcox, T.	University of Toronto	9:40 a.m.	BN307	Exercise Science and Health
Williamson, A.	Lakehead University	10:50 a.m.	BN302	Exercise Science and Health
Wilson, L.	McMaster University	8:55 a.m.	BN304	Cardiorespiratory and Cardiovascular Physiology
Wong, M.	University of Toronto	11:20 a.m.	BN307	Behavioural Studies and Physical Activity
Wut, L.	University of Toronto	12:05 p.m.	BN302	Exercise Science and Health
Xu, F.	University of Toronto	2:40 p.m.	BN307	Behavioural Studies and Physical Activity
Yazdy, A.	McMaster University	2:00 p.m.	WS2007	Skeletal Muscle Health and Physical Activity
Yee, B.	McMaster University	9:40 a.m.	BN304	Cardiorespiratory and Cardiovascular Physiology
Yong, J.	McMaster University	9:40 a.m.	BN302	Exercise Science and Health
York, E.	McMaster University	10:25 a.m.	WSB67	Neurophysiology & Sensorimotor Learning
Zavits, K.	University of Toronto	10:10 a.m.	BN304	Cardiorespiratory and Cardiovascular Physiology
Zeng, Y.	University of Toronto	3:10 p.m.	BN302	Biomechanics and Injury