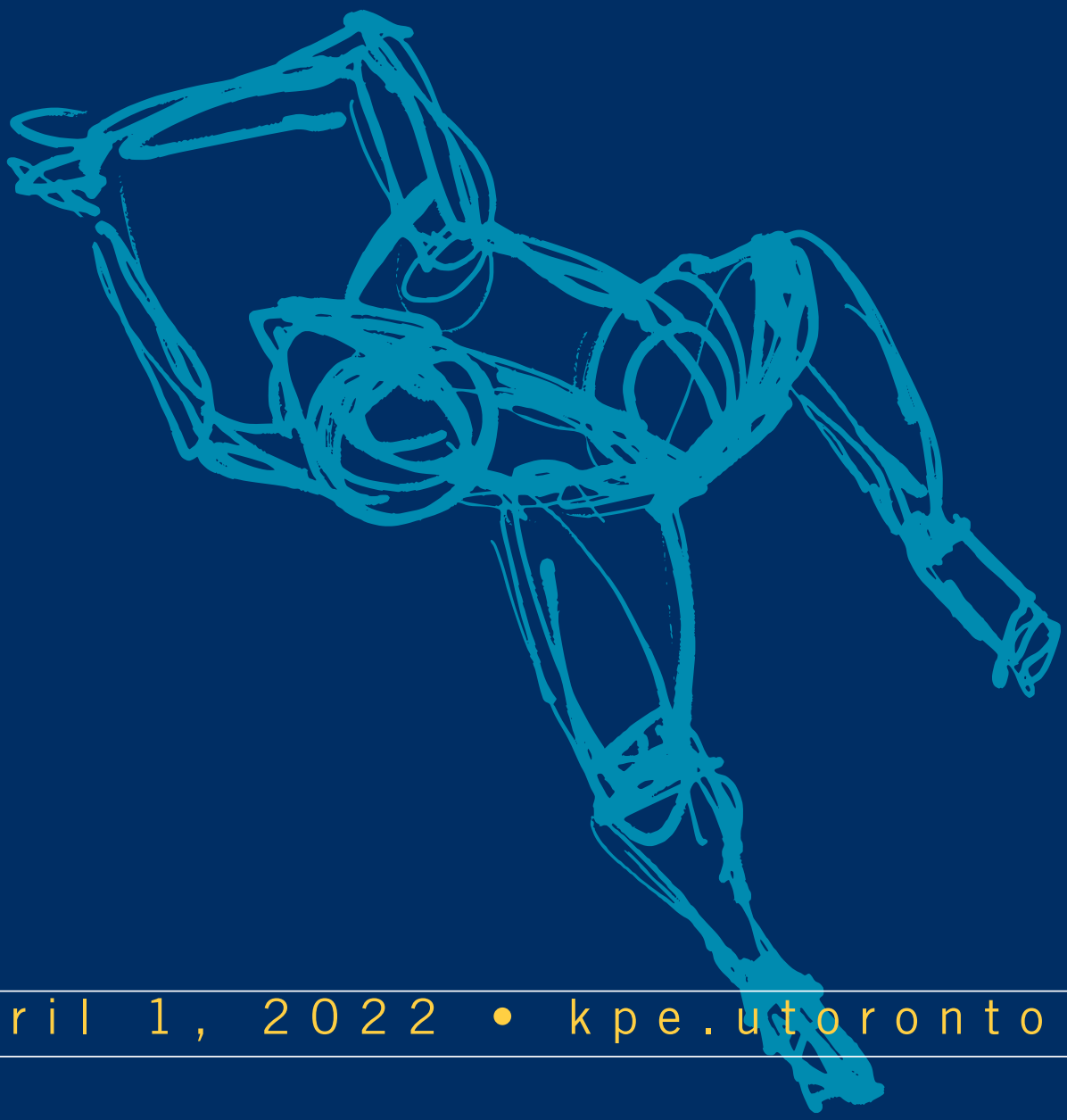
UNIVERSITY OF TORONTO
FACULTY OF KINESIOLOGY & PHYSICAL EDUCATION

THE 22nd ANNUAL BERTHA ROSENSTADT

NATIONAL UNDERGRADUATE RESEARCH CONFERENCE

KINESIOLOGY AND PHYSICAL EDUCATION



April 1, 2022 • kpe.utoronto.ca

KPE @ UofT

22nd 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

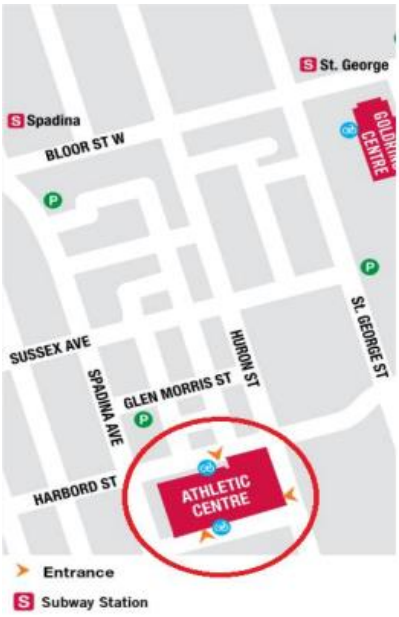
Conference Site

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 arriving, please make your way to the second 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.



Time Zone

The start and end times for all sessions are in the Eastern Time Zone (ET).

Mode of Delivery

This is an in-person conference with a few accommodated virtual presentations. All in-person presentations will be located at the Athletic Centre in the Benson building (55 Harbord St.). More details about how the conference will run can be found under the heading 'Presentations' on page 8.

If you have any questions regarding the conference or have any technical issues during the event, please email undergrad.kpe@utoronto.ca

Wifi Access

Individual access codes are available for pick-up at the registration desk.

Schedule at a Glance

Time	Item	In-person Sessions Topics & Location
8:30	Arrival	**Second Floor Benson Lobby**
9:00 a.m. – 9:15 a.m.	Welcome **Prof. Gretchen Kerr, Dean, Faculty of Kinesiology and Physical Education, U of T**	**BN307**
9:15 a.m. – 9:30 a.m.	Break	**BN Student Lounge**
9:30 a.m. – 10:45 a.m.	Block 1 Presentations	Session 1A - Sport Psychology & Physical Activity - **BN302** Session 1B – Cardiovascular Health & Exercise Science – **BN304** Session 1C – Exercise Science & Motor Learning – **WS2007** Session 1D – Neurophysiology & Cognitive Function – **BN307**
10:45 a.m. – 11:00 a.m.	Break	**BN Student Lounge**
11:00 a.m. – 12:15 a.m.	Block 2 Presentations	Session 2A - Sport Psychology & Physical Cultural Studies - **BN302** Session 2B – Cardiorespiratory & Cardiovascular Physiology - **BN304** Session 2C – Exercise Interventions & Treatment - **WS2007** Session 2D – Health & Performance - **BN307 (Virtual Session)**
12:15 p.m. – 1:00 p.m.	Lunch & Networking Break	**BN Student Lounge**
1:00 p.m. – 2:15 p.m.	Block 3 Presentations	Session 3A - Sport Psychology & Physical Cultural Studies - **BN302** Session 3B – Skeletal Muscle Health & Physical Activity - **BN304** Session 3C – Sensorimotor & Perceptions- **WS2007** Session 3D – Education - **BN307**
2:15 p.m. – 2:30 p.m.	Break	**BN Student Lounge**
2:30 p.m. – 3:45 p.m.	Block 4 Presentations	Session 4A - Sport Psychology - **BN302** Session 4B – Cardiovascular & Muscle Physiology - **BN304** Session 4C – Biomechanics & Injury - **WS2007** Session 4D – Exercise Science & Health – **(Virtual Session)**

3:45 p.m. – 4:00 p.m.	Break	**BN Student Lounge**
4:00 p.m. – 4:40 p.m.	Keynote: **Prof. Fiona Moola, School of Early Childhood Studies, Ryerson University**	
4:40 p.m. – 5:00 p.m.	Closing Remarks **Prof. Catherine Amara, Director of Undergraduate Studies, Faculty of Kinesiology and Physical Education, U of T**	**BN307**

Block Presentation Room Assignments

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

Zoom Session Links

One zoom link and passcode for Welcome, Closing, Keynote Speaker, and Virtual Session 2D & 4D:

Zoom link: https://utoronto.zoom.us/j/82741459761
Passcode: 055554

Time	Items & Sessions	Zoom Link & Password
8:30	Arrival	**Second Floor Benson Lobby**
9:00 a.m. – 9:15 a.m.	Welcome	**BN307** Zoom link: https://utoronto.zoom.us/j/82741459761 Passcode: 055554
9:15 a.m. – 9:30 a.m.	Break	**BN Student Lounge**
9:30 a.m. – 10:45 a.m.	Block 1 Presentations **Session 1A** - Sport Psychology & Physical Activity **Session 1B** – Cardiovascular Health & Exercise Science **Session 1C** – Exercise Science & Motor Learning **Session 1D** – Neurophysiology & Cognitive Function	**1A: In-person – BN302** **1B: In-person – BN304** **1C: In-person – WS2007** **1D: In-person – BN307**
10:45 a.m. – 11:00 a.m.	Break	**BN Student Lounge**
11:00 a.m. – 12:15 a.m.	Block 2 Presentations **Session 2A** - Sport Psychology & Physical Cultural Studies **Session 2B** – Cardiorespiratory & Cardiovascular Physiology **Session 2C** – Exercise Interventions & Treatment **Session 2D** – Health & Performance	**2A: In-person – BN302** **2B: In-person – BN304** **2C: In-person – WS2007** **2D: Virtual Session** Zoom link: https://utoronto.zoom.us/j/82741459761 Passcode: 055554 Can watch in-person in room **BN307**
12:15 p.m. – 1:00 p.m.	Lunch & Networking Break	**BN Student Lounge**
1:00 p.m. – 2:15 p.m.	Block 3 Presentations **Session 3A** - Sport Psychology & Physical Cultural Studies **Session 3B** – Skeletal Muscle Health & Physical Activity **Session 3C** – Sensorimotor & Perceptions **Session 3D** – Education	**3A: In-person – BN302** **3B: In-person – BN304** **3C: In-person – WS2007** **3D: In-person – BN307**
2:15 p.m. – 2:30 p.m.	Break	**BN Student Lounge**

2:30 p.m. – 3:45 p.m.	Block 4 Presentations **Session 4A** - Sport Psychology **Session 4B** – Cardiovascular & Muscle Physiology **Session 4C** – Biomechanics & Injury **Session 4D** – Exercise Science & Health	**4A: In-person – BN302** **4B: In-person – BN304** **4C: In-person – WS2007** **4D: Virtual Session** Zoom link: https://utoronto.zoom.us/j/82741459761 Passcode: 055554 Can watch in-person in room **BN307**
3:45 p.m. – 4:00 p.m.	Break	**BN Student Lounge**
4:00 p.m. – 5:00 p.m.	Keynote & Closing Remarks	**BN307** Zoom link: https://utoronto.zoom.us/j/82741459761 Passcode: 055554

Keynote Speaker

Fiona Moola

Assistant Professor, Early Childhood Studies, Ryerson University

Dr. Fiona J. Moola is a racialized woman and second generation Canadian with ancestral roots from apartheid South Africa. She is an Assistant Professor in the School of Early Childhood Studies at X (Ryerson) University and an Adjunct Scientist at the Holland Bloorview Kids Rehabilitation Hospital. She is also an Assistant Professor at the Dalla Lana School of Public Health and Rehabilitation Sciences Institute at the University of Toronto and a Psychotherapist Under Supervision at the Gestalt Institute of Toronto where she has a small psychotherapy practice. Over the past several years, Dr. Moola has left a substantive impact on the global pediatric disability and chronic illness peer reviewed qualitative literature. Dr. Moola's scholarship is strongly underpinned by principles from critical health psychology, the sociology of childhood, equity, diversity, and inclusion, and social justice. Dr. Moola is currently funded by CIHR project scheme grant, SSHRC Connection, and SSHRC Insight.

Portraits in Motion: Arts-Based Research in Health and Physical Activity for Disabled and Chronically Ill Children, Youth, and Families—Equity, Embodiment, Affect, and Aesthetics

In this keynote presentation, called "Portraits in Motion", Dr. Fiona J. Moola will discuss the role of arts-based research in health and physical activity in the context of childhood disability research. After unpacking the marginalization of the arts in traditional academic circles, Dr. Moola will discuss the role of arts-based research in offering affective, emotional, aesthetic, and embodied research approaches that are justice-seeking and equity-driven. Dr. Moola will show how the arts can be used in the service of social justice, offering particularly novel modes of communication for marginalized communities such as those that do not have access to language. Dr. Moola will draw on a corpus of data across numerous research projects to engage this discussion, such as Listening to the Margins, the SANI project, and decolonizing childhood disability research.

Presentations

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

In-Person Sessions:

- The majority of the sessions will be hosted and presented in-person.
- Please intend to stay during the full session to limit the distractions for presenters and to support your fellow colleagues and co-presenters.
- Each session will be facilitated by a moderator who will welcome all the attendees, provide session housekeeping details, introduce the speakers, and facilitate questions.
- As this is an in-person conference, live in-person presentations will not be available virtually. Only the virtual sessions, Welcoming & Closing Remarks and the Keynote Speaker will be accessible remotely.
- In-person attendees will be able to watch the 2 virtual sessions (Session 2D & 4D) in room BN307 where the zoom meeting will be broadcasted. During the Q&A portion, in person attendees can ask the in-person moderator to type their question(s) in the chat for the virtual presenter.

Virtual Sessions:

- Please use the links and passwords provided in the Conference Programme to join the sessions.
- Only the virtual sessions, Welcoming & Closing Remarks and the Keynote Speaker will be accessible remotely.
- Each session will be facilitated by a moderator who will welcome all the attendees, provide session housekeeping details, introduce the speakers, and facilitate questions.
- Virtual presenters are expected to **present live synchronously** over zoom.
- Virtual presenters will be made as co-hosts and will share their screens during their allotted presentation time. After you present (approx. 10 minutes), stop sharing your screen, and the moderator will facilitate the Q&A portion (approx. 5 minutes). If possible, presenters are encouraged to have their cameras while they are presenting and while answering questions.
- Online attendees can ask questions using the chat function or by virtually raising their hands if they wish to use the audio. Questions can also be asked by attendees in-person. Moderators will monitor the questions accordingly and bring forward the questions to the presenter at the appropriate time in the session.

Presentations Schedule

Block 1: 9:30 a.m. – 10:45 a.m.

Session 1A (BN302)– Sport Psychology & Physical Activity	
9:30 a.m.	***Factors that Impact the Sport and Physical Activity Participation of a Hijab-Wearing Woman in North America: An Autoethnography*** By: Noor Yaghi Faculty Advisor: Dr. Janelle Joseph University of Toronto
9:45 a.m.	***Content exploration of return to play guidelines for children with disabilities in organized sport and physical activity spaces*** By: Olga Brankovan Co-Author(s): Nancy Huynh Faculty Advisor: Dr. Kelly Arbour-Nicitopoulos University of Toronto

10:00 a.m.	***Gender-based violence against trans* individuals in sport: a look into the harm experienced by five trans and non-binary athletes in North America*** By: Raiya Taha Thomure Faculty Advisor: Dr. Ashley Stirling University of Toronto
10:15 a.m.	***The Somatic Portrayal of a Second-Generation Canadian's Physical Activity Behaviours: Investigating Biculturalism and Family Dynamics*** By: Avleen Bains Faculty Advisor: Dr. Janelle Joseph University of Toronto
10:30 a.m.	***The relationship between cardiorespiratory fitness and working memory following one night of partial sleep deprivation.*** By: David Walker Faculty Advisor: Dr. Jeremy Walsh McMaster University

Session 1B (BN304) – Cardiovascular Health & Exercise Science	
9:30 a.m.	***A sense of direction: Investigating the fibre direction of interspinous ligaments in the human lumbar spine*** By: Kyle Farwell Faculty Advisor: Dr. Judith Laprade, Dr. Timothy Burkhart University of Toronto
9:45 a.m.	***Testing the relationship of the bilateral force and endurance deficit in humans*** By: Kyle Lau Co-Author(s): Aaron Thomas, Troy Hornberger Faculty Advisor: Dr. Stuart Phillips McMaster University
10:00 a.m.	***Cardiovascular Response in Athletes completing Stair climbing based High intensity interval training (CRASH)*** By: Jenna Stone Co-Author(s): JS Williams, A Zia, SE Valentino, MJ MacDonald Faculty Advisor: Dr. Maureen MacDonald McMaster University
10:15 a.m.	***The Effect of Submaximal Semi-Upright Cycling on Central Hemodynamics and Exercise Tolerance - A Pilot Study*** By: Daniel Basile Co-Author(s): Jona B. Bernal, Adam N. Di Salvo, Robert F. Bentley Faculty Advisor: Dr. Robert F. Bentley University of Toronto

10:30 a.m.	***Biological sex as a contributor to the presence or absence of compensatory vasodilation - A pilot study*** By: Rony Galperin Co- Author(s): Navraj S. Brar Faculty Advisor: Dr. Robert F. Bentley University of Toronto

Session 1C (WS2007) – Exercise Science & Motor Learning	
9:30 a.m.	***Investigating the Effects of Acute Single-leg Immobilization on the Contralateral, Non-Immobilized Leg*** By: Vagif Zeynalli Co-Author(s): Jonathan McLeod, James Mckendry, Changhyun Lim, Stuart Phillips Faculty Advisor: Dr. Stuart Phillips McMaster University
9:45 a.m.	***Cardiac Rehabilitation Maintenance: Associations between exercise capacity, strength, quality of life and anxiety*** By: Ethan Kelly Co-Author(s): Kevin Boldt, Sarah L West Faculty Advisor: Dr. Sarah L West Trent University
10:00 a.m.	***Dyad Practice and the Impact of Competitive versus Cooperative Pair Dynamics on Motor Learning*** By: Erin Brooks Co-Author(s): Rowena Cai, Katherine Tamminen, Luc Tremblay, Molly Brillinger, Nicole Hodges Faculty Advisor: Dr. Tim Welsh University of Toronto
10:15 a.m.	***The Effects of 3-Days Step Reduction on Leucine Retention and Anabolic Resistance*** By: Nigel LeGood Co-Author(s): Paul Babits, Hugo Fung, Matthew Lees Faculty Advisor: Dr. Daniel Moore University of Toronto
10:30 a.m.	***Micromotion of rectangular and cylindrical bone-blocks in ACL reconstruction using patellar tendon grafts.*** By: Michele Matsubara Faculty Advisor: Dr. Timothy Burkhart University of Toronto

Session 1D (BN307) – Neurophysiology & Cognitive Function	
9:30 a.m.	***Optimising stimulus pulses to recruit sensory axons for transcutaneous spinal cord stimulation.*** By: Isaac Porozni Co-Author(s): Jessica Leverett & Lucas Bronder Faculty Advisor: Dr. David F. Collins University of Alberta
9:45 a.m.	***Changes in Light Physical Activity and Sedentary Behaviour on Cognitive Function of Cancer Survivors During the COVID-19 Pandemic*** By: Sarah Elizabeth Ryan Co-Author(s): Lauren Voss, Allyson Tabaczynski, Linda Trinh Faculty Advisor: Dr. Linda Trinh University of Toronto
10:00 a.m.	***Examining the feasibility of improving neck pain using a mobile concussion rehabilitation app.*** By: Genevieve Ammendolia Tome Faculty Advisor: Dr. Michael Hutchison University of Toronto
10:15 a.m.	***The relationship between physiological markers of stress and mood in Oral Contraceptive Users"*** By: Claudia Yong Faculty Advisor: Dr. Jeremy Walsh McMaster University
10:30 a.m.	***Improving the Recruitment of Axons in Human Peripheral Nerves by Optimizing Stimulus Pulse*** By: Lucas B. Bronder Co-Author(s): Isaac Porozni & Jessica Leverett Faculty Advisor: Dr. David F. Collins University of Alberta

Block 2: 11 a.m. – 12:15 p.m.

Session 2A (BN302) - Sport Psychology & Physical Cultural Studies	
11:00 a.m.	***Perceptions of Parent-Child Relationships and Sport Experiences among East-Asian Women*** By: Joey Wong Faculty Advisor: Dr. Katherine Tamminen University of Toronto

11:15 a.m.	***Overcoming the "Deep End" of Mainstream Sport: A Feminist Autoethnography of a Bicultural Canadian-Punjabi*** By: Tavleen Bains Faculty Advisor: Dr. Janelle Joseph University of Toronto
11:30 a.m.	***Supporting Equity and Inclusion of Muslim Women in Canadian Sport*** By: Bahar Dastaran Mamaghani Faculty Advisor: Dr. Ashley Stirling University of Toronto
11:45 a.m.	***Investigating Masculine Embodiment in Team Sports*** By: Daniel Wilson Faculty Advisor: Dr. Michael Atkinson University of Toronto
12:00 p.m.	***Examining associations between using social media workouts, mental health and exercise motives during the COVID-19 pandemic*** By: Sabrina Malouka Co-Author(s): Sabrina Malouka, Kristen M. Lucibello, Lamia Firasta, Madison F. Vani, Catherine M. Sabiston Faculty Advisor: Dr. Catherine M. Sabiston University of Toronto

Session 2B (BN304)- Cardiorespiratory & Cardiovascular Physiology	
11:00 a.m.	***Can Trained Cyclists Pacing Ability be Predicted with Experience or Performance?*** By: Matt Fong Co-Author(s): Devin McCarthy Faculty Advisor: Dr. Martin Gibala McMaster University
11:15 a.m.	***The Efficacy of a Breath Test to Detect Differences in Leucine Retention in Individuals with Varying Habitual Physical Activity*** By: Paul Babits Co-Author(s): Hugo Fung, Nigel LeGood, Matthew Lees, Daniel Moore Faculty Advisor: Dr. Daniel Moore University of Toronto

11:30 a.m.	***Physical activity, cardiorespiratory fitness, and sedentary time as predictors of cardiovascular risk in breast cancer survivors*** By: Alexandra Dojutrek Faculty Advisor: Dr. Amy Kirkham University of Toronto
11:45 a.m.	***The Effects of Gingival Inflammation on Vascular Function*** By: Ker-Yung Hong Co-Author(s): Avin Ghafari, Yi Xue Mei, Jourdyn E Forsyth, Kevin Wang, Michael Glogauer Faculty Advisor: Dr. Trevor J King McMaster University
12:00 p.m.	***Ventilatory and oxygen saturation responses during submaximal exercise in upright and semi-upright cycling positions - A pilot study.*** By: Jona Bernal Co-Author(s): Daniel Basile, Adam DiSalvo Faculty Advisor: Dr. Robert Bentley University of Toronto

Session 2C (WS2007) – Exercise Interventions & Treatment	
11:00 a.m.	***Injury and Recovery in University Athletes and Association with Eating Behaviours*** By: Sarah O'Connell Co-Author(s): Ingrid Brenner, Sarah L West Faculty Advisor: Dr. Sarah L West Trent University
11:15 a.m.	***Identifying impacts of online implementation of an ergonomic tool for desk set-up among university students on posture and musculoskeletal pain*** By: Cassandra Sitar Faculty Advisor: Dr. Kathryn Sinden Lakehead University
11:30 a.m.	***Structuring mobility interventions to facilitate transfer to functional activities*** By: Kyle Farwell Faculty Advisor: Dr. David Frost University of Toronto
11:45 a.m.	***Categorization of Multi-Joint Movement Patterns During the Star Excursion Balance Test*** By: Anita Borhani Co-Author(s): Tiffany Tiu Faculty Advisor: Dr. Timothy Burkhart University of Toronto

12:00 p.m.	***The effects of ankle taping on measures of ground reaction forces and jump height during a sport-specific vertical jump in youth basketball players.*** By: Michelle Pratola Faculty Advisor: Dr. Paolo Sanzo Lakehead University

Session 2D (BN307) – Health & Performance (Virtual)	
11:00 a.m. (Virtual)	***Examining the relationships between the gut microbiota, mental health, cardiometabolic health, and lifestyle factors in healthy older adults*** By: Priya Verma Co-Author(s): Sameer Ahmad, Andrew DS Cameron, Julia O Totosy de Zepetnek Faculty Advisor: Dr. Julia O Totosy de Zepetnek University of Regina
11:15 a.m. (Virtual)	***Diethylamine nonoate as an adjuvant immunotherapy agent to treat glioblastoma*** By: Vrishank Saini Faculty Advisor: Ammar Salkini University of British Columbia
11:30 a.m. (Virtual)	***Track and Field Performance Trends Over the Four Year Olympic Cycle*** By: Jada Roach Faculty Advisor: Dr. Tim Taha University of Toronto
11:45 a.m. (Virtual)	***The impact of stair climbing-based high intensity interval training on cardiorespiratory fitness in varsity student athletes: a preliminary analysis*** By: Amna Zia Co-Author(s): Sydney Valentino, Jennifer Williams, Jenna Stone Faculty Advisor: Dr. Maureen MacDonald McMaster University
12:00 p.m. (Virtual)	***The impact of osteoarthritis and frailty on cardiovascular disease risk in the Canadian Longitudinal Study on Aging*** By: Hope Harnack Co-Author(s): Yixue Mei, Baraa K. Al-Khazraji Faculty Advisor: Dr. Baraa K. Al-Khazraji McMaster University

Block 3: 1 p.m. – 2:15 p.m.

Session 3A (BN302) - Sport Psychology & Physical Cultural Studies	
1:00 p.m.	***Dyad Learning in Cooperative vs. Competitive settings and the Role of Psychosocial Outcomes*** By: Rowena Cai Co-Author(s): April Karlinsky, Erin Brooks, Katherine Tamminen, Luc Tremblay, Molly Brillinger, Nicole Hodges Faculty Advisor: Dr. Timothy Welsh University of Toronto
1:15 p.m.	***An Autoethnographic Examination of Latin American Female Immigrant Identity in Sport in Canada*** By: Andrea Barrientos Faculty Advisor: Dr. Janelle Joseph University of Toronto
1:30 p.m.	***Athlete Activism in the Tokyo Olympics*** By: Abdullah Al-Azzawi Faculty Advisor: Dr. Simon Darnell University of Toronto
1:45 p.m.	***Critical Analysis of Coping Measures in Sport*** By: Jian Kun Zhan Faculty Advisor: Dr. Katherine Tamminen University of Toronto
2:00 p.m.	~~***No Space to Play?: Examining the availability of rugby and cricket facilities in the GTA***~~ ~~By: Cody Wang~~ ~~Faculty Advisor: Dr. Peter Donnelly~~ ~~University of Toronto~~

Session 3B (BN304) – Skeletal Muscle Health & Physical Activity	
1:00 p.m.	***Bone Turnover Markers and Osteokines in Adolescent Female Athletes of High-impact and Low-impact Sports Compared with Non-athletic Controls*** By: Steven Kottaras Co-Author(s): Joshua Stoikos, Brandon J. McKinlay, Izabella A. Ludwa, Andrea R. Josse, Bareket Falk, Panagiota Klentrou Faculty Advisor: Dr. Panagiota Klentrou Brock University

1:15 p.m.	***The Acute Effect of Dry Cupping on Hamstring Muscle Range of Motion*** By: Sydney Elliott Faculty Advisor: Dr. Paolo Sanzo Lakehead University
1:30 p.m.	***Evaluation of muscle-specific disuse atrophy using magnetic resonance imaging during 14-days upper limb immobilization in young women*** By: Yijia Huang Co-Author(s): Freddie Seo Faculty Advisor: Dr. Tyler Churchward-Venne McGill University
1:45 p.m.	***Effect of 1 Week Single-leg Immobilization on Muscle Fibre Cross Sectional Area and Capillarization in Elderly Adults*** By: Lucas Wiens Co-Author(s): Jonathan Mcleod Faculty Advisor: Dr. Stuart Phillips McMaster University
2:00 p.m.	***Changes in Light Physical Activity and Sedentary Behaviour and Associations with Quality of Life Among Cancer Survivors During the COVID-19 Pandemic*** By: Lucas Aragao Co-Author(s): Allyson Tabaczynski, Lauren Voss, Linda Trinh Faculty Advisor: Dr. Linda Trinh University of Toronto

Session 3C (WS2007) – Sensorimotor & Perceptions	
1:00 p.m.	***Investigating modulations in afferent inhibition following training on a novel sensorimotor finger maze task*** By: Maria Salman Co-Author(s): Jacob Pickersgill Faculty Advisor: Dr. Aimee Nelson McMaster University
1:15 p.m.	***Do receptors in the skin contribute to the perception of movement in the hand?*** By: Jessica Leverett Co-Author(s): Isaac Porozni, Lucas Bronder Faculty Advisor: Dr. David F. Collins

	University of Alberta
1:30 p.m.	***Quantifying the pressure and force distribution on the perineal region during hip arthroscopy when using a perineal post: A potential mechanism of pudendal nerve palsy*** By: Nadeem Mamajiwalla Faculty Advisor: Dr. Timothy Burkhart University of Toronto
1:45 p.m.	***Can we acutely train the visuomotor pathways of our non-dominant eye?*** By: Gabriela Oancea Co-Author(s): Damian Manzone Faculty Advisor: Dr. Luc Tremblay University of Toronto
2:00 p.m.	***The Adaptive Plasticity of the Sensorimotor System Assessed Through an Online Visuomotor Task*** By: Jake Brien Faculty Advisor: Dr. Tim Welsh University of Toronto

Session 3D (BN307) – Education	
1:00 p.m.	***Exploring Students' Experiences of Mental Health and Well-being While Participating in Remote Work-integrated Learning*** By: Mona Emam Faculty Advisor: Dr. Ashley Stirling University of Toronto
1:15 p.m.	***How Systemic Oppression and Discrimination is (Re)Produced in Canadian University Kinesiology Curriculum*** By: Erin Sullivan Faculty Advisor: Dr. Adam Ali University of Toronto
1:30 p.m.	***Socioeconomic Effects of the Aesthetic Philosophy of Music Education*** By: Alessia Signorella Faculty Advisor: Dr. Antía González Ben University of Toronto

1:45 p.m.	***Investigating strategies used to foster quality participation on playgrounds*** By: Amanda Sottile Co-Author(s): Amanda Sottile, Nikoleta Odorico, Maeghan E. James, Dr. Jennifer Leo, Carolyn Millar, Dr. Amy Latimer-Chung, Dr. Kelly Arbour-Nicitopoulos Faculty Advisor: Dr. Kelly Arbour-Nicitopoulos University of Toronto
2:00 p.m.	***Framing Sport as a Platform for Sustainable Development: A Case Study on 2023 Canada Winter Games*** By: Kyara Simoes Faculty Advisor: Dr. Simon Darnell University of Toronto

Block 4: 2:30 p.m. – 3:45 p.m.

Session 4A (BN302) - Sport Psychology	
2:30 p.m.	***Moderating Factors of the Relationship between Personal Standards Perfectionism and Evaluative Concerns Perfectionism in Cross-Country Skiers*** By: Conor McGovern Faculty Advisor: Dr. John Gotwals Lakehead University
2:45 p.m.	***Social antecedents of emotion regulations among adolescent athletes*** By: Daniya Idrissova Co-Author(s): Jeemin Kim Faculty Advisor: Dr. Katherine Tamminen University of Toronto
3:00 p.m.	***A Critical Analysis of Canada's NHL Teams' Environmental Initiatives*** By: Anna Khouzam Faculty Advisor: Dr. Adam Ali University of Toronto
3:15 p.m.	***Players' Perspectives on their Experiences of Autonomy-Supportive Coaching*** By: Hannah Schoenroth Faculty Advisor: Dr. Ashley Stirling University of Toronto

3:30 p.m.	***Adolescents' Risk-Raking Behaviour in Sport*** By: Ali Doroodchi Faculty Advisor: Dr. Katherine Tamminen, Rachel Dunn University of Toronto

Session 4B (BN304) – Cardiovascular & Muscle Physiology	
2:30 p.m.	***The impact of single-limb immobilization on muscle size and cross-sectional area: a potential proteo-lipid complex to mitigate muscle disuse-atrophy*** By: Taylor Giacomin Co-Author(s): T. Giacomin, C. Lim, and S.M. Phillips Faculty Advisor: Dr. Stuart Phillips McMaster University
2:45 p.m.	***The effect of 8 weeks of local lower limb heating on central and peripheral arterial stiffness in recreationally active, healthy, young males and females*** By: Keira Mattook Co-Author(s): Keira Mattook, B.Sc. Kin.; Jem Cheng, MSc.; Maureen MacDonald, PhD Faculty Advisor: Dr. Maureen MacDonald McMaster University
3:00 p.m.	***Identification of FKBP8-PLN Interaction in Mouse Hearts*** By: Ava Vandenbelt Co-Author(s): Allen C. T. Teng, Marjan Tavassoli, Marius Locke, Anthony O. Gramolini Faculty Advisor: Dr. Marius Locke and Dr. Anthony Gramolini University of Toronto
3:15 p.m.	***Exploring at-home assessment of postprandial glucose metabolism in males and females*** By: Anessa Koussiouris Co-Author(s): Daniel West, Stephanie Estafanos, Alexa Govette, Beata Friesen, Daniel Moore Faculty Advisor: Dr. Jenna Gillen University of Toronto
3:30 p.m.	***The contribution of skeletal muscle desaturation to compensatory vasodilation - A pilot Study*** By: Navraj Brar Co-Author(s): Rony Galperin Faculty Advisor: Dr. Robert F. Bentley University of Toronto

Session 4C (WS2007) – Biomechanics & Injury	
2:30 p.m.	***The Impact of Weight and Trimester on Balance and Gait in Pregnancy*** By: Abigayle Fontaine Faculty Advisor: Dr. Eryk Przysucha Lakehead University
2:45 p.m.	***Does tape on the low-back while exercising influence spine motion and lower extremity kinematics?*** By: Kyle Farwell Faculty Advisor: Dr. David Frost University of Toronto
3:00 p.m.	***Intra- and inter-rater agreement of a virtual method to quantify lower extremity kinematics in healthy adults*** By: Ikeade Charles Adeyinka Co-Author(s): Margaret Harrington Faculty Advisor: Dr. Timothy Burkhart University of Toronto
3:15 p.m.	***Robotic guidance and the timing accuracy of a circle-drawing task - A feasibility study*** By: Amin Mostofinejad Co-Author(s): Dr. Rachel Goodman, and Dr. Tristan Loria Faculty Advisor: Dr. Luc Tremblay University of Toronto
3:30 p.m.	***AAV9-mediated KCC2 Upregulation Improves Neurological Recovery Following Traumatic Spinal Cord Injury*** By: Akshat Modi Co-Author(s): Mohammad-Masoud Zavvarian Faculty Advisor: Dr. Michael Fehlings University of Toronto

Session 4D (BN307) – Exercise Science & Health (Virtual)

2:30 p.m. (Virtual)	***Physical Activity and the Optimal Exercise Intensity: Inhibitory Control and ADHD*** By: Victoria Cirone Co-Author(s): Sameena Karsan and Michelle Ogrodnik Faculty Advisor: Dr. Jennifer Heisz McMaster University
2:45 p.m. (Virtual)	***The Effect of One Night of Acute Partial Sleep Deprivation on Endothelial Cell Viability and Endothelial Function*** By: Manahil Iftikhar Co-Author(s): Iftikhar M, Cherubini JM, MacDonald MJ Faculty Advisor: Dr. Maureen MacDonald McMaster University
3:00 p.m. (Virtual)	***Exploring the impact of physical activity on the interaction between ADHD and depression*** By: Sameena Karsan Co-Author(s): Michelle Ogrodnik, Victoria Cirone Faculty Advisor: Dr. Jennifer Heisz McMaster University
3:15 p.m. (Virtual)	***The effects of mental fatigue, self-efficacy, and motivation on exercise decision making.*** By: Samira Sunderji Co-Author(s): Sheereen Harris Faculty Advisor: Dr. Steven Bray McMaster University
3:30 p.m. (Virtual)	***Monitoring Athlete Internal Load Using Introspective Measures for Overtraining Prevention in Collegiate Female Basketball Players*** By: Sobia Mahmood Co-Author(s): Emma Waddington, Joshua Keogh Faculty Advisor: Dr. Jennifer Heisz, Dr. Dylan Kobsar McMaster University

Abstracts

(in alphabetical order by surname)

Adeyinka, Ikeade Charles
Intra- and inter-rater agreement of a virtual method to quantify lower extremity kinematics in healthy adults
Faculty Advisor: Dr. Timothy Burkhart
Co-Author(s): Margaret Harrington
University of Toronto / Faculty of Kinesiology and Physical Education

Introduction: Two-dimensional motion analysis is a cost-effective method for the objective quantification of joint kinematics. A virtual motion analysis method has been developed to address the cost, time, and transportation barriers to research participation and clinical care, which have been emphasized by the COVID-19 pandemic. Preliminary analysis of this method, for squat and lateral lunge tasks, demonstrated good to excellent reliability for joint angle measurements at maximum depth and acceptable intra-/inter-rater agreement over the entire angle-time signal during the squats. However, none of the lateral lunge variables met the threshold of acceptable agreement. Therefore, the purposes of this study are: i) to compare the intra-/inter-rater kinematic measures over the entire joint angle-time signal; and ii) to analyze the agreement at five-time points of the motion-time cycles. Methods: Fourteen healthy adults (age=25.14[5.56] years) filmed themselves performing bodyweight squats (sagittal-plane) and lateral lunges (frontal-plane). The hip and knee joint angles over the duration of the tasks were calculated using Kinvoea(V.0.9.5). Two kinesiology students each performed the video analysis procedure twice, two weeks apart. Two-tailed statistical parametric mapping (SPM) paired t-tests (α=0.05) will be used to conduct intra-/inter-rater comparisons of angle-time signals for each participant. Bland-Altman plots will be used to analyze the intra-/inter-rater agreement at 0%, 25%, 50%, 75%, and 100% of the joint angle curves normalized to 100% of the motion cycle. Expected results: It is expected that statistically significant differences in the angle-time signals for the lateral lunge measurements will be found between raters. It is also expected that the intra-/inter-rater differences will demonstrate acceptable agreement during the middle phase of the motions (25-75%) during the greatest ranges of motion. Impact: This study will provide an understanding of the repeatability of a virtual motion analysis over various functional tasks and will guide the integration of this accessible form of motion analysis.

Al-Azzawi, Abdullah

Athlete Activism in the Tokyo Olympics

Faculty Advisor: Dr. Simon Darnell
University of Toronto / Faculty of Kinesiology and Physical Education

In the most recent Tokyo Olympics, the rule that was reinforced by the International Olympic Committee was Rule 50. It does not permit athletes to express or form of activism when they are present in the stadium, venues, or other sporting arenas. For example, taking a knee, raising fists, or using any demonstrative stance would be prohibited. Rule 50 states "No kind of demonstration or political, religious or racial propaganda is permitted in any Olympic sites, venues or other areas." (Developed by the IOC Athletes' Commission - Olympic Games 2020). This rule dates back since 1975, with many years, it was rewritten and redefined; however, it was heavily implemented through the Tokyo Olympics, causing an uproar. To have the freedom of expression is a civil and a political right; it is a fundamental law established internationally, under human rights territories and national laws (Goh, 2021). Tommie Smith and John Carlos, in 1968, raised their fist to make a stance of what African American's were facing as oppression at the time. They were mocked, booed, and ridiculed in the Olympics; after causing such an uproar, their medals were taken away and banned from further Olympic events. Historically, the Olympics has always taken a measure to deal with individuals who break the rules. However, it raises various questions, especially during the year 2020. With the Black Lives Matter movement, the murder of George Floyd and Trans Lives matter. By prohibiting athletes from making a specific gesture or a movement to cater some support for a movement, it takes away the athlete's platform to freely express

themselves and lets them live in a world of fear. This paper will examine the history of the Olympics and how its rules have affected athletes' freedom of expression.

Ammendolia Tome, Genevieve
Examining the feasibility of improving neck pain using a mobile concussion rehabilitation app
Faculty Advisor: Dr. Michael Hutchison
University of Toronto / Faculty of Kinesiology and Physical Education

Background: Headache, dizziness, and neck pain are common symptoms associated with neck dysfunction following a concussion. The use of neck exercise interventions to reduce neck pain and disability has been well-documented in individuals suffering from chronic neck pain. However, research examining the efficacy of neck exercise interventions in concussion rehabilitation is limited. Objective: To pilot the feasibility of a neck exercise intervention to reduce neck-related concussion symptoms in concussed patients. Methods: Participants were provided an at-home exercise plan using a mobile app (Rhea) based on concussion symptoms. For participants with self-reported neck pain, their intervention included a neck exercise plan that involved four exercises. Participants were required to complete six sessions over a two-week period. Differences in self-reported symptoms were analyzed over the intervention period. Results: After 3 sessions (3-5 days), 10 out of 18 participants (56%) reported a reduction in neck pain after completion of the first plan, and none of the participants reported an increase in neck pain. After the six sessions were completed, one additional participant reported an improvement in neck pain, however, seven of the 18 participants did not report an improvement in symptoms. Additional results will be presented at the conference. Implications: Sixty-one percent of participants reported an improvement in neck pain with a digital exercise program. These findings provide preliminary support for the utility of an at-home digital neck rehabilitation program.

Aragao, Lucas
Changes in Light Physical Activity and Sedentary Behaviour and Associations with Quality of Life Among Cancer Survivors During the COVID-19 Pandemic
Faculty Advisor: Dr. Linda Trinh
Co-Author(s): Allyson Tabaczynski, Lauren Voss, Linda Trinh
University of Toronto / Faculty of Kinesiology and Physical Education

Background: The COVID-19 pandemic has resulted in higher volumes of sedentary behaviour (SB) and reductions in light physical activity (LPA) among cancer survivors; however, it is unknown how these changes are related to quality of life (QoL). Purpose: This study examines the associations between changes in SB, LPA and QoL of cancer survivors during the COVID-19 pandemic. Methods: A global sample of cancer survivors completed an online survey measuring SB through the modified Domain-Specific Sitting Time Questionnaire, LPA using the Godin Leisure Time Exercise Questionnaire, and QoL (i.e., physical functioning, pain, social and role functioning, mental health, and health perceptions) using the 20-Item Short-Form Survey. Linear regressions examined associations between changes in SB, LPA, and QoL. Separate subgroup analyses compared cancer survivors who were diagnosed and received treatment <5 years and ≥5 years ago. Results: Participants (N=485) were predominantly females (71%), had a mean age of 48.4 ± 15.4 years, and primarily diagnosed with breast, hematologic, or gynecologic cancers. In the main analysis, there were no

significant association between any QoL subscales and change in SB or LPA (p>0.05). For those diagnosed <5 years ago, there was a significant positive association between changes in SB and role (ß=0.17, p=0.02) and social functioning (ß=0.14, p=0.02). There was a positive association between changes in LPA and mental health (ß=0.15, p=0.02) in those diagnosed <5 years ago. For those who received treatment <5 years ago, positive associations were found between changes in SB and role (ß=0.13, p=0.01) and social functioning (ß=0.13, p=0.03). Conclusion: Increases in SB and LPA were associated with better role and social functioning, and mental health for survivors recently diagnosed or treated for cancer. Cancer survivors should still aim to break up prolonged bouts of SB in certain domains and increase LPA during the pandemic, especially those who have been recently diagnosed or treated.

Babits, Paul

The Efficacy of a Breath Test to Detect Differences in Leucine Retention in Individuals with Varying Habitual Physical Activity

Faculty Advisor: Dr. Daniel Moore
Co-Author(s): Hugo Fung, Nigel LeGood, Matthew Lees, Daniel Moore
University of Toronto / Faculty of Kinesiology and Physical Education

Lean body mass (LBM) is a primary determinant of health and wellbeing that is maintained or increased by a neutral or positive whole-body protein balance (i.e., protein synthesis - breakdown). Inactivity can increase the portion of dietary amino acids broken down via oxidation, resulting in reduced LBM. Our lab recently developed a non-invasive method for determining anabolic sensitivity. While this breath test was able to detect elevations in leucine retention (LR; i.e., consumed - oxidized leucine) after resistance exercise, it is unknown whether it can detect smaller changes. Thus, we sought to evaluate the efficacy of the breath test to detect differences in LR between individuals with differing habitual physical activity (PA). We expected greater LR in participants with higher habitual PA. Our recruitment goal was 24 younger (18-35 y; 6M/6F) and older (60-80 y; 6M/6F), healthy, moderately active adults. Participants completed 3-days of habitual PA, during which they were instructed to achieve >7000 steps/day and participate in all structured PA. During the morning of the fourth day, participants underwent a fasted metabolic trial wherein they consumed an amino-acid drink (20 mg/kg body mass unlabelled leucine) containing L-[1-13C]-leucine, a stimulator of protein synthesis in muscle, followed by breath samples taken every 20 or 30 minutes for the first and final 3 hours, respectively. All breath samples were analyzed using isotope-ratio mass spectrometry from which LR was calculated. Participants included in our preliminary analysis (4 young males; 26±6y) were selected for the low (LA; n=2; <9000 steps/day) or high (HA; n=2; >9000 steps/day) activity groups. We detected no differences (P>0.05) in LR between LA (75.9±9.5 %/6h) and HA (71.1±2.6 %/6h). These results suggest our breath test cannot detect differences in LR between individuals with low and high habitual PA, however, further recruitment will allow us to conduct more robust statistical analyses.

Bains, Avleen

The Somatic Portrayal of a Second-Generation Canadian's Physical Activity Behaviours: Investigating Biculturalism and Family Dynamics

Faculty Advisor: Dr. Janelle Joseph
University of Toronto / Faculty of Kinesiology and Physical Education

Second generation Canadian children are significantly impacted by the influence of their bicultural values, one being Canadian values and the other being the ancestral cultural

values adopted from their immigrant parents. Immigrant upbringing and family factors such as parenting styles, family structure, cultural expectations, feelings of belongingness and safety all work dynamically to dictate a second-generation Canadian's physical activity behaviours. Therefore, their physical activity participation is much more complex and multifaceted than what Canadian institutions and physical activity and sporting spaces recognize. In order to understand the complexity of bicultural second-generation sport participation, it is imperative to understand the somatic individual experience. Current literature was inconsistent in providing specific results regarding the bicultural second-generation Canadian-North Indian/Punjabi female sporting experience with relation to family dynamics, which this paper aims to recognize. This study uses Abooali's (2021) sensory dimension approach to storytelling to investigate an extensive, multi-dimensional somatic portrayal of a second-generation Canadian-North Indian/Punjabi woman's physical activity behaviours within Canadian sporting spaces. The family dynamic factors investigated showed that the dominant parental influence in upbringing and their concerns for safety in Canadian sporting spaces facilitated physical activity behaviours as a second-generation Canadian. The necessity of a sense of belonging and the safety of physical and emotional health were shown to be prioritized by the dominant parent, even over culture. This research suggests that a second-generation Canadian's physical activity behaviours are the result of the integration of Canadian cultural values and their family dynamics, suggesting that their physical activity participation can be simultaneously promoted and rejected depending on feelings of belongingness and safety. Future research is suggested to investigate the somatic portrayal of the sense of belonging and safety of the immigrant parents themselves in order to bridge the sensory experiences of the immigrant parent(s) and second-generation child(ren) in Canadian physical activity spaces.

Bains, Tavleen

Overcoming the "Deep End" of Mainstream Sport: A Feminist Autoethnography of a Bicultural Canadian-Punjabi

Faculty Advisor: Dr. Janelle Joseph
University of Toronto / Faculty of Kinesiology and Physical Education

Bicultural individuals who identify as women often experience cultural dissonance when engaging in dominant White, masculine sporting spaces. This paper analyzes the cultural environment of Canadian sporting and physical activity spaces that result in instances of acceptance or separation of bicultural individuals. Furthermore, the experiences within non-dominant Canadian sporting spaces, such as Punjabi Bhangra dance, will be explored to investigate experiences of feminism and belonging. A feminist perspective on auto-ethnography can enable researchers to understand and reveal power relations in sport and physical activity. This paper utilizes this evocative methodology with multiple personal stories that reflect on themes of belonging, ideals of femininity, and cultural expectations through memory work of previously engaged physical activity spaces. Major findings of this paper suggest that traditional Canadian sporting spaces may be discouraging environments for bicultural participation as they fail to promote inclusivity, representation, and feelings of collectiveness. This may further result in decreased participation rates in dominant Canadian sport due to the various cultural differences that I have conceptualized as a problem of the 'deep end', which entails a difficult cultural barrier towards a true sense of belonging and representation. It can be interpreted that dominant Canadian sporting spaces must include culturally appropriate markers that invite and welcome bicultural identities while recognizing collectivity. Furthermore, this invites bicultural individuals to embrace and recognize that

their experiences are valid, regardless of whether or not they participate in non-dominant sporting spaces. Last, I suggest further research to be conducted using feminist auto-ethnographical methods that may provide lived experiences across a variety of bicultural identities in Canada to create a deeper understanding and appreciation of biculturalism and physical activity.

Barrientos, Andrea

An Autoethnographic Examination of Latin American Female Immigrant Identity in Sport in Canada

Faculty Advisor: Dr. Janelle Joseph
University of Toronto / Faculty of Kinesiology and Physical Education

Biculturalism is found in sport and can influence the ways actors in sport hinder or encourage sport participation. The purpose of this study is to apply this topic with an autoethnographic examination through my personalized experience as a Latin American female immigrant in Canada. The design of the study requires the use of journaling and storytelling where a list of questions are analyzed and explored. For 6 weeks the study required three journal entries written each week in regards to the questions related to the study. Major findings and themes found after the data collection include identity, the importance of people such as friends and family, location, financial struggles and language. One of the major findings include the search for identity being part of a bicultural sport environment. Family and friends have also been a recurring trend as the data contains the many influences of loved ones who have persuaded the writer to participate in sport. Moreover, financial struggles are common when immigrants begin to settle into a new country. Language barriers are also common and can prevent the participation of physical activity as an immigrant in sport. The overall summary and interpretation from the study suggests that sport participation is essential to develop physically, mentally, socially and emotionally; however immigrant individuals may struggle with these developments as the lack of inclusivity in the team or society may make them not feel welcomed in a sporting environment. Overall this study helps bring awareness to the immigrant experience in sport through personal experiences.

Basile, Daniel

The Effect of Submaximal Semi-Upright Cycling on Central Hemodynamics and Exercise Tolerance - A Pilot Study

Faculty Advisor: Dr. Robert F. Bentley
Co-Author(s): Jona B. Bernal, Adam N. Di Salvo, Robert F. Bentley
University of Toronto / Faculty of Kinesiology and Physical Education

Introduction: Stress echocardiography and exercise right heart catheterization are common cardiac assessment procedures involving semi-upright cycling. However, our understanding of the cardiovascular response to semi-upright cycling is incomplete. Purpose: To Identify the effect of body position on central hemodynamics and exercise tolerance during submaximal cycling. Methods: Six healthy individuals (24±5 years, 33% female) performed alternating five-minute bouts of upright and semi-upright (40˚ incline) cycling at 50W and 100W of intensity. Starting body position was randomly assigned and counterbalanced. Central hemodynamics were recorded beat-by-beat (finger photoplethysmography). Exercise tolerance was obtained using the Borg rating of perceived exertion (RPE) scale. Measures were averaged

during the final minute of each exercise bout. Results: Data are from seated rest and reported as mean±SD. As expected, there was a main effect of intensity on cardiac output (CO), heart rate (HR), RPE and rate-pressure product (RPP) (data not shown, all $p<0.05$). Regardless of intensity, the increase in CO was greater in the semi-upright compared to upright position (7.3±2.8 vs. 5.5±2.4 L/min, $p=0.04$). This was due to a greater increase in stroke volume (25±17 vs. 5±16 mL, $p<0.03$), as the increase in HR was blunted (54±13 vs. 63±10 bpm, $p=0.013$) in the semi-upright position. Regardless of intensity, the increase in mean arterial pressure was reduced in the semi-upright compared to upright position (9±9 vs. 23±11 mmHg, $p=0.007$), due to a greater reduction in total peripheral resistance in the semi-upright compared to upright position (-576±468 vs. -410±469 dyn·s·cm-5, $p<0.03$). There was no effect of semi-upright body position on RPE (median, Q1-Q3: 10, 8-12 vs. 9, 8-11, $p=0.224$) or RPP (11052±1590 vs. 11560±2648 mmHg·bpm, $p=0.661$). Conclusions: Despite a greater stroke volume mediated increase in CO with semi-upright exercise, RPE was unaffected by body position. This may suggest a unique local hemodynamic response influencing active skeletal muscle oxygen delivery.

Bernal, Jona

Ventilatory and oxygen saturation responses during submaximal exercise in upright and semi-upright cycling positions - A pilot study.

Faculty Advisor: Dr. Robert F. Bentley
Co-Author(s): Daniel Basile, Adam DiSalvo
University of Toronto / Faculty of Kinesiology and Physical Education

Introduction: Semi-upright cycling exercise is a common body position and modality during cardiac function assessments. However, the effects of a semi-upright position on oxygen uptake and skeletal muscle saturation are poorly understood. Due to postural-induced changes in hemodynamic conditions, exploration in potential differences between upright and semi-upright exercise are warranted. Purpose: To explore the effect of a semi-upright body position on oxygen consumption (VO2), oxygen cost (O2C), and skeletal muscle oxygen saturation (SmO2) during submaximal cycling. Methods: Six healthy individuals (24±5 yrs, 66% male) completed alternating 5-minute bouts of submaximal cycling at 50W and 100W in upright and semi-upright (40˚ incline) positions. Starting body position was randomly assigned and counterbalanced. SmO2 (near-infrared spectroscopy, vastus lateralis) and pulmonary gas exchange were measured continuously at seated rest and during exercise. Data was averaged during the last minute of rest and each exercise bout. Oxygen cost (O2C) was computed as the increase in oxygen consumption divided by intensity. Results: Data are Δ from seated rest and reported as mean±SD. As expected, there was a main effect of intensity on all variables associated with pulmonary ventilation, VO2 and SmO2 (data not shown, all $p<0.05$). The increase in VO2 was reduced during semi-upright compared to upright exercise (1.0±0.2 vs. 1.2±0.3 L/min, $p=0.044$) as was O2C (13.9±2.4 vs. 16.3±4.1 ml O2/watt, $p=0.044$). There was seemingly a reduction in the increase in minute ventilation (23±6 vs. 28±8 L/min, $p=0.1$) and a greater decrease in skeletal muscle saturation (-21±17 vs. -13±11 %, $p=0.089$) during semi-upright compared to upright exercise. Conclusion: While O2C is reduced in a semi-upright position, active skeletal muscle oxygen delivery appears compromised resulting in an increased oxygen extraction. Further research is required with additional participants to confirm this relationship.

Borhani, Anita

Categorization of Multi-Joint Movement Patterns During the Star Excursion Balance Test

Faculty Advisor: Dr. Timothy Burkhart
Co-Author(s): Tiffany Tiu
University of Toronto / Faculty of Kinesiology and Physical Education

BACKGROUND: The Star Excursion Balance Test (SEBT) is a functional screening tool to assess lower extremity dynamic stability and neuromuscular control. It is commonly utilized to guide rehabilitation progression and return-to-play decision making following lower extremity injuries. While the SEBT provides insight into overall lower extremity function, it only uses a single outcome, reach distance, as measure of performance and does not consider the multi-joint movement strategies that are used to achieve this, generating the potential for incorrect assessments of lower extremity function. Therefore, the purpose of this study is to determine if there are specific categories of movement strategies individuals adopt while performing the SEBT. METHODS: 20 healthy participants (10 males and 10 females; 18-35 years) were recruited for the study. Two different SEBTs were used: the traditional method and a novel star excursion system (ONPoint medical, London, ON, Canada). Participants performed two reaches in each of the eight directions, for a total of 32 trials. An eight-camera markerless motion tracking system recorded the participants' motions, that were processed by Theia3D. The resulting kinematic data were further processed in Visual 3D to extract the three-dimensional motions from the hip, knee, and ankle. The data will be analysed using functional data techniques that assess the entire motion-time curve and allow categorization of patterns within the data. Joint coupling will also be quantified and the variability around the joint angles at peak reach distance will be calculated. EXPECTED RESULTS: It is expected that there will be hip, knee, or ankle dominant strategies used to achieve similar reach distances. It is also expected that there will be large variability in individual joint motions for similar reach distances. IMPACT: The data from this study will better inform rehabilitation progress and return-to-play readiness following lower extremity injuries, reducing the risk of reinjury.

Brankovan, Olga

Content exploration of return to play guidelines for children with disabilities in organized sport and physical activity spaces

Faculty Advisor: Dr. Kelly Arbour
Co-Author(s): Nancy Huynh
University of Toronto / Faculty of Kinesiology and Physical Education

BACKGROUND: The COVID-19 pandemic and its associated public health restrictions has significantly impacted youth sports. Research suggests that children and youth with disabilities (CYD) are experiencing a delay in their return to organized sports programs. This study aimed to (a) explore existing Return To Play (RTP) guidelines in Ontario for CYD in organized sport and physical activity (PA), and (b) develop recommendations to support a safe and quick return to sport and PA for CYD in Ontario. METHODS: A strategic environmental scan of RTP guidelines for CYD in sport and PA in Ontario was conducted in consultation with community partners with expertise in sport for CYD. RTP guidelines were collected via direct email communication with community organizations as well as utilized publicly available information on organization's websites. Documents were coded and analyzed by the student investigator (OB) using a content thematic analysis approach. RESULTS: 46 organizations were contacted via email, with 22 (48%) of the organization representatives

responding. None of the 22 responding organizations had RTP guidelines specific to CYD however all had RTP protocols related to masking, distancing, and transitioning activities outdoors. Results of the thematic analysis are underway and will be discussed during the presentation. STUDY IMPLICATIONS:. The current investigation is important for mitigating equity gaps in sport and PA programing for CYD as many do not have access to programming to the same extent as children and youth without disabilities. Incorporating RTP guidelines into traditionally ableist settings can improve accessibility to programming for all.

Brar, Navraj

The contribution of skeletal muscle desaturation to compensatory vasodilation - A pilot Study

Faculty Advisor: Dr. Robert F. Bentley
Co-Author(s): Rony Galperin
University of Toronto / Faculty of Kinesiology and Physical Education

Background: Our previous work observed that introducing a challenge to muscle blood flow, and by extension oxygen delivery, during forearm exercise in males revealed two disparate groups of phenotypic vasodilatory responses - compensatory and non-compensatory vasodilation. Currently, the cause of compensatory and non-compensatory vasodilation is unknown, but may be related to the extent of local skeletal muscle desaturation. Purpose: To explore the contribution of local skeletal muscle desaturation to compensatory vasodilation. Methods: Four healthy participants (25±6 yrs, 25% female) completed rhythmic constant load isometric forearm exercise (2:1 relaxation:contraction duty cycle). Following 5 minutes of exercise, steady manual brachial artery compression was applied to challenge oxygen delivery. Thirty seconds prior to completion of exercise, arterial compression was removed. Forearm blood flow (ml/min; brachial artery Doppler and Echo ultrasound), mean arterial blood pressure (mmHg; finger photoplethysmography) and skeletal muscle saturation (SmO2, near-infrared spectroscopy, flexor digitorum profundus) were measured continuously. Compensatory vasodilation was identified when steady state vasodilation (Forearm vascular conductance (FVCRELAX (ml/min/100 mmHg) during the final 30s prior to completion of exercise when arterial compression was removed was greater than unchallenged exercise by 2.75%x1.96. Results: Manual arterial compression reduced mean blood velocity by 45%, $p<0.001$. The intensity of forearm exercise did not differ between unchallenged and challenged exercise (11±3 vs. 11±3 kg·s, $p=0.9$). Compensatory vasodilation was present in 75% of participants (n=3, 100% male). Correlational analysis suggests a positive relationship between the presence of compensatory vasodilation and SmO2 ($r=0.87$, $p=0.135$) and a negative relationship between SmO2 and FVCRELAX ($r=-0.88$, $p=0.124$). Conclusions: This preliminary evidence suggests a positive relationship between local skeletal muscle desaturation and the presence of compensatory vasodilation, aligning with previous work. There is reason to believe that differences in skeletal muscle desaturation during exercise may explain the presence of vasodilatory phenotypes; however, this remains to be confirmed.

Brien, Jake

The Adaptive Plasticity of the Sensorimotor System Assessed Through an Online Visuomotor Task

Faculty Advisor: Dr. Tim Welsh
University of Toronto / Faculty of Kinesiology and Physical Education

Sensorimotor adaptation is the ability to adjust behaviour to changing environmental or internal demands to maintain appropriate goal-directed motor performance. The adaptive plasticity of the human sensorimotor system has been studied extensively by exposing learners to visuomotor tasks with perturbations that produce predictable displacements of a visual display. These perturbations were applied during reaching movements by changing the mapping between the position of the hand and the position of a cursor on a display screen. Previous research has indicated that when learners first experience such perturbations, performance is worse than before the perturbation with error reducing incrementally during prolonged practice resulting in an after-effect when the adaptation is removed (Krakauer et al. 2000; Wigmore et al., 2002; Caithness et al., 2004). The present study tested if a similar phenomenon would occur when a visuomotor adaptation is delivered exclusively online with the rotation of a computer mouse from the normal orientation. Twenty-two right-handed participants performed the online experiment in which they clicked stimuli with a computer mouse in three conditions: pre-perturbation (computer mouse in normal orientation), perturbation (rotated clockwise 90), and post-perturbation (computer mouse in normal orientation after perturbation). Movement time, absolute angular error, and radial error were recorded for each trial of the three conditions. Results indicate a significant increase in all three measures during perturbation compared to pre-perturbation. These values revealed an adaptation in that the measures decrease from the onset of perturbation to the last trial of the condition. There was also an after effect, as shown by higher values in the post-perturbation condition compared to pre-perturbation. The results suggest that the online experiment resembles the phenomenon associated with visuomotor adaptations.

Bronder, Lucas B.

Improving the Recruitment of Axons in Human Peripheral Nerves by Optimizing Stimulus Pulse

Faculty Advisor: Dr. David F. Collins
Co-Author(s): Isaac Porozni & Jessica Leverett
University of Alberta/ Faculty of Kinesiology, Sport, and Recreation

Electrical stimulation is used for applications ranging from testing reflexes to generating contractions for people with paralysis; for the former, sensory axons are the targets, for the latter it's motor axons. Using "monophasic" pulses, wider pulses more effectively recruit axons, and this effect is largest for sensory axons. Monophasic pulses, however, are being replaced by "kilohertz frequency alternating pulses" (KFAP) which may not be optimal to recruit axons. Thus, the purpose of this study was to examine the effects of KFAPs on recruiting axons in the human tibial nerve. We hypothesised: 1) KFAPs with longer phase durations will more effectively recruit motor and sensory axons and 2) the improvement will be most prominent in sensory axons. Electrical stimulation was applied over the tibial nerve at the back of the knee. Muscle activity was recorded from soleus, that plantar-flexes the ankle, to record M-waves (a measure of activating motor axons) and H-reflexes (a measure of activating sensory axons) . KFAPs were delivered using phase durations of 0.125 ms and 0.5 ms over a range of stimulation intensities. Changes in the threshold of M-waves, H-reflexes, and amplitude of H-reflexes, relative to M-waves, between pulses provided outcomes of axonal recruitment. Pulses with wider phases produced M-waves and H-reflexes at lower thresholds, or less current, than narrower phases; H-reflex threshold decreased by 63% while M-wave threshold decreased by 55% when employing a wide phase duration compared to narrower phases. Phase duration of KFAPs influenced the recruitment of motor and

sensory axons and KFAPs with wider phases preferentially favoured sensory axons. Thus, like monophasic pulses, the phase duration of KFAPs can be tailored to favour the recruitment of motor or sensory axons depending on the task at hand and wider phases should be recommended for producing reflexes and narrower pulses for producing contractions.

Brooks, Erin

Dyad Practice and the Impact of Competitive versus Cooperative Pair Dynamics on Motor Learning

Faculty Advisor: Dr. Tim Welsh
Co-Author(s): Rowena Cai, Katherine Tamminen, Luc Tremblay, Molly Brillinger, Nicole Hodges
University of Toronto / Faculty of Kinesiology and Physical Education

Historically motor learning research has focused on individual learning because this was believed to be the best learning environment. However, the emergence of dyad (paired) learning research has begun to challenge this perspective (Shea et al., 1999). While the emerging research on dyad learning indicates that it may be more effective and efficient than individual learning, there is still much to be learned about this area. Within dyad learning, there is also a consideration on how to enhance motor learning and which variables that could impact learning. One variable that could influence motor learning within dyads is the nature of the pair. The current study investigated if dyad learning was impacted by cooperative or competitive pair dynamics, and if dyad learning was more effective than an individual condition. Participants completed a skilled key pressing task, where they aimed to execute a 5-keystroke sequence with distinct movement time goals. The study took place over 2 days - on Day 1 participants engaged in skill acquisition, individually or in their dyad. Day 2 examined retention and used the same key-pressing task and was completed 24-hours later but was performed individually regardless of the experimental condition. To assess performance, actual movement time was subtracted from goal movement time to produce an error score. Early data analysis suggests that all the groups performed similarly on Day 1 and the error scores were reduced across the acquisition blocks. However, the cooperative group performed the best in the retention test relative to their Day 1 scores, and the competitive group preformed the worst. The results of this study suggest that the dynamics of the dyad can have an impact on the effectiveness of motor learning, and that cooperative conditions create a more favourable learning environment.

Cai, Rowena

Dyad Learning in Cooperative vs. Competitive settings and the Role of Psychosocial Outcomes

Faculty Advisor: Dr. Tim Welsh
Co-Author(s): April Karlinsky, Erin Brooks, Katherine Tamminen, Luc Tremblay, Molly Brillinger, Nicole Hodges
University of Toronto / Faculty of Kinesiology and Physical Education

Individual practice is typically considered the most effective way to train because of the undivided attention provided to the learner by the instructor. However, recent research has shown that practicing in a social context, particularly in pairs (dyad), may be more effective than individual practice due to several potential factors. First, it provides the opportunity for

discussion with co-learners, therefore, allowing for the sharing of knowledge and/or strategies. Second, it provides the opportunity for social comparison which has shown to influence motivation. Third, it provides an opportunity for rest between trials which was found to provide learning benefits compared to trials without rests. Fourth, it provides the opportunity for observational learning which plays a role in skill acquisition. Despite the benefits of dyad practice, there is a limited understanding of the underlying mechanisms of paired practice. Therefore, the purpose of this study is to address the gaps in the literature surrounding dyad learning. Specifically, the study was designed to determine if the nature of the partnership (i.e., cooperative vs. competitive environment) affects the effectiveness of practice, thereby influencing learning. The role of psychosocial outcomes in learning are also examined. Participants (ages 18 to 30) are recruited for a 2-day experiment and randomly assigned to one of three groups: (a) Competitive, (b) Cooperative, and (c) Control. The experiment involved the completion of a keypress task and online questionnaires assessing psychosocial outcomes (i.e., motivation, enjoyment, and efficacy). Performance and psychosocial outcomes are also examined between groups to determine how these outcomes vary among the nature of the partnership and to provide a better understanding of the mechanisms underlying dyad learning by considering psychosocial processes and outcomes.

Cirone, Victoria

Physical Activity and the Optimal Exercise Intensity: Inhibitory Control and ADHD

Faculty Advisor: Dr. Jennifer Heisz
Co-Author(s): Sameena Karsan and Michelle Ogrodnik
McMaster University / Department of Kinesiology

Introduction: Young adults with Attention Deficit Hyperactivity Disorder (ADHD) experience difficulty paying attention and ignoring distractions which are rooted in inhibitory control deficits. To help support sustained focus, previous research has explored exercise as a means to improve inhibitory control performance in children with ADHD. Through mechanisms such as catecholamine release and increased cerebral blood flow, moderate and high intensity exercise help with improving inhibition. However, the intensity-response effect in young adults with ADHD is unclear. Purpose: The present study investigated whether minutes spent doing a) moderate b) high intensity exercise correlated with and predicted inhibition performance on the Sustained Attention to Response Task (SART) and Stroop Task in an ADHD and neurotypical population. Methods: 74 young adults aged 18-35 years were recruited for a virtual study. Participants were recruited for an ADHD group (n=36) and neurotypical control (n = 36). Alongside demographic questionnaires, participants completed a 7-day physical activity recall interview and recalled minutes spent doing moderate and vigorous intensity exercise. Inhibitory control was measured through 1) commission errors and mean reaction time on the Sustained Attention to Response Task and 2) proportion correct and reaction time to an incongruent stimulus on the Stroop Task. Results: Preliminary results suggest that minutes spent doing moderate and vigorous intensity exercise did not significantly differ between groups. However, participants who spend more minutes engaging in moderate physical activity performed more accurately on the Stroop task. Conclusion: These preliminary results suggest that spending more time doing moderate intensity exercise may help young adults with and without ADHD improve their inhibitory control.

Dastaran Mamaghani, Bahar

Supporting Equity and Inclusion of Muslim Women in Canadian Sport
Faculty Advisor: Dr. Ashley Stirling
University of Toronto / Faculty of Kinesiology and Physical Education

Considering the dominant ideas of white supremacy and male supremacy in Canadian sport, athletes who identify as male or white are the most advantaged, supported and included (Joseph & Kriger, 2021). Athletes who are part of minority groups are prone to experiencing discrimination, exclusion, and/or harm. Canadian Muslim women athletes are one of the disadvantaged groups of athletes that have been highly marginalized due to the intersection of racism, sexism, and islamophobia (Ahmad et al., 2020). Coaches, as one of the most influential factors in the experiences of athletes, can impact the extent to which their athletes feel safe, respected, and included. The purpose of this research was to examine Canadian Muslim women's inclusive experiences in sports with a focus on the coach-athlete relationship, with the intent of providing strategies that help promote positive sport experiences for this marginalized group. This research question is addressed through online surveys and virtual interviews. The survey includes a list of strategies under the categories of equity, inclusion and respect, and social support; participants are asked to rate each strategy based on the extent to which they find each helpful. Participants are then invited to participate in a semi-structured interview in which they are able to elaborate on their answers. They are asked to talk about their coaches' roles in promoting equity and inclusion in sports. The collected data will be qualitatively analyzed through thematic analysis.

Dojutrek, Alexandra
Physical activity, cardiorespiratory fitness, and sedentary time as predictors of cardiovascular risk in breast cancer survivors
Faculty Advisor: Dr. Amy Kirkham
University of Toronto / Faculty of Kinesiology and Physical Education

Introduction: Breast cancer survivors are at 3-fold elevated risk for cardiovascular disease (CVD) compared to women without a history of cancer. The etiology of CVD risk is related to pre-existing CVD risk factors (which overlap with breast cancer risk factors), cardiotoxic effects of cancer treatment, and lifestyle toxicity including physical inactivity. Cardiorespiratory fitness (CRF) measured by VO2peak is also impaired after breast cancer treatment and is a strong independent predictor of CVD-related mortality. Purpose: To compare the strength of the relationships between CRF, sedentary time, and moderate-to-vigorous physical activity (MVPA) with CVD risk, measured by Framingham 10-year Risk (FR) (%) in breast cancer survivors. Methods: This cross-sectional secondary analysis used prospectively collected data from two studies on female early-stage (I-III) breast cancer survivors (n=72) who were 1-6 years post-chemotherapy treatment. VO2peak was measured via incremental-to-maximal cardiopulmonary exercise tests on a cycle ergometer. MVPA and sedentary time were measured with accelerometers worn for one week. In separate linear regression models, VO2peak (normalized to body weight), MVPA, and sedentary time were used as independent variables with FR as the dependent variable. Results: VO2peak (mL/kg/min) explained 33.9% of variance in FR (β=-1.217, 95% CI [-1.62, -0.812], p=0.001). MVPA (hours/week) explained 7.7% of variance in FR (β=-0.572, 95% CI [-1.047, -0.98], p=0.019). Sedentary time (hours/day) explained 6.0% of variance in FR (β=-0.386, 95% CI [-0.753, -0.019], p=0.040). Conclusion: VO2peak is a stronger predictor of CVD risk than MVPA and sedentary time in breast cancer survivors. Every 1 mL/kg/min increase in VO2peak was associated with a 1.2% lower risk of a CVD event in the next 10 years. While

MVPA is important for cardiovascular health, strategies that optimize the impact on relative VO2peak such as high-intensity interval training and body weight loss may be needed to reduce CVD risk in early-stage breast cancer survivors.

Doroodchi, Ali
Adolescents' Risk-Raking Behaviour in Sport
Faculty Advisor: Dr. Katherine Tamminen & Rachel Dunn
University of Toronto / Faculty of Kinesiology and Physical Education

Decision-making necessitates weighing future benefits against the risks of specific actions. Engaging in activities with the possibility of failure is essential for athletes because they guide the individual towards reaching their full athletic potential. In hypothetical situations, assessing risks and judging actions is similar in adolescents compared to adults. Yet, in reality, adolescents engage in far more risky behaviour than adults (Steinberg, 2004). Sports-related risk-taking behaviour in adolescents (10-18-years-old) is a complex topic worth investigating as it can be helpful or disadvantageous to athletes. By conducting a literature review, this presentation will outline special features of adolescent development and sports environments that collectively drive adolescents to choose risky behaviours. The presentation will cover the developmental changes during adolescence that contribute to risk-taking, and relevant factors in sports settings. In youth, the reward systems (limbic systems) are substantially more developed than self-regulating pathways (pre-frontal cortex). The mismatch increases the possibility of risk-taking by increasing the appeal of rewards while making the individual nihilistic about the consequences. Peers, who are always present in sporting contexts, increase the prevalence of risk-taking because risk-taking behaviour is associated with a rewarding sense of social acceptance. Adolescents who have a positive relationship with their parents and coaches are likely to take fewer unjustified risks as they are more aware of the consequences. On the other hand, a negative relationship may foster harmful fear of failure. The criteria for success and failure are clearly defined in sporting environments, and success is interpreted as exceedingly desirable while failure is widely regarded as unfavourable. Therefore, athletes are compelled to make decisions that avoid loss and succeed. Future research should investigate how coaches and parents can permit youth athletes to take risks while limiting the probability of negative consequences in sports or other areas of life.

Elliott, Sydney
The Acute Effect of Dry Cupping on Hamstring Muscle Range of Motion
Faculty Advisor: Dr. Paolo Sanzo
Lakehead University/ School of Kinesiology

Background: The hamstrings are comprised of three muscles including the biceps femoris, semitendinosus, and semimembranosus. These muscles are commonly affected by a lack of flexibility which can lead to negative impacts on knee, hip, and low back function. Tightness of the hamstrings can lead to an increased pelvic tilt posteriorly, resulting in 'flat back' and pain, or can create postural derangements resulting in hyperlordosis. Dry cupping is a soft tissue treatment technique which manipulates underlying skin and fascia to allow for local circulation and elongation of the muscle. These effects decrease overall muscle tension which improves flexibility. Low back pain is an increasingly common condition worldwide. If musculoskeletal factors such as a lack of hamstring flexibility can be treated clinically before

developing low back pain, increases in quality of life and reductions in health care costs could be observed. Objective: The purpose of this study is to investigate the acute effect of dry cupping on hamstring muscle range of motion (ROM). Method: 30 participants between the ages of 18-30 years, were recruited (19 female, 11 male) and were cupped for 5-mins on the lateral, middle, and medial aspects of the hamstrings for a total of 15-minutes. Using IBM© SPSS Statistics 28, a paired samples t-test was conducted to analyze pre-cupping and post-cupping hamstring ROM measured using a Straight Leg Raising Test. Results: There was a statistically significant increase in the pre-cupping ROM (M=87.50±10.98 degrees) compared to the post-cupping ROM (M=95.23±11.06 degrees), 95% CI [6.32, 9.14], t(30)=11.21, p<.001, with a large effect size. Conclusion: Hamstring ROM increased after a 15-minute dry cupping session. Further research is required to fully under the lasting effects of cupping therapy on hamstring muscle ROM so that clinicians may look to incorporate cupping therapy to improve flexibility and prevent different musculoskeletal disorders.

Emam, Mona

Exploring Students' Experiences of Mental Health and Well-being While Participating in Remote Work-integrated Learning

Faculty Advisor: Dr. Ashley Stirling
University of Toronto / Faculty of Kinesiology and Physical Education

Work-integrated learning (WIL) experiences have been increasingly offered in higher education as a means to enhance students' employability skills and respond to employers' demands for work-ready graduates (Patrick et al., 2008). Such experiences develop student competencies, increase their intrinsic motivation for participation in the workforce, and reduce performance anxiety, all of which may translate to improved student mental health and well-being (McBeath et al., 2017). Notwithstanding the benefits, WIL has also been theorized to challenge students' wellbeing by exposing them to unfamiliar and anxiety-provoking workplace experiences (Gilliet-Swan & Grant-Smith, 2018). Given the potential benefits and challenges of WIL on student mental health and well-being, attention to how students' well-being may be best supported throughout the WIL experience is needed, particularly within the COVID-19 context. The purpose of this study, therefore, was to explore experiences of how student well-being is supported by mentors/supervisors and program coordinators when engaging in remote work-integrated learning. One-hour, online, semi-structured interviews were conducted with 10 students from a mixture of Canadian universities and colleges who were currently participating in remote WIL or had done so in the past two years. The participants were also asked to complete a demographic questionnaire. Students were participating in WIL in a variety of programs of study, including business administration, kinesiology, computer sciences, education, and occupational therapy. Thematic analysis will be employed to assess students' responses regarding their experiences of their well-being and how it was supported throughout their remote WIL placement. Preliminary results show that the students experienced both challenges and facilitators to their learning and well-being due to the remote context of their WIL placement. Final results will be shared at the conference.

Farwell, Kyle

Structuring mobility interventions to facilitate transfer to functional activities

Faculty Advisor: Dr. David Frost
University of Toronto / Faculty of Kinesiology and Physical Education

Background: Passive and active mobility do not influence the way individuals move to the same extent. For example, significant increases in passive mobility do not transfer to functional activities. Yet, most of the literature is focused on describing options to assess and increase passive mobility, or the extent to which a joint can be moved via external forces. Active mobility, defined as the joint motion that can be accessed via the coordinated contraction of muscles, may be a more relevant outcome for practitioners to target with assessments and exercise interventions. When assessing passive mobility, neurophysiological factors (e.g., stretch tolerance) and structural constraints (e.g., the stiffness and compliance of periarticular structures) are commonly discussed. In contrast, active mobility is also influenced by factors such as muscular coordination (motor control), strength, kinesthetic awareness, motivation, mood, etc. These factors must be considered when assessing mobility and devising mobility-focused interventions to reduce injury risk and improve performance. For example, individuals who lack strength may "freeze" physiological degrees of freedom, effectively reducing the movement solutions that can be accessed thus elevating their risk of injury or reducing performance. Having appropriate tools to both assess and improve the specific mobility needs of individuals and populations is recommended. Practical Implications: Mobility is a complex personal characteristic that can be influenced by many factors. Accordingly, there is a need to be more critical of mobility assessments and interventions to ensure they can distinguish the unique needs of an individual and thus inform suitable exercise recommendations. The purpose of this review was to highlight the complexity of the issue and provide several considerations for effective mobility assessment and intervention.

Farwell, Kyle

Does tape on the low-back while exercising influence spine motion and lower extremity kinematics?

Faculty Advisor: Dr. David Frost
University of Toronto / Faculty of Kinesiology and Physical Education

Background: Repeatedly flexing the spine under load is a mechanism for disc injury. Accordingly, a neutral spine position is commonly recommended when performing bilateral lifting exercises such as squats and deadlifts. However, it can be challenging to avoid spine flexion while squatting and lifting for various reasons. Rigid leukotape applied to the low-back has been shown to reduce spine flexion in low-demand lifting tasks. Still, it is unclear whether this change would persist during high-demand activities, such as those performed by athletes in training. The purpose of this investigation was to assess thoracopelvic motion and lower extremity kinematics while performing a series of squats, deadlifts and kettlebell swings with and without tape applied to the low-back. It was hypothesized that the tape would reduce thoracopelvic motion and increase hip flexion, knee flexion and ankle dorsiflexion. Methods: Participants were instrumented with skin-mounted reflective markers for motion capture analysis while performing squats, deadlifts and kettlebell swings under two conditions: (1) without tape and (2) with tape. Digital videos were collected from a sagittal perspective and used post-collection to quantify participants' thoracopelvic motion and lower extremity kinematics. Results: The use of tape resulted in reduced thoracopelvic motion during the squatting and deadlifting tasks. Correspondingly, hip flexion range-of-motion increased with the application of tape. Further, the tape appeared more effective during exercises that challenged participants' mobility (e.g., squat to thighs parallel) compared to exercises with mobility constraints (e.g., box squat). Practical Implications: These results

show potential for tape applied to the low-back to be relatively low-cost tactile feedback that could reduce the risk of injury by altering squatting and lifting mechanics. Future work is needed to determine implications on training retention and transfer to other movement tasks, particularly those requiring movement through different motion planes (e.g., lateral bending and axial twisting).

Farwell, Kyle

A sense of direction: Investigating the fibre direction of interspinous ligaments in the human lumbar spine

Faculty Advisor: Dr. Judith Laprade, Dr. Timothy Burkhart
University of Toronto / Faculty of Medicine, Division of Anatomy

Background: Ligaments have complex loading patterns with non-uniform stress distribution that changes with joint angles. The arrangement of collagen fibres within a ligament determines its mechanical properties and function. The fibre direction of the interspinous ligament (ISL) in the lumbar spine has been a point of contention, and there appears to be a lack of consensus in the literature. Early anatomy textbooks depicted the fibre direction as posterocaudal, whereas others described the ISL's trajectory as posterocranial. These conflicting reports of fibre direction have led to different interpretations of the ISL's role in functional movements (e.g., forward flexion) and injury (e.g., disc herniation), particularly in the lumbar spine. Accordingly, the purpose of this research project was to investigate the fibre direction of the ISL in the lumbar spine. Methods: Twenty-five lumbar vertebral levels from five cadaveric specimens (de-identified) were dissected to expose relevant anatomical structures. Three-dimensional scans were taken of the specimens and imported into open-source medical imaging software (3D Slicer). It was hypothesized the ISLs in the lumbar spine traverse across the interspinous space posterocranially with respect to the cranial border of the inferior spinous process. Results: Fibres in the lumbar ISL predominantly ran posterocranially, relative to the cranial border of the inferior spinous process, in all specimens analyzed. Distinct ventral, middle and dorsal fibre bundles were apparent in all specimens, particularly upper lumbar levels. Impact: The ISL's posterocranial fibre direction suggests an anteroposterior (i.e., shear) resistance. Consequently, practitioners recommending therapeutic exercises that involve full lumbar flexion (e.g., supine knees to chest) must consider the resultant shear forces imposed. Based on results from this project, it appears ill-advised to prescribe full flexion stretches and exercises to patients with ISL injury or shear pathology (e.g., spondylolisthesis).

Fong, Matt

Can Trained Cyclists Pacing Ability be Predicted with Experience or Performance?

Faculty Advisor: Dr. Martin Gibala
Co-Author(s): Devin McCarthy
McMaster University / Department of Kinesiology

An endurance athlete's ability to pace themselves properly is vital to optimum performance, however the concept of pacing is complex and not well understood by researchers. The purpose of this experiment is to explore potential relationships to determine if a cyclist's experience, performance, or characteristics, can be used to predict their ability to evenly pace themselves in a time trial (TT). 25 Male and female trained cyclists will complete two visits.

During the first visit, subjects report their cycling experience, and undergo a peak oxygen uptake (VO2peak) test. During the second visit, cyclists complete a 20-minute TT on a Velotron cycle ergometer. The cyclists are instructed to maximize their average power output and no pacing instructions are provided. To prevent outside influence on pacing, the only metric available to the subjects is the time completed. Following the test, a coefficient of variation of the power output will be calculated and used to quantify pacing ability, where a lower coefficient would indicate more consistent pacing for a given participant. A correlation matrix will explore potential relationships between the coefficient of variation and VO2max, TT performance, age, and cycling experience. To quantify cycling performance, subjects power output will be expressed relative to their body weight. This project involves the secondary analyses of data being collected as part of a larger project on the effects of a ketone monoester supplement on time trial performance. Data has been collected on 7 out of a planned 25 total participants. I hypothesize that subjects who perform better in the TT, and those with more experience, will show less variation in their power output, indicating better pacing.

Fontaine, Abigayle

The Impact of Weight and Trimester on Balance and Gait in Pregnancy

Faculty Advisor: Dr. Eryk Przysucha
Lakehead University/ School of Kinesiology

Background: Pregnancy involves physical changes to accommodate for a growing fetus, those changes often affect a woman's ability to perform activities of daily living, as well as their mental state. Previous research suggested that weight and gestational age may impact the way women negotiate through their daily physical activities, but these issues have not been addressed sufficiently. As a result, this study examined if weight (under vs. over 155 pounds) and the trimester (before vs. after 28 weeks) had an impact on their ability to ambulate around and perform different balance tasks. Method: Twenty pregnant women (M = 29.7 years; SD = 3.6) were recruited via purposive sampling and they completed an online survey exploring their abilities to complete a variety of daily tasks involving balance and gait, across many different contexts. Also, open-ended questions were posed to gain more qualitative insights into their responses. Results: A series of independent samples t-tests showed predominantly no statistical differences between the levels of the variables manipulated. The descriptive data confirmed a trend where women were rather capable of performing the tasks, regardless of the individual constraints manipulated. The qualitative responses provided further insight into these issues, suggesting that although they are capable, it is clear that they expend a substantial amount of energy to avoid falling, resulting in fatigue and soreness, while coinciding with overall mental anguish and feelings of being "overwhelmed". Conclusion: Rather surprisingly, the results showed that variables such as weight and gestational age, which intuitively should have an impact, did not play a role in the way women performed activities of daily living, involving balance and gait. However, the qualitative responses indicated that the issues are more complex, and it is likely that a more extensive mix-methods design should be implanted in future research to disentangle the emerging behaviours.

Galperin, Rony

Biological sex as a contributor to the presence or absence of compensatory vasodilation - A pilot study

Faculty Advisor: Dr. Robert F. Bentley
Co-Author(s): Navraj S. Brar
University of Toronto / Faculty of Kinesiology and Physical Education

Background: During exercise, muscle blood flow (MBF) facilitates the matching of oxygen delivery to the muscle's oxygen demand. Our previous work identified that introducing a challenge to MBF during forearm exercise in males revealed two disparate groups of phenotypic vasodilatory responses - compensatory and non-compensatory vasodilation. Presently, it is unknown if females also present with disparate groups of phenotypic vasodilatory responses in response to challenges in MBF. Purpose: To test whether phenotypic vasodilatory responses will be present in females. Methods: Four healthy participants (25±6 yrs, 25% female) completed rhythmic constant load isometric forearm exercise (2:1 relaxation:contraction duty cycle). Following 5 minutes of exercise, steady manual brachial artery compression was applied to challenge oxygen delivery. Thirty seconds prior to completion of exercise, arterial compression was removed. Forearm blood flow (ml/min; brachial artery Doppler and Echo ultrasound) and mean arterial blood pressure (mmHg; finger photoplethysmography) were measured continuously. Compensatory vasodilation was identified when steady state vasodilation (Forearm vascular conductance (FVCRELAX (ml/min/100 mmHg) during the final 30s prior to completion of exercise when arterial compression was removed was greater than unchallenged exercise by 2.75%x1.96. Results: Manual arterial compression reduced mean blood velocity by 45%, $p<0.001$. The intensity of forearm exercise did not differ between unchallenged and challenged exercise (11±3 vs. 11±3 kg·s, $p=0.9$). Compensatory vasodilation was present in 75% of participants (n=3, 100% male) with an increase in FVCRELAX of 24±10% and absent in 25% of participants (n=1, 100% female) as FVCRELAX did not change (-1%). All participants had a small pressor response with challenged exercise (+3±1 mmHg, $p=0.02$). Conclusions: These preliminary findings align with previous literature of phenotypic vasodilatory responses in males. The absence of compensatory vasodilation in the female participant postulates the existence of disparate groups in females; however, further research is required with additional participants to elucidate this relationship.

Giacomin, Taylor

The impact of single-limb immobilization on muscle size and cross-sectional area: a potential proteo-lipid complex to mitigate muscle disuse-atrophy

Faculty Advisor: Dr. Stuart Phillips
Co-Author(s): T. Giacomin, C. Lim, and S.M. Phillips
McMaster University / Department of Kinesiology

Fortetropin is a natural source proteo-lipid complex from fertilized egg yolks. Fortetropin has been shown to lower serum myostatin, a negative regulator of muscle growth. We hypothesized that the ingestion of Fortetropin will attenuate a decline in muscle size during immobilization when compared to placebo. Nineteen, men (Age: 22 ± 3 years) were randomly assigned into either Fortetropin or placebo group and consumed one dose of their assigned supplement daily, for 6wk. The 6wk protocol was a 2-wk run-in, single-leg immobilization for 2wk, and recovery for 2wk. Participants underwent a dual x-ray absorptiometry scan (DXA), muscle ultrasound imaging, and isometric strength test at baseline(day 1), pre-immobilization(day 14), post-immobilization(day 28), and recovery(day 42). These methods were used to analyze body composition, muscle cross-sectional area (CSA) of vastus lateralis, and isometric strength, respectively. Due to time constraints, the randomization code of the

groups could not be broken, and we cannot comment on the effect of Fortetropin. For the purpose of this presentation, we analyzed changes from all participants, regardless of groups, at each time point and differences between legs. During immobilization, physical activity levels as steps (p=0.044) and METs (p=0.024) were reduced and returned to their normal level during the recovery phase. There was a reduction in muscle CSA during immobilization in the immobilized-leg (p≤0.001) but not in the non-immobilized-leg (p=0.121). The isometric strength decreased in the immobilized-leg during immobilization (p≤0.001); however, the strength in the non-immobilized-leg showed no differences (p=0.258). During 2wk recovery, the decreased CSA in the immobilized-leg did not recover (p=0.372), but the decreased isometric strength was recovered to baseline levels (p≤0.001). In conclusion, 2wk of single-leg immobilization decreased muscle and strength only in the immobilized-leg, and 2wk of recovery was insufficient to recover the atrophied muscle, whereas muscle strength was recovered. Fortetropin impact on disuse-induced atrophy remains unknown.

Harnack, Hope

The impact of osteoarthritis and frailty on cardiovascular disease risk in the Canadian Longitudinal Study on Aging

Faculty Advisor: Dr. Baraa K. Al-Khazraji
Co-Author(s): Yixue Mei, Baraa K. Al-Khazraji
McMaster University / Faculty of Science, Department of Kinesiology

Osteoarthritis (OA) is a progressive musculoskeletal disorder that is accompanied by an increased risk of cardiovascular disease (CVD). Age and sex differences in OA prevalence are known, with older individuals and women experiencing greater prevalence. More recently, there has been research suggesting a bi-directional relationship between OA and increased frailty. Similar to OA, frailty is also associated with an increased risk of CVD, with similar age and sex differences, where frailty is more prevalent in aging women. It is currently unclear how much of the increased CVD risk experienced by those with OA can be attributed to the disease alone, and to other known risk factors such as age, sex, waist-to-hip ratio (WHR), and frailty. Therefore, this study sought to understand the association between OA and CVD risk once these other known CVD risk factors are taken into account, and determine the impact of frailty on CVD risk in OA and non-OA populations. Our study used baseline data from the Canadian Longitudinal Study on Aging (CLSA), which collects parametric health data from subjects aged 45-85 years old. CVD risk and frailty were calculated using the INTERHEART CVD risk score, and a modified frailty index, respectively. Using multiple linear regressions, OA was found to be significantly associated with the INTERHEART CVD risk score before (p= 0.01) and after (p= 0.024) accounting for age, sex, and WHR. Once frailty was taken into account, the association between OA and the INTERHEART CVD risk score was no longer significant (p= 0.222). The Welch's t test yielded differences between those with and without OA in INTERHEART CVD risk score (p= 0.005) and frailty score (p< 0.001). These results suggest that frailty partly explains the association between OA and CVD risk, and that those with OA experience higher CVD risk and frailty than those without OA.

Hong, Ker-Yung

The Effects of Gingival Inflammation on Vascular Function

Faculty Advisor: Dr. Trevor J King
Co-Author(s): Avin Ghafari, Yi Xue Mei, Jourdyn E Forsyth, Kevin Wang, Michael Glogauer
McMaster University / Faculty of Science, Department of Kinesiology

The periodontium is a highly vascularized area of the mouth, and inflammation due to periodontitis invokes negative functional and structural changes in the vasculature. However, gingivitis, the less severe and more common form of periodontal disease, seems to have an unclear impact on cardiovascular function. Previous studies in the area have used subjective and arbitrary assessments of gingival inflammation to classify levels of gingivitis. Purpose: To investigate the effects of objectively measured mild gingival inflammation on vascular function. Methods: In this preliminary cross-sectional analysis, we recruited 11 young (18-30 years) and healthy participants (6 male, 5 female; final target N = 38). Using a mouth rinse, we collected the participant's saliva and quantified gingival inflammation using a hemocytometer to count oral neutrophils. Following 10 minutes of supine rest, blood pressure, artery stiffness (Pulse wave velocity) and endothelial function (brachial artery flow-mediated dilation) were measured. Analysis plan: Multiple linear regression will be used to predict artery stiffness and endothelial function from oral inflammation, age, and BMI. Conclusion: This study will help us understand the relationship between the onset of early periodontal disease and its effects on vascular function. Cardiovascular diseases are amongst the most prevalent causes of death in Canada, and early intervention in oral health may have an important role in the preventative care and management of cardiovascular and vascular diseases.

Huang, Yijia

Evaluation of muscle-specific disuse atrophy using magnetic resonance imaging during 14-days upper limb immobilization in young women

Faculty Advisor: Dr. Tyler Churchward-Venne
Co-Author(s): Freddie Seo
McGill University / Department of Kinesiology and Physical Education

Introduction: Periods of disuse (e.g., limb immobilization due to musculoskeletal injury) lead to rapid skeletal muscle atrophy. The susceptibility of different muscle groups of the upper arm to disuse atrophy is unclear. The aim of the present study is to assess the magnitude of skeletal muscle atrophy in the elbow flexors and extensors in response to 14-days of unilateral arm immobilization in young women. Methods: Twelve young women will undergo 14 days of immobilization of the left (non-dominant) upper-arm via an elbow-brace and sling. The contralateral non-immobilized arm will serve as an internal co-temporal control. Upper-arm muscle size and strength of both the elbow flexors and extensors will be assessed in both arms via magnetic resonance imaging (MRI) and BioDex dynamometry at baseline (day 0) and after 14 days of immobilization to quantify the degree of muscle atrophy and strength loss. MRI scans will be analyzed using MRtrix 3 software to calculate both anatomical cross-sectional area and volume. Predicted Results: In the immobilized arm, it is hypothesized that the elbow flexors will experience a greater decline in muscle size and strength than the elbow extensors. It is further hypothesized that the magnitude of the decline in muscle strength will exceed the magnitude of decline in muscle size following immobilization. No changes in muscle size or strength are expected in the contralateral non-immobilized control arm. Conclusion: This study will enhance our basic understanding of the response of skeletal muscle of varied function (i.e., elbow flexors vs. extensors) to disuse stimuli. It may also have practical implications in a clinical setting regarding application of appropriate countermeasures to counteract muscle decline.

Idrissova, Daniya
Social antecedents of emotion regulations among adolescent athletes
Faculty Advisor: Dr. Katherine Tamminen
Co-Author(s): Jeemin Kim
University of Toronto / Faculty of Kinesiology and Physical Education

Emotional responses can be changed using emotion regulation strategies (ERS), such as cognitive reappraisal (CR) and expressive suppression (ES). CR involves changing one's perspective on the emotion-inducing situation, and ES involves withholding emotions. Given that the use of appropriate ERS provides benefits to athletes (e.g., facilitates performance), it is important to examine factors, such as social norms, that could influence ERS use. Social norms could be divided into descriptive norms (DN; a perception of what others do) and injunctive norms (IN; a perception of what others approve of). Our study explored whether DN and IN produced by teammates and coaches influence adolescent athletes' use of CR and ES. We focused on adolescent athletes because the responsiveness to social rewards is heightened during adolescence. Athletes (N = 42) aged 14-18 years (M = 15.67), who play competitive team sports completed an online survey. From these responses, 22 identified as females, 19 as males, and one person has not indicated their gender. Survey measures included (1) demographics, (2) CR and ES use, (3) DN: teammates, (4) IN: teammates, (5) DN: coaches, (6) IN: coaches. Data analysis included descriptive statistics, frequency statistics, and correlations among variables. Results demonstrated that perceived use of CR and ES by teammates was correlated with athletes' use of CR ($r = .37$; $p = .022$) and ES ($r = .39$; $p = .018$), respectively. There was no statistically significant correlation between DN produced by a coach and athletes' ERS. The analysis of IN revealed that only perceived approval of CR by a coach significantly correlated with athletes' CR use ($r = .38$, $p = .018$). This study suggests that DN may affect ERS only when people have the same status (i.e., an athlete and teammates) but not different statuses (i.e., a player vs a coach).

Iftikhar, Manahil
The Effect of One Night of Acute Partial Sleep Deprivation on Endothelial Cell Viability and Endothelial Function
Faculty Advisor: Dr. Maureen MacDonald
Co-Author(s): Iftikhar M, Cherubini JM, MacDonald MJ
McMaster University / Faculty of Science

Background: Sleep deprivation (SD) is a risk factor and endothelial function is an indicator for cardiovascular disease (CVD). While chronic partial SD (PSD) is associated with reduced endothelial function and increased oxidative stress, the influence of acute PSD on endothelial function and oxidative stress remains unknown. Purpose: This study examined the effects of one night of acute PSD on endothelial cell viability and endothelial function in humans. We hypothesized that one night of acute PSD would decrease endothelial cell viability in response to H2O2-induced oxidative stress and reduce endothelial function. Methods: Nine young, healthy, male and female participants underwent three nights of normal sleep (NS) (7-9h), followed by one night of PSD (3h) in a repeated-measure design. Sleep duration was quantified subjectively and objectively. Cell viability was assessed in cultured umbilical vein endothelial cells (HUVECs) after ex-vivo exposure to 10% human serum obtained from NS and PSD, and after adding 500 μM H2O2 for 1h to stimulate oxidative stress. Endothelial function was measured in-vivo using flow-mediated dilation at the brachial artery (BA FMD). Results: Cell viability was unchanged between HUVECs cultured in NS-serum compared to

SD-serum, both in the absence (NS 111.0±14.3%, SD 97.2 ±11.3%, p = 0.297) and presence (NS 111.0±11.2%, SD 93.1±9.7%, p = 0.126) of H2O2 exposure. Further, the interaction between sleep condition and H2O2 exposure on cell viability was statistically insignificant (p = 0.495). Analysis is pending, however, we predict that cell viability will correlate with BA FMD. Significance: To our knowledge, this is the first study to examine the effects of acute PSD on the endothelium, both in vitro and in vivo. Findings will enhance the current understanding of the influence of sleep in CVD and may facilitate the development of therapeutic strategies to reduce CVD risk.

Karsan, Sameena

Exploring the impact of physical activity on the interaction between ADHD and depression

Faculty Advisor: Dr. Jennifer Heisz
Co-Author(s): Michelle Ogrodnik, Victoria Cirone
McMaster University / Faculty of Science, Department of Kinesiology

Attention deficit hyperactivity disorder (ADHD) is a prevalent neurodevelopmental disorder with symptoms including hyperactivity, inattention, and impulsivity. In addition, many also suffer from depression. Research suggests that there may be a bi-directional relationship between depression and ADHD due to common symptomology and overlapping brain structures affected in both disorders. However, more work is needed to unpack this relationship. Additionally, there are currently no therapies or prescriptions that can aid individuals who suffer from both disorders. The aim of the present study was to confirm whether depression is more prevalent among individuals with ADHD than neurotypical controls and whether experiencing both ADHD and depression has a negative impact on inhibitory control. Moreover, this study explored whether physical activity exerts a protective factor for inhibitory control deficits in individuals who present with both ADHD and depression. Sixty-eight young adults (18-35 years) were recruited to participate in our virtual study (ADHD = 34, non-ADHD = 34). The experimental protocol consisted of completing demographic questionnaires, conducting a physical activity interview, and finally completing cognitive tasks such as the Sustained Attention Response Task (SART) and the Stroop Task to measure inhibitory control performance. Preliminary findings suggest that individuals with ADHD exhibit significantly greater depressive symptoms compared to non-ADHD participants as measured by the Depression Anxiety and Stress Scale (DASS) ($p = 0.008$). Furthermore, individuals with ADHD and depression had significantly slower reaction times on the SART task compared to those with ADHD and no depression ($p = 0.017$). Finally, those with ADHD and depression who met the 150-minute physical activity guidelines scored significantly better on the Stroop task than those who did not ($p < 0.001$). These findings suggest that depression has the ability to exacerbate symptoms impacting inhibitory control deficits in people with ADHD; however, being more physically active may help mitigate these deficits.

Kelly, Ethan

Cardiac Rehabilitation Maintenance: Associations between exercise capacity, strength, quality of life and anxiety

Faculty Advisor: Dr. Sarah L West
Co-Author(s): Kevin Boldt, Sarah L West
Trent University / Kinesiology Program

Introduction: Cardiovascular diseases (CVD) are the second leading cause of death in Canada and are also associated with increased incidence of secondary outcomes such as anxiety and depression. Exercise is an effective treatment method to increase exercise capacity, strength, quality of life (QOL), anxiety and depression. However, there is a paucity of research that examines the correlation of these outcomes in CVD patients attending community-based exercise maintenance programs. Therefore, we examined exercise capacity, strength, QOL, and state anxiety/depression in three case studies of individuals living with CVD attending a community-based exercise maintenance program. Methods: Participants completed the Short-Form 36 (SF-36) to assess quality of life and the Hospital Anxiety and Depression Scale to determine state anxiety and depression. Exercise capacity was measured using the 6-minute walk test (6MW) and strength was assessed with a hand grip dynamometer. Results: Each of the 3 participants had normal scores for state anxiety and depression except one with borderline increased state-depression. Participants also scored close to or above average scores for all domains of the SF-36. Compared to normative values of 6MW in healthy individuals all participants performed lower than their age group (mean= 328 metres, standardized norm 475.3□93 metres). However, participants performed better than established gender and age-related norms for the grip strength test (mean=69.5 kg, standardized norm 26.1□8.85 kg). Conclusions: In this case study of 3 individuals living with CVD attending a community-based exercise maintenance program, state anxiety/depression and QOL scores were similar to healthy normative values. While a reduced 6MW suggests impaired cardiorespiratory capacity, strength was above normative ranges. Future randomized controlled trial studies should examine the impact of community-based exercise maintenance programs on QOL, state depression/anxiety to determine causation.

Khouzam, Anna

A Critical Analysis of Canada's NHL Teams' Environmental Initiatives

Faculty Advisor: Dr. Adam Ali
University of Toronto / Faculty of Kinesiology and Physical Education

This paper analyzes the environmental initiatives and policies of the seven Canadian National Hockey League teams. Hockey in Canada serves important cultural significance yet, due to the significant impact of climate change, it will become increasingly difficult to play with warming temperatures (IPCC report, 2022). The relationship between the ongoing climate crisis and the NHL has recently been amplified by the impact of the COVID-19 pandemic. Disrupted teams' travel patterns, the halting of arena food production, and the reduction in aggregate energy consumption reshaped the sport, albeit temporarily, in a profound way. Such changes demonstrated how the League can rapidly transform its core operations in response to a global crisis. The way in which the League responded to the global pandemic out of 'necessity' sparked the question; how can the League or Canadian teams intentionally respond to the climate crisis? Utilizing the theory of ecological modernization, I conducted a critical analysis of the major environmental initiatives utilized by each team, including the adoption of Adidas' ADIZERO Primegreen recycled jerseys, the purchasing of carbon offsets, the sponsoring of local rinks to convert to non-ozone depleting refrigerants, and the hosting of Go Green Nights. Preliminary findings illustrate the shortcoming of the teams' environmental initiatives, and the environmental and human consequences of those shortcomings. As a result, I argue that the Canadian NHL franchises acquire financial and social benefits through practices of greenwashing in regard to their environmental initiatives.

I conclude by making recommendations to improve how the teams can enact more meaningful environmentally focused programming, empower players to engage with deeper forms of athlete environmental activism, and encourage fans to collectively use their influence to demand legitimate environmental accountability from the organizations they support.

Kottaras, Steven

Bone Turnover Markers and Osteokines in Adolescent Female Athletes of High-impact and Low-impact Sports Compared with Non-athletic Controls

Faculty Advisor: Dr. Panagiota Klentrou
Co-Author(s): Joshua Stoikos, Brandon J. McKinlay, Izabella A. Ludwa, Andrea R. Josse, Bareket Falk, Panagiota Klentrou
Brock University / Faculty of Applied Health Sciences

This study examined differences in resting concentrations of markers of bone formation and resorption and osteokines between female adolescent (12-16 years) swimmers, soccer players and non-athletic controls. Resting, morning blood samples were obtained after an overnight fast from 20 swimmers, 20 soccer players and 20 non-athletic controls, matched for age. Carboxyl- terminal crosslinking telopeptide of type I collagen (CTX), amino-terminal propeptide of type I collagen (P1NP), total osteocalcin (OC), sclerostin, osteoprotegerin (OPG), and receptor activator of nuclear factor kappa B ligand (RANKL) were analysed in serum. After controlling for somatic maturity and percent body fat, there were no significant differences between swimmers and non-athletic controls in any of the measured markers. In contrast, soccer players had significantly higher P1NP (89.5 ± 25.6 ng·ml-1), OC (60.0 ± 32.2 ng·ml-1) and OPG (1052.5 ± 612.6 pg·ml-1) compared to both, swimmers (P1NP: 66.5 ± 20.9 ng·ml-1; OC: 24.9 ± 12.5 ng·ml-1; OPG: 275.2 ± 83.8 pg·ml-1) and controls (P1NP: 58.5 ± 16.2 ng·ml-1; OC: 23.2 ± 11.9 ng·ml-1; OPG: 265.4 ± 97.6 pg·ml-1), with no differences in CTX, sclerostin and RANKL. These results demonstrate that regular participation in high-impact sports in adolescent girls improves bone metabolism specifically by increasing markers of bone formation.

Koussiouris, Anessa

Exploring at-home assessment of postprandial glucose metabolism in males and females

Faculty Advisor: Dr. Jenna Gillen
Co-Author(s): Daniel West, Stephanie Estafanos, Alexa Govette, Beata Friesen, Daniel Moore
University of Toronto / Faculty of Kinesiology and Physical Education

Introduction: Following the ingestion of carbohydrate, blood glucose concentration and rates of whole-body glucose oxidation increase. Exaggerated increases in postprandial blood glucose or reduced rates of glucose oxidation can be indicative of metabolic disease and insulin resistance. The aim of this project was to determine the feasibility of at-home assessment of glucose metabolism and to explore whether there are differences between males and females in postprandial blood glucose concentration and glucose oxidation. Methods: Seventeen healthy males (n=10; 24±4 yr; 22±2 kg/m2) and females (n=7; 25±8 yr; 21±2 kg/m2) completed a 3 h at-home metabolic trial with an investigator via Zoom. Supplies for physiological measurements were delivered to participants in advance and body

composition measurements were obtained via bioelectrical impedance. Following a 12 h overnight fast, participants consumed a 75 g oral glucose tolerance test (OGTT) beverage enriched with 75 mg (0.1%) [U-13C6] D-glucose. Breath and finger-stick capillary samples were collected by participants while fasted, and every 30-min postprandially for 3 h. Capillary glucose concentration was determined by participants via a glucometer and subsequently analyzed for postprandial glucose peak, mean, and area under the curve (AUC). Breath samples were returned to the laboratory and analyzed via isotope ratio mass spectrometry for 13CO2 enrichment and glucose oxidation. Results: At-home data collection has been successfully completed for seventeen participants. Postprandial glucose mean, peak and AUC were not different between males and females ($p>0.05$). Preliminary analysis (n=6 each) revealed lower postprandial glucose oxidation in males relative to females, as determined by cumulative dose recovery of the [U-13C6] D-glucose tracer ($P<0.05$). Our findings suggest that at-home assessment of postprandial glucose metabolism and indices of disease risk is feasible. The observed sex-based differences in postprandial glucose oxidation warrant further investigation.

Lau, Kyle

Testing the relationship of the bilateral force and endurance deficit in humans

Faculty Advisor: Dr. Stuart Phillips
Co-Author(s): Aaron Thomas, Troy Hornberger
McMaster University / Faculty of Science

Aerobic and resistance exercise training are distinct forms that lead to markedly different phenotypic adaptations in skeletal muscle. Both forms of exercise can be performed with one (unilateral) or both (bilateral) limbs at a time. Although unilateral exercise is not a new concept, its use in conditioning and sport-specific training has grown in popularity. However, there is controversy regarding the maximum force produced when comparing unilateral and bilateral exercises. This concept is known as the bilateral deficit, where the combined force produced in unilateral exercise (each limb summed) is greater than when the same exercise is performed bilaterally. Interestingly, this phenomenon has been observed for not only resistance exercise, but also while performing aerobic exercise. There were two main purposes of the current investigation. The first was to compare the "force deficit" phenomenon of resistance and aerobic exercise, by examining the disparity between the unilateral:bilateral peak force and VO2peak testing outcomes achieved while performing a one-repetition maximum or VO2peak test, respectively. The second aim was to examine the relationship of "force deficit" between aerobic and resistance exercise within an individual. Alternatively phrased, does the "force deficit" measured during resistance exercise share a positive, negative, or no correlation with aerobic exercise. We recruited n=8 individuals to perform maximal unilateral and bilateral exercises. Resistance exercise was performed via leg press and leg extension. Aerobic exercise was performed on a cycle ergometer adapted for unilateral activity. Statistical testing will be done using SPSS data analytic software. A two-tailed t-test will be used to determine if the unilateral:bilateral ratio is distinct between peak aerobic and resistance exercise measures. Additionally, Pearson correlation coeficients will determine if unilateral aerobic and resistance exercise capacity (unilateral/bilateral %) share a relationship within an individual.

LeGood, Nigel

The Effects of 3-Days Step Reduction on Leucine Retention and Anabolic Resistance

Faculty Advisor: Dr. Daniel Moore
Co-Author(s): Paul Babits, Hugo Fung, Matthew Lees
University of Toronto / Faculty of Kinesiology and Physical Education

Skeletal muscle and other forms of lean body mass (LBM) are vital metabolic tissues optimized by a healthy lifestyle revolving around consistent physical activity (PA). The ability to maintain and synthesize these tissues is interrupted by bouts of sedentary living that initiates the development of anabolic resistance; a reduced ability to utilize dietary amino acids (AA) for tissue synthesis. Being that AA's cannot be stored within the body, their metabolic fates are either retention for tissue protein synthesis or irreversible oxidization, the latter of which can be assessed by pairing the ingestion of stable isotope tracers with continuous breath sampling. As such, we tested whether a 3-day period of step reduction (<2000 steps/day) lacking PA would alter AA retention. Participants ingested a carbohydrate (0.75g/kg BM); and AA (0.25g/kg BM; composition modelled-off egg protein) containing beverage, with 5% leucine enriched with L-[1-13C] leucine. Immediately following ingestion, breath samples were collected periodically (20-30 min. intervals) over a 6-hour span. AA oxidation was calculated using 13CO2 enrichment in breath samples and VCO2 estimates from body surface area. It is predicted that greater inactivity during step reduction will result in greater AA oxidation and therefore a greater extent of anabolic resistance development. Four male participants between the ages of 18-30 provided preliminary data as we continue to reach the recruitment target (n = 24). The current sample size is too small to draw meaningful conclusions, as the results suggest no significant relationships between relative decreases in activity level and leucine retention ($p = 0.22$). Continuing to explore the efficacy of the tracer and breath test to screen for the development of anabolic resistance may yield a useful research and clinical tool if found to be a valid method.

Leverett, Jessica
Do receptors in the skin contribute to the perception of movement in the hand?
Faculty Advisor: Dr. David F. Collins
Co-Author(s): Isaac Porozni, Lucas Bronder
University of Alberta / Faculty of Kinesiology, Sport & Recreation

Feedback from receptors in muscles, joints and the skin provide information about limb movement. Of these receptors, muscle spindles are thought to be most important for the conscious perception of movement, however, the role of receptors in the skin is less clear. Thus, the purpose of this project was to assess the extent to which receptors in the skin contribute to the conscious perception of movements of the hand. We hypothesised: 1) electrical stimulation of receptors in the skin will cause participants to perceive movement (when the hand is not moving), 2) participants will perceive flexion of the fingers when the stimulation is on, and 3) higher stimulation frequencies will produce stronger illusions of movement. Participants were seated with their hands relaxed over the edge of a stable surface with eyes closed. Electrical stimulation was used to activate receptors in the skin on the back of the right hand to mimic their discharge during movement, to create illusions of movement. Stimulation was delivered over a range of frequencies (up to ~100 Hz) for 6 seconds; frequency was increased to a maximum over 3 seconds, and decreased over 3 seconds. 10 trains were delivered with ~10 seconds between. When participants perceived movement, they were instructed to mimic it with the left hand, which was tracked by movement markers and cameras. While the stimulation was on, all participants tested thus far perceived movements. In some participants, the movement perceived was flexion of the

fingers. However, in others, extension, abduction, and adduction were perceived as well, which may be due to minor differences in placement of the electrodes. Despite this, as hypothesized increasing frequency created the illusions of faster and larger movements. These data support the idea that receptors in the skin contribute to our conscious perception of movements of the hand.

Mahmood, Sobia

Monitoring Athlete Internal Load Using Introspective Measures for Overtraining Prevention in Collegiate Female Basketball Players

Faculty Advisor: Dr. Jennifer Heisz, Dr. Dylan Kobsar
Co-Author(s): Emma Waddington, Joshua Keogh
McMaster University / Faculty of Science, Department of Kinesiology

Overloading is used to induce positive adaptations and improve sports performance, but requires a fine balance between training and rest. High training load compounded with inadequate rest can put athletes at risk for injury, non-functional overreaching, and negative mental health repercussions. Monitoring training load is key in maintaining this balance. Yet, the majority of current literature has focused on measures of the external loads placed on the athlete, with few studies assessing the impact of internal load (e.g., introspective state), resulting in critical information regarding performance and injury risk being missed. To address this gap, the current study recognized athletes as a whole by tracking the psychological and internal load status of the McMaster's women's varsity basketball team (n=16) across two months of pre-season and four months of in-season training. After each practice, internal workload was assessed using ratings of perceived exertion in line with existing literature. Players reported their academic workload, and completed a questionnaire on their introspective state using the six-item Spielberger State-Trait Anxiety Inventory (STAI-6), modified Overuse Injury Questionnaire by the OSTRC, and Feeling Scale. Data was analyzed to assess whether introspective states modulate perceived workload. Preliminary results show that subjective sport-related pain across the 6 months (pre- and in-season) was significantly correlated with athlete internal load ($p = 0.023$), while academic workload and anxiety were not significantly correlated ($p = 0.553$-0.915). The discordant findings between these measures of introspective state may be partially attributable to a 62% lower reporting rate of the STAI-6 section compared to the Feeling Scale. These findings are consistent with the current literature supporting a correlation between pain and internal load. Moreover, the lack of willingness to answer anxiety-related questions may hint to an internalized mental health stigma within the sports community suggesting the need for better mental health education and awareness.

Malouka, Sabrina

Examining associations between using social media workouts, mental health and exercise motives during the COVID-19 pandemic

Faculty Advisor: Dr. Catherine M. Sabiston
Co-Author(s): Sabrina Malouka, Kristen M. Lucibello, Lamia Firasta, Madison F. Vani, Catherine M. Sabiston
University of Toronto / Faculty of Kinesiology and Physical Education

The COVID-19 pandemic and subsequent lockdown restrictions have decreased access to gyms and physical activity spaces. Motivated by the desire to socialize and improve mood, health and physical appearance, many have turned to social media for at-home exercise alternatives. Little is known about the different motives for using social media workouts and the associations with mental health, and if following fitness influencers is associated with different motives or mental health. This study examined the associations between use of social media workouts, mental health and exercise motives. Participants (N = 300; 65% women, Mage ± SD = 23.60 ± 3.57) completed self-report questionnaires to assess their social media workout use, anxiety and depression symptoms, and exercise motives. The majority (61%) of the sample reported using social media workouts at least once a week. No differences in mental health were found between those who use versus do not use social media workouts [$F(2, 297) = .14$, $p = .87$]. Among those who use social media workouts, higher depressive symptoms were associated with higher appearance motives for social media workouts [$F(1, 182) = 5.45$, $p = .021$]. Higher anxiety symptoms were also associated with higher appearance motives [$F(1, 182) = 7.75$, $p = .006$] and social motives [$F(1, 182) = 4.83$, $p = .029$] for social media workouts. The participants who reported following fitness influencers (33%) reported higher appearance ($p < .001$), fitness ($p = .005$) and stress-related ($p = .044$) motives for engaging in online workouts [$F(4, 179) = 4.33$, $p = .002$] compared to individuals who do not follow fitness influencers. These results highlight the link between anxiety and depression symptoms and appearance motives for social media based exercise, as well as the link between following fitness influencers and appearance motives. Implications for body image and exercise maintenance will be discussed.

Mamajiwalla, Nadeem

Quantifying the pressure and force distribution on the perineal region during hip arthroscopy when using a perineal post: A potential mechanism of pudendal nerve palsy

Faculty Advisor: Dr. Timothy Burkhart
University of Toronto / Faculty of Kinesiology and Physical Education

Introduction: Approximately 1.8% of hip arthroscopy patients are diagnosed with pudendal nerve palsy (PNP) that causes external genital numbness and sexual dysfunction. Prolonged compression of the pudendal nerve against the perineal post during surgery may be a risk factor for PNP. The purpose of this study was to quantify the biomechanical properties of the perineal region in response to compression during hip arthroscopy. Methods: Twelve hip arthroscopy patients were recruited (mean [SD] age = 37[14] years) at Women's College Hospital. A Tekscan pressure sensor (Tekscan Inc. South Boston, MA) was fastened to the perineal post. Pressure data were collected from the time of the traction force application to the end of surgery. The Tekscan data were analysed by creating a region of interest isolating the perineal region from other contact areas; the gluteal folds were used as a relevant border landmark. Peak pressure, peak force, and contact area were extracted from each of the respective data sets, along with the total time of traction. Results and Discussion: The mean (SD) peak force and pressure were 903 (464) N and 23.8 (7.2) kPa, respectively. The mean (SD) contact area was 0.36 (0.16) m2. Traction was applied for an average of 72.6 (13.7) minutes. The forces measured on the perineal region reported here are almost three times higher than the 372 N (52% body weight) reported at the bicycle seat and perineal interface. These forces are likely large enough to generate injuries to the perineal region. Significance: PNP can have devastating long-term consequences for both male and female patients

undergoing HA. The data reported in this study quantify, for the first time, the forces, pressures, and contact areas on the perineal region imparted by the perineal post. With this understanding, improved surgical approaches can be designed to reduce the risk of PNP.

Matsubara, Michele

Micromotion of rectangular and cylindrical bone-blocks in ACL reconstruction using patellar tendon grafts.

Faculty Advisor: Dr. Timothy Burkhart
University of Toronto / Faculty of Kinesiology and Physical Education

Anterior cruciate ligament reconstruction (ACLR) using a bone-patellar tendon-bone (BPTB) graft is a common treatment for ACL injuries. In order to mitigate some of the complications associated with this graft type (e.g. residual post-ACLR laxity, poor bone-block integration) Shino et al. (2005) developed a BPTB ACLR technique that uses rectangular bone tunnels rather than the traditional cylindrical tunnels. While this has shown positive results across various measures, the bone-block motion within the tunnels has not been investigated. Therefore, the purpose of this study was to quantify and compare bone-block motion within the femoral tunnel between cylindrical and rectangular techniques. CT scans of 16 cadaveric knee specimens, which were randomized into either a rectangular (n=8) or cylindrical (n=8) BPTB ACLR group, were used for this study. The treated specimens were subjected to three loading conditions (anterior translation, internal rotation, pivot shift) at four knee flexion angles (0˚, 30˚, 60˚, 90˚) by a CT-compatible knee joint stimulator. For each loading condition, a scan was taken in the neutral-state (i.e., unloaded) followed by the loaded-state. The pairs of neutral and loaded-state scans were imported into an image analysis software (3D Slicer). 3D models of the bone-blocks were created and registered to compute the difference in their positions. This difference in position, or bone-block movement, was quantified as three-dimensional translations and rotations. To date, eleven specimens have been analyzed (six cylindrical and five rectangular) for the 0˚-anterior transition condition only. Preliminary results show that the largest translations occurred axially within the bone tunnel with a mean (SD) translation of 0.178 (0.109) mm and 0.194 (0.131) mm in the rectangular and cylindrical groups, respectively. This appears to be consistent across specimens. The largest rotations for the rectangular and cylindrical groups were in the z-axis with a mean (SD) of -0.742 (0.222)˚ and -1.053 (1.843)˚, respectively.

Mattook, Keira

The effect of 8 weeks of local lower limb heating on central and peripheral arterial stiffness in recreationally active, healthy, young males and females

Faculty Advisor: Dr. Maureen MacDonald
Co-Author(s): Keira Mattook, Jem Cheng, Maureen MacDonald
McMaster University / Faculty of Science, Department of Kinesiology

Introduction: Improvements in cardiovascular health through reductions in arterial stiffness have been elicited following chronic, repeated exposure to whole body heating. However, whole body heating interventions lack feasibility and affordability for long-term use, which has led to the development of local heating applications. Although local heating induces transient reductions in arterial stiffness, it is unknown how the vasculature will respond following a chronic local heating regime. The purpose of this study was to determine the effects of 8 weeks of lower limb heating compared to a control condition on central and

peripheral arterial stiffness in recreationally active healthy, young males and females. Methods: Sixteen participants were allocated into either the local heating (HEAT) or control (CON) group (n=8/group). HEAT consisted of 45 minutes of 42˚C hot water lower limb immersion to the ankle level using a commercially-available footbath, 3 times per week for 8 weeks. Both HEAT and CON were asked to maintain current lifestyle habits for the duration of the study. Arterial stiffness was assessed centrally via carotid to femoral pulse wave velocity (cfPWV) and peripherally via femoral to foot pulse wave velocity (ffPWV), at weeks 0, 2, 4, 6 and 8. Results: No significant group or time differences in cfPWV or ffPWV were observed ($P > 0.05$). Discussion: These findings demonstrate that chronic lower limb heating does not improve arterial stiffness when compared to a control group. Greater increases in core body temperature, sample size and study duration may be required to induce the structural vascular alterations necessary to change arterial stiffness. Future research should investigate the effects of duration and intensity of local heating to determine if there is a protocol that can elicit reductions in arterial stiffness.

McGovern, Conor

Moderating Factors of the Relationship between Personal Standards Perfectionism and Evaluative Concerns Perfectionism in Cross-Country Skiers

Faculty Advisor: Dr. John Gotwals
Lakehead University/ School of Kinesiology

Background: Perfectionism is common among high-performance athletes and can result in both positive and negative outcomes. There are two dimensions to perfectionism. Evaluative concerns perfectionism (ECP) is related to negative outcomes (e.g., depression, burnout, anxiety). Personal standards perfectionism (PSP) is generally related to positive outcomes (e.g., engagement, positive affect, self-confidence) when ECP is controlled for, but mixed outcomes when measured independently. The two dimensions are positively correlated. Therefore, maximizing the positive outcomes of PSP, while minimizing the associated negative outcomes of ECP is important. To date, the personal and environmental factors that moderate the relationship between PSP and ECP have not been examined. Athletic identity, self-concept clarity, and perfectionistic climate are factors that may strengthen or weaken the relationship between PSP and ECP. Objective: The purpose of the study is to examine the moderating effects of athletic identity, self-concept clarity, and perfectionistic climate on the relationship between PSP and ECP in high-performance cross-country skiers.
Hypotheses: It is anticipated that the relationship between PSP and ECP will be stronger when self-concept clarity is low, athletic identity is high and a highly perfectionistic climate exists. Method: Approximately 100 high-performance cross-country skiers will be recruited to complete an online survey (SurveyMonkey). Following informed consent, participants will complete the Sport-Multidimensional Perfectionism Scale 2, the Multidimensional Inventory of Perfectionism in Sport, the Athletic Identity Measurement Scale, the Self-Concept Clarity Scale, and the Perfectionistic Climate Questionnaire- Sport. Significant moderation effects will be probed through multiple regression analysis, visual depiction, and the Johnson-Neyman technique. Conclusion: Identifying the factors that moderate the PSP-ECP relationship will help to understand when perfectionism is adaptive and when it is maladaptive. It will also aid in identifying athletes at risk of negative outcomes and provide guidance in minimizing the negative effects of ECP in perfectionistic athletes and athletes in perfectionistic environments.

Modi, Akshat
AAV9-mediated KCC2 Upregulation Improves Neurological Recovery Following Traumatic Spinal Cord Injury
Faculty Advisor: Dr. Michael Fehlings
Co-Author(s): Mohammad-Masoud Zavvarian
University of Toronto / Division of Anatomy

Background: Traumatic cervical spinal cord injury (SCI) is a life-threatening and life-changing event that results in sensorimotor impairment and autonomous dysfunction despite the presence of spared neural tissue at the lesion site. The presence of spare neural tissue could be a potential therapeutic target for most SCI patients, however, their inability to maintain functional neurotransmission exhibits a major challenge in endogenous recovery and effectiveness of rehabilitation-based treatment. While emerging preclinical data suggest that the neuron-specific K+/Cl- cotransporter 2 (KCC2) downregulation plays a major role in the inactivation of spared neural tissue after SCI, the impact of its upregulation remains unexplored. Objective: The aims of the study were: (1) examining the ability of KCC2 gene therapy to alter SCI-induced synaptic neuroplasticity, its impact on the (2) functional improvement, and (3) the neuroanatomical alterations. Methods: Female adult Wistar rats received a clip compression-contusion SCI at the C6/C7 level of the spinal cord. Injured rats were randomized, in a blinded manner, to receive AAV9-mediated KCC2 or GFP expression. Animal mass and neurobehavioural assessments including open field BBB, inclined plane, and grip strength were performed on day 3 and weekly until week 12 post-SCI. At 12 weeks post-SCI, additional neurobehavioral analyses including FLAS score, Von Frey, and CatWalk gait analysis were performed. Results: The KCC2 treatment resulted in significantly longer stride length for forelimb and hindlimb, increased inclined plane angle, stronger grip strength, and improved FLAS and open field BBB score as compared to GFP and Sham group. No significant differences were observed when comparing outcomes between the swing speed of the forelimb and hindlimb. Conclusion: Enhancements in overall gait pattern, hindlimb-forelimb coordination, trunk stability, and gross muscle strength signifies that the therapeutic treatment of KCC2 upregulation has the potential to improve the quality of life of individuals suffering from SCI.

Mostofinejad, Amin
Robotic guidance and the timing accuracy of a circle-drawing task - A feasibility study
Faculty Advisor: Dr. Luc Tremblay
Co-Author(s): Dr. Rachel Goodman, and Dr. Tristan Loria
University of Toronto / Faculty of Kinesiology and Physical Education

Did you know that robots can help you learn motor skills? Indeed, robotic guidance can lead to significant improvements in spatial aspects of motor performance (e.g., steering: Marchal-Crespo et al., 2010; trajectory tracing: Williams et al., 2016;). Moreover, mixing robotic guidance with unassisted practice clearly facilitates endpoint accuracy in a golf putting task (Bested et al., 2019b). The suggested mechanism for optimal motor learning with mixed practice is the reference-of-correctness provided during robotic guidance and error detection during unassisted trials (see Bested et al., 2019a). However, it is not known if this benefit of mixed guidance extends to timing accuracy (i.e., synchrony). The rationale for such a question partly stems from music therapy studies, which have yielded improvements in upper-limb function in patients with a stroke (see Haire et al., 2021). Thus, the current study

will ascertain if mixing robotic guidance and unassisted practice with a rhythmic task can lead to a more accurate synchronization compared to unassisted practice only. Participants will be asked to perform circle-drawing sequences while receiving robotic guidance on 0% or 50% of acquisition trials. Also, a pre- and post-test will be performed without guidance. Participants will be asked to synchronize the completion of each circle with an auditory beep. The main dependent variable will be the difference between the actual and desired completion time (in ms), for each circle in each sequence. Because robotic guidance is known to provide a reference of correctness, it is hypothesized that participants who receive robotic guidance will exhibit more accurate synchronization in the post-test (i.e., a smaller difference between actual and desired duration), as compared to those only engaged in unassisted practice. Ultimately, if effective, the integration of robotic guidance and music therapy could be extended to trials in clinical settings and rehabilitation programs (e.g., patients with a stroke).

O'Connell, Sarah

Injury and Recovery in University Athletes and Association with Eating Behaviours

Faculty Advisor: Dr. Sarah L West
Co-Author(s): Ingrid Brenner, Sarah L West
Trent University / Biology/Biomedical Program

Introduction: Athletes are at a greater risk of developing disordered eating (DE) behaviours than non-athletes. DE is relatively well understood in the context of the female athlete triad, with current literature suggesting that there are associations between DE and injuries in female athletes. However, associations between DE, injuries, and injury recovery have been understudied, particularly in male athletes. Our primary objective is to determine if associations between DE, injuries, and injury recovery exist in male and female varsity athletes. Methods: In this cross-sectional study, varsity athletes from Trent University were recruited to complete an anonymous online survey. The survey included questions regarding demographics, injury occurrence, and injury detail including type, length, and frequency, and the Disordered Eating Screen for Athletes (DESA-6). The DESA-6 is scored, and a score of 3 or greater is indicative of DE. Results: We currently have collected data from 60 varsity athletes and are completing the process of data analysis. Athletes will be grouped by DE status and injury data will be compared using T-tests. Multiple regression analysis will be used to determine whether injury frequency and length of recovery could be explained by DE. Gender and sport type will also be included in this model. Final data will be presented at the conference. Conclusions: In addition to contributing to research on DE and injuries in both male and female athletes, this data may be used to inform educational sessions with athletes supporting health eating behaviours and injury recovery.

Oancea, Gabriela

Can we acutely train the visuomotor pathways of our non-dominant eye?

Faculty Advisor: Dr. Luc Tremblay
Co-Author(s): Damian Manzone
University of Toronto / Faculty of Kinesiology and Physical Education

Some coaches opt to force athletes to practice using both their dominant and non-dominant sides. However, it is not known how the online control of an action can improve when using our non-dominant eye. We do know that, when performing upper-limb movements with the

dominant hand, humans tend to be more effective in using information from the dominant eye to implement online trajectory amendments (Manzone et al., 2018). The current study investigated whether the visuomotor pathways associated with the non-dominant eye can be acutely trained and exhibit an improved ability to make online corrections when performing upper-limb pointing movements. Participants performed 30 cm reaching movements to a target while wearing liquid crystal goggles. Vision was provided to both eyes before the movement and to one eye for another 20 ms early in the trajectory. To assess online control, an imperceptible target jump was introduced after movement onset on one third of trials. On the first day, participants were tested for eye dominance during a pre-test, which was based on their movement correction amplitude during target jump trials for each eye. Then, participants trained for 45 minutes using their non-dominant eye (i.e., acquisition). Both eyes were tested again immediately after acquisition as well as 24 hours later (i.e., post-tests). It was expected that after acquisition, performance when seeing with the non-dominant eye would improve (i.e., more online limb trajectory amendments). That is, movement endpoints when seeing with the non-dominant eye on jump trials should reveal a larger movement correction amplitude in the post-tests compared to the pre-test. These results could suggest that the visuomotor pathways of the non-dominant eye can undergo acute neuroplastic changes and improve their capacity to support online control mechanisms.

Porozni, Isaac

Optimising stimulus pulses to recruit sensory axons for transcutaneous spinal cord stimulation.

Faculty Advisor: Dr. David F. Collins
Co-Author(s): Jessica Leverett & Lucas Bronder
University of Alberta / Faculty of Kinesiology, Sport & Recreation

Transcutaneous spinal cord stimulation (tSCS) is a promising new application to improve voluntary movements for people experiencing a spinal cord injury (SCI). tSCS is applied through the skin of the back and targets sensory axons in the dorsal roots before they enter the spinal cord. Stimulating these axons can produce contractions via reflexes, also known as dorsal root reflexes (DRRs). Since tSCS only works if the dorsal roots are stimulated, it would be recommended to use the most effective stimulus pulse to activate them. When stimulating peripheral nerves, stimulus pulses with wider phases more effectively recruit motor and sensory axons than narrow phases. Therefore, the purpose of this project was to evaluate the effect if this effect of phase duration held true for DRRs. We hypothesised that wider phase pulses (0.5ms) would more effectively stimulate axons in the dorsal roots and produce contractions in leg muscles than narrow phase pulses (0.125ms). Using the Ebramed nero9 stimulator these 2 pulses were delivered through electrodes placed on the back and hips. Electromyography was used to record the DRR in 4 leg muscles. 40 pulses were delivered at a range of intensities to compare how effectively axons were recruited using both pulses. We found that wider phase duration pulses activated all 4 leg muscles at a lower stimulation intensity than the narrow phases. In fact, in some participants, the narrow phase duration pulses did not evoke a response even at maximum intensity. We recommend that when using tSCS to target sensory axons in the dorsal roots, wider phase pulses are better than the more frequently used narrower phase pulses. A next step for this work is to test the idea that wider-phased pulses will also more effectively reduce paralysis and improve voluntary movements for people experiencing a SCI.

Pratola, Michelle
The effects of ankle taping on measures of ground reaction forces and jump height during a sport-specific vertical jump in youth basketball players.
Faculty Advisor: Dr. Paolo Sanzo
Lakehead University/ School of Kinesiology

Background: Ankle sprains are the most common injury among youth basketball players with inversion sprains accounting for 90% of injuries. Ankle tape has been shown to reduce the risk of sustaining an ankle injury in basketball players by reducing inversion range of motion and altering sport performance. Limited research, however, exists regarding the effect of tape on sport-specific jumping tests and ground reaction forces (GRF). Objective: To investigate the effects of ankle taping versus no tape on GRF and jump height. Methods: Participants were recruited through purposive sampling and completed a basketball specific vertical jump test without and with zinc oxide tape. Mean sway velocity (SV), 95% ellipse area, and path length were measured using the AMTI© force platform and vertical jump height using a Vertec© device. A paired t-test with a significance level of $p<.05$ was used for analysis. Results: 23 individuals participated (11 females, 12 males; aged M=15.22 years; height M=171.43 cm; mass M=64.72 kg). There was a statistically significant decrease in jump height with tape (M=57.33 cm) compared to without tape (M=58.84 cm), 95% CI [2.74, 0.28], $t(20)=-2.56$, $p<.05$, $d=.56$; statistically significant decrease in 95% ellipse area with tape (M=1.04 in.in) compared to without tape (M=1.30 in.in), 95% CI [0.50, 0.02], $t(22)=-2.26$, $p<.05$, $d=.47$; statistically significant decrease in SV with tape (M=9.25 ft/sec) compared to without tape (M=13.39 ft/sec), 95% CI [7.47, 0.27], $t(22)=-2.22$, $p<.05$, $d=.46$; and a statistically significant decrease in path length with tape (M=47.61 in) compared to without tape (M=66.97 in), 95% CI [37.37, 1.33], $t(22)=-2.23$, $p<.05$, $d=.46$, with a medium effect size for all variables. Conclusion: The application of taping the ankle resulted in decreased jump height performance and increased ankle stability at landing. Future research could explore different basketball skills or taping techniques and types of tape as a preventative method.

Roach, Jada
Track and Field Performance Trends Over the Four Year Olympic Cycle
Faculty Advisor: Dr. Tim Taha
University of Toronto / Faculty of Kinesiology and Physical Education

Introduction: We investigated changes in performance in elite men's and women's long jump, triple jump, and high jump across four-year Olympic cycles occurring over the 2000 to 2020 Olympics. Historically, track and field performance at the Olympic Games and World Championships has improved. However, these improvements are not linear, and rates of performance improvements have been declining. Methods: The top 10 yearly performances from each year between 2000 and 2021 in both male and female long jump, triple jump and high jump were pulled from the world athletics database. For each Olympic cycle, jump performances were normalized to season leading performances during the previous Olympic year. Changes in performance results within events and between sexes were analyzed using a two-way ANOVA. Results: In women's long jump and triple jump, significant effects were observed within normalized performance and cycle year ($p = 0.0459$, $p = 0.00805$, respectively). Further comparisons revealed performances were significantly lower in the second year of the Olympic cycle when compared to previous Olympic year performances. Performances remained unchanged despite the cycle year in women's high jump and the

men's events. Conclusion: These findings suggest that in year 2 of the Olympic cycle, a year with no Olympic Games or World Championships, elite women's long jump and triple jump performance declined compared to the previous Olympics performances. Further studies should investigate potential causes of performance declines during cycle year 2 and the role of sex and event differences in performance variability season to season.

Ryan, Sarah Elizabeth

Changes in Light Physical Activity and Sedentary Behaviour on Cognitive Function of Cancer Survivors During the COVID-19 Pandemic

Faculty Advisor: Dr. Linda Trinh
Co-Author(s): Lauren Voss, Allyson Tabaczynski, Linda Trinh
University of Toronto / Faculty of Kinesiology and Physical Education

Background: Sedentary behaviour (SB) is negatively associated with cancer survivors' cognitive functioning. Regular moderate-to-vigorous physical activity may mitigate these effects; however, few survivors achieve the current physical activity (PA) guidelines. Light physical activity (LPA) may be more attainable, but research examining SB, LPA, and cognitive function is limited. Purpose: This secondary analysis examines the associations between changes in LPA and SB on the cognitive function of cancer survivors during the COVID-19 pandemic. Methods: A global sample of cancer survivors completed an online survey (July-November 2020) where they self-reported PA and SB habits using the Godin Leisure Time Exercise Questionnaire and Domain-Specific Sitting Time Questionnaire, respectively. Cognitive function was assessed with the Functional Assessment of Cancer Therapy-Cognitive Functioning scale. Separate linear regression models examined associations between changes in LPA and SB with self-reported cognitive function. Subgroup analyses compared survivors by time since treatment (i.e., >5 years, ≤5 years), time since diagnosis (i.e., <5 years, ≥5 years), and treatment status (i.e., currently on treatment, completed treatment). Results: Participants (N=393; Mage=48.5±15.2 years) were mostly female (73%) and diagnosed ≥5 years ago (51%), predominantly with breast, gynecologic, or hematologic cancers. Movement behaviour changes were not significantly associated with cognitive function or cognitive domains ($p>0.05$). Those who received treatment >5 years ago had significant associations between the change in LPA and the Comments from Others domain ($\beta=-0.18$, $p=0.02$), as well as the change in SB and Perceived Cognitive Abilities ($\beta=-0.20$, $p=0.04$). Conclusion: Reductions in LPA and SB were not associated with changes in cognitive function. Additional research is required to further assess the movement behaviours of survivors during the pandemic. Future studies should examine the dose of LPA required to produce clinically meaningful cognitive changes, especially among survivors who received treatment >5 years ago.

Saini, Vrishank

Diethylamine nonoate as an adjuvant immunotherapy agent to treat glioblastoma

Faculty Advisor: Ammar Salkini
University of British Columbia/ Faculty of Science

Glioblastoma is a malignant brain cancer that targets glial cells and invades nearby brain tissue. Glioblastoma hinders the immune system to a level equivalent to individuals with AIDS. This is thought to contribute to the severely poor prognosis of glioblastoma patients. As a result, immunotherapy is being investigated as a possible treatment. Despite

immunotherapy advancements in neuro-oncology, currently there are no FDA-approved immunotherapies for glioblastoma. Temozolomide (TMZ) is a chemotherapy that readily passes the blood brain barrier (BBB). It decreases the rate of cell division of glioblastoma by directly targeting the DNA. In a 2016 clinical study, over 50% of glioblastoma patients being treated with TMZ developed resistance due to methylguanine methyltransferase (MGMT), a protein that suppresses TMZ activity. MGMT transcribes and translates proteins responsible for DNA repair in both cancerous and non-cancerous cells, which results in the suppression of TMZ's activity. Diethylamine nonoate has been shown to act as a nitric oxide donor which inhibits MGMT when used against glioma cells. We are proposing to administer diethylamine nonoate as an adjuvant immunotherapy agent alongside TMZ via a mesoporous silica nanoparticle to inhibit MGMT activity. This nanodrug would suppress the effects of MGMT granting TMZ an increased potential in combating glioblastoma. Once MGMT is inhibited, the alkylating agent present in TMZ will remain intact and cleave the guanine it is bound to, inducing apoptosis in glioblastoma cells. This opens the opportunity for immunotherapy to be used alongside TMZ as a potential treatment for glioblastoma in the future.

Salman, Maria

Investigating modulations in afferent inhibition following training on a novel sensorimotor finger maze task

Faculty Advisor: Dr. Aimee Nelson
Co-Author(s): Jacob Pickersgill
McMaster University / Faculty of Kinesiology

Short-Latency Afferent Inhibition (SAI), Long-Latency Afferent Inhibition (LAI) and Afferent Facilitation (AF) are measures that assess sensorimotor integration using Transcranial Magnetic Stimulation (TMS) by pairing peripheral nerve stimulation with transcranial magnetic stimulation. Prior research has explored the influence of motor or sensory stimuli on these measures independently, but no study to date has investigated the influences of a sensorimotor task involving tactile discrimination. This study sought to quantify SAI, LAI, and AF before and after training on a sensorimotor maze, to determine how these measures are influenced by sensorimotor training on this task. Participants performed 2 training and 1 control condition in a randomized fashion, where the training consists of two 15-minute blocks of training in a high and low difficulty condition. Outcome measures were collected before and after training to quantify the changes in sensorimotor integration as induced by training. This study found SAI in the high condition, showed main effect of Time ($p=0.017$), which indicates that within each day, pre-training to post-training, SAI showed an increase (less inhibition). In the high condition, LAI showed main effects of Time ($p=0.034$) indicating an increase in LAI pre to post training. Lastly, AF showed main effects condition ($p=0.006$) which means that AF did increase in relation to the low-difficulty condition compared to the control measures. Performance on the maze was also assessed, and compared to percent change in SAI and LAI, with results showing a trend towards a positive correlation between the 2 measures. Results suggest that training on a tactile discrimination sensorimotor task can influence components of sensorimotor integration differently, depending on difficulty of maze.

Schoenroth, Hannah

Players' Perspectives on their Experiences of Autonomy-Supportive Coaching

Faculty Advisor: Dr. Ashley Stirling

University of Toronto / Faculty of Kinesiology and Physical Education

Background: There is a heightened focus on athletes' experiences in sport, and as such, coaches are increasingly being encouraged to adopt an autonomy-supportive coaching style to foster positive sport experiences. Autonomy-supportive coaching provides opportunities for athletes to partake in independent, task-oriented work, self-paced learning and receive supportive feedback and acknowledgment of the feelings of each individual (Gurgis, Kerr, Stirling, 2020, p. 396). Purpose: The purpose of this research was to explore players' perspectives on their experiences of autonomy-supportive coaching. It is hoped that this research will inform the benefits and rationale for adopting an autonomy-supportive coaching style. Methods: A qualitative research design was used to collect valuable data that focused on athletes' experiences and meaningful reflections about these past experiences. Athlete participants were interviewed using semi-structured, open-ended questions to gather information about their personal views on their autonomy-supportive coach. Data were analyzed thematically. Results: The findings from this study contribute to a better understanding of the benefits and rationale of incorporating this specific coaching style in the sports setting. Conclusion: Acknowledging the influence of autonomy-supportive coaching on athletes' positive sport experiences can provide a foundation for delineating effective ways to best support athletes throughout their athletic careers.

Signorella, Alessia
Socioeconomic Effects of the Aesthetic Philosophy of Music Education
Faculty Advisor: Dr. Antía González Ben
University of Toronto / Faculty of Music

In this paper, the effects of the aesthetic philosophy of music education will be brought to light. Specifically, the need to venture away from this philosophy in hopes of better supporting students. Teaching in school has made it so that our students need outside help from tutors, coaches, or mentors. There are significant contributing factors to this phenomenon which include; socioeconomic status. The philosophy was used by Bennett Reimer to bring credibility to the discipline but is now one of the leading factors as to why students cannot take music lessons. This paper explains what the current teaching philosophy is. Once that is completed I state its pros and cons. There have also been counter teaching philosophies, but none have gained as much praise as the aesthetic philosophy. I examine two different case studies to highlight how damaging this teaching philosophy is. The case studies look at students from different socioeconomic backgrounds, and how this teaching philosophy is either helpful or detrimental based on your financial situation. The school system as it stands prioritizes privileged over marginalized individuals. It is a standardized practice that pleases the 1% of students. The big issue is finding how to make education a more accessible venture for students regardless of their home lives. There is no one way that a subject can be taught, but there is a way you can make it elitist and discriminatory. We are set on the one method of teaching because it pleases the upper class. As future members of society, we must push back and see that changes are made for the improvement of future education.

Simoes, Kyara
Framing Sport as a Platform for Sustainable Development: A Case Study on 2023 Canada Winter Games

Faculty Advisor: Dr. Simon Darnell
University of Toronto / Faculty of Kinesiology and Physical Education

Sport is a platform to promote sustainable initiatives for social, economic, and environmental development across society. While research into the relationship between sport and sustainability has advanced in recent years, most studies on sport sustainability have largely focused on high profile, mega-events, leaving significant gaps in our understanding of the impact of smaller-scale sports events. By virtue of their high degree of ownership and stakeholder engagement, smaller-scale sports events have been found to have a greater potential for social leveraging, in which local governments use the opportunity to host sports events to further policy objectives and community development. This article presents an exploratory case study of the 2023 Canada Games, the most popular multi-sport event that occurs within the country, which has a significant impact on social movements, economic growth, and the natural environment. The purpose of this case study is to better understand sport sustainability in the context of hosting the 2023 Canada Winter Games in small-town Prince Edward Island. In turn, this will address the knowledge gaps of smaller-scale sports events and direct future research on sustainable sports design. Data on the 2023 Games was collected by method of semi-structured interviews and thematically organized to highlight key themes of sustainable development in the context of sport and small-sport events. A greater collection of research on sport sustainability is necessary to successfully promote and incorporate sustainable strategies, practices, and policies into sporting events. Recommendations are given to enhance future events and to broaden the conversation around sport and sustainability.

Sitar, Cassandra
Identifying impacts of online implementation of an ergonomic tool for desk set-up among university students on posture and musculoskeletal pain
Faculty Advisor: Dr. Kathryn Sinden
Lakehead University/ School of Kinesiology

Background: The Covid-19 pandemic has changed the world resorting in online learning for most students. Many students do not have suitable ergonomic environments in their homes resulting in an increased risk of musculoskeletal problems from poor posture. There is a lack of research, however, on how the pandemic and online learning environment is creating musculoskeletal problems among students and the lack of proper ergonomic workstations and education. Objective: To explore the effects of an online ergonomic tool 'Moving Forward with Covid-19 Kinesiology guidelines for maintaining optimal health- Ergonomics' on university students' cervical, thoracolumbar spine posture, and upper extremity pain. Methods: Participants were recruited through purposive sampling where a pre/post experimental study design was used. Participants completed the Nordic Musculoskeletal questionnaire and took a short video of themselves at their home workstations. A posture analysis was conducted for each participant's video using the "myDartfish" app and the Rapid Entire Body Assessment (REBA). Through the aid of the ergonomic tool, recommendations were implemented to correct posture. After the pre-assessment, participant used the recommendations for 48 hours and then completed the questionnaire again and took a final video. A paired t-test design was used to examine the variables at two points in time. Results: 7 individuals' participants (1 male, 6 females). There was a noted decrease in lumbar spine pain (43%), elbow (100%), thoracolumbar spine (100%), and the right shoulder (15%). Participants still experienced pain after the post-assessment in the cervical spine

(43%) and both shoulders (14%). There was no increase in pain experienced in the post-assessment. Conclusion: It can be concluded that the implementation of recommendations made using ergonomic tool to correct posture resulted in a decrease in musculoskeletal pain in university students. Future research could explore the use of the ergonomic tool for a longer period to explore its preventative measures.

Sottile, Amanda

Investigating strategies used to foster quality participation on playgrounds

Faculty Advisor: Dr. Kelly Arbour-Nicitopoulos
Co-Author(s): Amanda Sottile, Nikoleta Odorico, Maeghan E. James, Dr. Jennifer Leo, Carolyn Millar, Dr. Amy Latimer-Chung, Dr. Kelly Arbour-Nicitopoulos
University of Toronto / Faculty of Kinesiology and Physical Education

Background: Play is a vital component throughout childhood, as it is a natural tool that helps children develop many critical skills. Playgrounds are valuable spaces that allow for structured and unstructured play and offer areas that encourage children to engage in sensory, social, and motor-based opportunities. Many playgrounds are inaccessible to children and youth with disabilities (CYD), which has led to an increase in accessible playgrounds being built across Canada. However, there has been limited research conducted on how to facilitate CYD's quality participation on playgrounds. Evans et al.'s (2018) Quality Participation (QP) Framework describes six experiential elements of quality sport experience for individuals with physical disabilities (autonomy, belonging, challenge, engagement, mastery, and meaning) which will be used to guide the systematic creation of strategies best fit to foster QP on playgrounds. Objective: The objective of this research is to create unique Blueprints for parents and educators/recreation programmers to use that highlight strategies that can help to facilitate quality play experiences on playgrounds for CYD. Methods: Using the 25 strategies identified through deductive thematic analysis in an earlier phase, an electronic survey has been distributed to parents, educators/programmers. Parents/guardians have been asked to rate the likelihood of utilizing each of the 25 strategies when on playgrounds with their children. Educators/programmers have been asked to identify which strategies best reflect specific building blocks of the QP Framework. Results: The data is being analyzed using descriptive statistics (parent ratings) and a matrix-type response system to determine the percent agreement for each building block-strategy pairing (educations/programmers ratings), and the importance of each strategy. Conclusion: The results will inform which strategies will be included in a QP Blueprint for Playgrounds. The Blueprint will be a valuable tool for enhancing QP of CYD on playgrounds. This research is funded through Canadian Tire Jumpstart Charities.

Stone, Jenna

Cardiovascular Response in Athletes completing Stair climbing based High intensity interval training (CRASH)

Faculty Advisor: Dr. Maureen MacDonald
Co-Author(s): JS Williams, A Zia, SE Valentino, MJ MacDonald
McMaster University / Faculty of Science, Department of Kinesiology

INTRODUCTION: In young athletes, high intensity interval training (HIIT) (e.g., 4 weeks) results in improved endothelial function [measured using flow mediated dilation (FMD)] and decreased arterial stiffness [measured using pulse wave velocity (PWV)]. However, these

research studies have primarily focused on male participants, due to the perceived difficulty of testing with female participants, and gender inequity in sport. There is minimal research investigating the effects of stair climbing based high intensity interval training (STAIR) on endothelial function and arterial stiffness in both male and female athletes, and whether these vascular adaptations differ between sexes. The primary purpose of this study is to examine the effect of 4-weeks of STAIR on endothelial function and arterial stiffness, in both male and female athletes. The secondary purpose of this study is to examine the sex-differences between male and female athletes' vascular response to STAIR. METHODS: 56 male and female McMaster varsity/club athletes will be recruited and randomized into either 4 weeks of STAIR or a no training control condition (CON). They will participate in two identical data collection visits at baseline and following the 4-week intervention. Measurements taken during these visits will include: resting heart rate and blood pressure, PWV, FMD, and heart rate variability. EXPECTED RESULTS: It is hypothesized that both male and female athletes will experience improvements in endothelial function and decreased arterial stiffness following STAIR, compared to CON. Moreover, it is hypothesized that females will have a greater magnitude of change following STAIR compared to males, due to greater levels of circulating 17 beta-estradiol. SIGNIFICANCE: This study aims to provide insight on the impact of stair climbing based high intensity interval training on endothelial function and arterial stiffness, and the differing vascular adaptations between males and females following training, with the goal of improving exercise prescription for athletes.

Sullivan, Erin

How Systemic Oppression and Discrimination is (Re)Produced in Canadian University Kinesiology Curriculum

Faculty Advisor: Dr. Adam Ali
University of Toronto / Faculty of Kinesiology and Physical Education

Institutionalized oppression experienced by marginalized groups is a central component of post-secondary education and, if left unchallenged, it could become a permanent part of academia (Lincoln and Stanley, 2021). Emerging literature that examines discrimination and oppression in kinesiology focuses on the consequences of racism, sexism and ableism on the discipline, faculty and students (Nachman et al., 2021; Douglas & Halas, 2011). However, there is limited research that examines if and how the kinesiology curricula allow these processes to be reproduced. The purpose of this study is to further explore if and how systemic oppression and discrimination is (re)produced through Canadian university kinesiology curricula. Using a summative qualitative content analysis and the framework of the Five Faces of Oppression (Young, 1990), eight of the most highly ranked undergraduate kinesiology programs in Canada were chosen to understand which knowledge and pedagogies are seen as superior or most influential (College Learners, 2021; Student Matrix, 2021; QS Rankings, 2021). The public websites of each kinesiology program were used to analyze the curricula, specifically, degree requirements, course offerings, mission statements, EDI statements, faculty and the values, beliefs conveyed through their varying curricula from the 2021-2022 academic year or most recent year available. Three main findings include the following: (a) an unequal knowledge distribution within curricula prioritizes biophysical disciplines over socio-cultural and behavioural disciplines (b) messaging from university programs often depict a false sense of social responsibility, and (c) white privilege is seen within faculty and administration, as ranking increases, diversity decreases.

Recommendations for how Canadian kinesiology curricula should engage with social justice scholarship and challenge oppressive systems are to be suggested.

Sunderji, Samira
The effects of mental fatigue, self-efficacy, and motivation on exercise decision making.
Faculty Advisor: Dr. Steven Bray
Co-Author(s): Sheereen Harris
McMaster University / Faculty of Kinesiology

Barriers to physical activity participation are pervasive within the Canadian adult population that increase the risk of poor health outcomes. These barriers can be attributed to factors of mental fatigue, low self-efficacy, and decreased motivation. Mental fatigue is defined as a psychobiological state caused by prolonged periods of demanding cognitive activity. Coupled with a decreased belief in one's ability to perform a behaviour that does not lead to a desired outcome or accrue any benefits, Social Cognitive Theory (SCT) highlights how efficacy beliefs and outcome expectancies are also primary motivators of behaviour. Previous research focused on exercise decision-making has been experimental within a lab setting and has not examined the extent to which these domains impact such processes in a real-world context. In this study, the relationship between factors of mental fatigue, self-efficacy, and motivation are investigated with respect to exercise decision-making. Participants between the ages of 17-30 years are recruited from McMaster University and are asked to wear a wrist-worn accelerometer while responding to survey prompts to determine how such factors fluctuate throughout the day, and subsequently impact levels of physical activity. Though the study is ongoing, the hypotheses of this study can be divided into 4 premises: 1) increased mental fatigue will increase perceived costs and decrease perceived benefits of exercise, 2) the increased costs of exercise lead to individuals not choosing to perform exercise behaviours, 3) increased mental fatigue leads to lower self-efficacy, as theorized by the SCT, and 4) decreased self-efficacy will lead to the decreased choice of physical activity. The results of this work will contribute to our understanding of the decisions individuals make in a real-world, real-time context that could provide insight regarding one's choice to partake in physical activity and further inform strategies that could be implemented to promote physical activity participation.

Thomure, Raiya Taha
Gender-based violence against trans* individuals in sport: a look into the harm experienced by five trans and non-binary athletes in North America
Faculty Advisor: Dr. Ashley Stirling
University of Toronto / Faculty of Kinesiology and Physical Education

Trans* athletes are becoming an increasingly marginalized demographic within competitive and recreational sport. Despite growing research on policy and physiology of trans* athletes, there is little attention given to the experiences of these athletes regarding harm, discrimination, and violence. The present study aimed to uncover the experiences of gender-based violence that exist for trans* folks across the gender spectrum in sport. This research incorporated both an intersectional approach, as well as a grounding in queer theory to understand the relationships between the gendered/raced/disabled/sexual identities, and the gender-based violence faced. Each semi-structured interview consisted of a demographic

sampling component, a general questioning period, as well as a period to discuss experiences of gender-based violence in sport. Thematic analysis was used to dissect the five semi-structured virtual interviews, and to formulate key takeaways from the data. There were a series of findings on multiple levels of interaction between the athletes and sport systems. Within these systems, the athletes expressed examples of harm experienced from peers, as well as coaching and other staff in positions of power. Such harms exist on lines of identity invalidation, politics of passing, and an interconnectedness with other axes of oppression. Identities such as non-whiteness, disability, and fatness worsened, triggered, and made more frequent the experiences of gender-based violence. Outside of interpersonal violence, athletes also expressed harm within sport structures, including gendered sport team policies, as well as the locker room as a site of harm. The findings from this study expose a need to safeguard sport for trans* athletes on multiple fronts: interpersonally between athletes, interpersonally on different levels of power, within policy, and within the larger structure of a binary gender system in sport.

Vandenbelt, Ava

Identification of FKBP8-PLN Interaction in Mouse Hearts

Faculty Advisor: Dr. Marius Locke and Dr. Anthony Gramolini
Co-Author(s): Allen C. T. Teng, Marjan Tavassoli, Marius Locke, Anthony O. Gramolini
University of Toronto / Faculty of Kinesiology and Physical Education

The sarcoplasmic reticulum (SR) protein, Phospholamban (PLN), plays a critical role in modulating cardiomyocyte Ca2+ regulation. In its unphosphorylated state, PLN inhibits SR Ca2+ uptake by decreasing the Ca2+ affinity of sarco-endoplasmic reticulum Ca2+ - ATPase, type 2 (SERCA2) (MacLennan & Kranias, 2002). The inhibitory effect of PLN on SERCA2 is relieved upon phosphorylation of PLN at the Serine 16 residue, or at the Threonine 17 residue by protein kinase A, or Ca2+/calmodulin-dependent protein kinase II, respectively. Multiple studies have reported the interaction of hematopoietic-substrate-1 associated protein X-1 (HAX-1) and PLN further inhibits SERCA2 function and Ca2+ uptake via an unknown mechanism (Larsen et al., 2020; Vafiadaki et al., 2007). Additionally, a recent proteomic study suggests a possible interaction between HAX-1 and FK506-binding protein 8 (FKBP8) (Antonicka et al., 2020). Our current study identifies FKBP8 as a new PLN-interacting protein. We used immunofluorescence to show co-localization of endogenous PLN and FKBP8 in both mouse ventricular tissue and isolated adult mouse cardiomyocytes. The interaction of these proteins was further confirmed by co-immunoprecipitation assays (Co-IP) with mouse cardiac lysates and in transfected human embryonic kidney cells. Lastly, Co-IP with PLN - and a selection of polymerase chain reaction developed FKBP8 truncates - revealed that PLN interacts specifically with the LC3 - interacting domain of FKBP8. Together, these studies confirm FKBP8 as a novel interacting partner to PLN in the heart. Future studies will address the role of FKBP8 in modulating cardiac Ca2+ uptake via HAX-1/PLN/SERCA2 complex.

Verma, Priya

Examining the relationships between the gut microbiota, mental health, cardiometabolic health, and lifestyle factors in healthy older adults

Faculty Advisor: Dr. Julia O Totosy de Zepetnek
Co-Author(s): Sameer Ahmad, Andrew DS Cameron, Julia O Totosy de Zepetnek
University of Regina / Faculty of Science and Faculty of Kinesiology and Health Studies

The gut microbiome is the most metabolically complex organ in the body; its composition varies greatly between individuals due to differences in host lifestyle and environment. Poor sleep, stress, physical activity, or diet can reduce the abundance of certain beneficial species and overall bacterial diversity. Further, research has shown that age is inversely related to bacterial diversity. The ensuing gut microbial dysbiosis has been linked to cardiometabolic dysfunction and mental illness. The present study is investigating relationships between gut microbiota abundance and diversity, cardiometabolic health, mental health, and lifestyle in healthy older adults (aged 55y+). Fecal samples were obtained and 16S rRNA sequencing will be performed to determine microbial community compositions. Cardiovascular health was assessed via BP (Dinamap, GE Healthcare) and arterial stiffness (applanation tonometry, SPT-301); metabolic health was assessed via fasting blood glucose (YSI2900 Inc.) and body composition (BodPod, SECA); mental health and lifestyle were assessed via standardized questionnaires (anxiety, depression, stress, sleep, physical activity, diet). Data collection and analysis is ongoing. Currently all participants are male (n=6) with average age 64+/-5y. The cohort is cardiometabolically healthy: BP 127+/-7/76+/-6mmHg, MAP 95mmHg+/-5, HR 60bpm+/-11, SpO2 99+/-1%, central pulse wave velocity 11.7+/-2.3m/s, fasting blood glucose 4.4+/-0.3mmol/L, height 180.0+/-6.4cm, body mass 78.5+/-8.1kg, BMI 24.2+/-1.5kg/m^2, waist circumference 89.2+/-4.6cm, body fat 18.3+/-0.7%, total body water 56.5+/-1.9%. Mental health and lifestyle behaviours are also healthy: all participants scored well on anxiety (GAD-7: 1+/-1), depression (PHQ-9: 1.5+/-1.5), and stress (PSS: 5+/-4); sleep quality was good (PSQI: 4+/-3); physical activity was high (IPAQ: 335+/-291min MVPA/week); eating patterns and behaviours were healthy (REAPS: 32+/-4; TFEQ: cognitive restraint 15+/-4, uncontrolled eating 12+/-2, emotional eating 3.8+/-1.2). Initial analyses confirm that the present participants are a healthy aging cohort; fecal sample analyses in the coming weeks will allow for an exploration of these predictor variables on bacterial species abundance and diversity.

Walker, David

The relationship between cardiorespiratory fitness and working memory following one night of partial sleep deprivation.

Faculty Advisor: Dr. Jeremy Walsh
McMaster University / Faculty of Kinesiology

Introduction: A large number Canadian adults receive less than the recommended 7-9 hours of sleep per night. Short sleep may negatively impact aspects of cognition, especially working memory (WM). Strategies are needed to protect WM against the detrimental effects of short sleep. One such strategy is exercise, as higher aerobic fitness (VO2max) protects against WM impairment following one night of total sleep deprivation. Whether higher VO2max buffers the negative effects of partial sleep deprivation (PSD) is currently unknown. Therefore, we tested the hypothesis that higher VO2max would be associated with preservation of WM following PSD in young adults. Methods: 17 healthy adults (12 females; ages 21.8±3.6 yrs) participated in two experimental conditions. Participants completed WM testing in the morning following one night of normal sleep (≥6 hours sleep) and following 3 hours sleep (PSD condition). Subjective sleep quality was assessed using the Pittsburgh Sleep Quality Index questionnaire and sleep quantity was measured via wrist-worn FitBit device and the Sleep Cycle app. WM was assessed via a computerized N-back test (1-back and 3-back variants). A graded maximal exercise test on a cycle ergometer was used to assess VO2max one week before experimental visits. Results: Participants had 'average' VO2max (41.4±8.2

mL/kg/min 1), based on ACSM norms. Contrary to our hypothesis, there was no effect of PSD on N-back performance (reaction time and accuracy) for both the 1-back and 3-back variants. Further, there was no relationship between aspects of WM performance and VO2max. Conclusion: Unlike total sleep deprivation, one night of PSD did not detrimentally impact WM in young adults and there was no relationship between VO2max and WM performance. Future studies should examine the effect

Wang, Cody

No Space to Play?: Examining the availability of rugby and cricket facilities in the GTA

Faculty Advisor: Dr. Peter Donnelly
University of Toronto / Faculty of Kinesiology and Physical Education

The demand for playing fields in the Greater Toronto Area has been dominated by soccer and baseball/ softball. With growing urban and suburban sprawl, access to playing fields is increasingly limited, especially to growing sports such as rugby and cricket. The association of sports such as cricket with newcomer communities creates additional concerns about inclusion. This question of access has been explored by: (a) surveying current facilities and recently lost facilities (such as Fletcher's Fields, a major rugby facility in Markham, ON); (b) reviewing published sources (media, Parks and Recreation materials, club annual reports); and (c) carrying out interviews with relevant experts in Parks and Recreation, provincial sporting bodies (cricket and rugby) and cricket and rugby club officials. Preliminary results indicate that the experiences of rugby and cricket teams are quite different. Cricket is a very popular and rapidly growing sport, not only in the GTA but in other parts of Canada, and cricket fields are in high demand. The care, provision, and expansion of cricket facilities by municipalities depends on political will and community engagement. Rugby, while an established sport, is growing more slowly than cricket. There is more diversity, with some clubs owning private facilities and others booking public fields. Each rugby club has different priorities when it comes to field use. At this time, it is too early to determine the effects of the sale of Fletcher's Fields on the sport. Further research is encouraged to examine in more depth the municipal politics of facility provision, and the ways that clubs negotiate those politics.

Wiens, Lucas

Effect of 1 Week Single-leg Immobilization on Muscle Fibre Cross Sectional Area and Capillarization in Elderly Adults

Faculty Advisor: Dr. Stuart Phillips
Co-Author(s): Jonathan Mcleod
McMaster University / Faculty of Kinesiology

Introduction: Situations such as the recovery from injury and illness can lead to periods of muscle disuse or unloading. Single leg immobilization is a model in which one leg is immobilized, and the contralateral limb acts as an internal control comparator. Immobilization leads to rapid skeletal muscle atrophy, loss of strength, and many negative health consequences, including insulin resistance. Older adults are particularly vulnerable to the acute challenges of skeletal muscle disuse as their capacity to recover is likely limited. Skeletal muscle capillarization plays a primary role in oxygen and nutrient delivery to the muscle. However, the impact of single-leg immobilization on skeletal muscle capillarization

has yet to be determined. We aimed to determine the impact of single-leg immobilization on skeletal muscle capillarization in healthy older adults. Methods:15 healthy older adults (2 Women, 13 Men ,66± 5 yrs.) underwent one week of single-leg immobilization, followed by two weeks of recovery. Vastus Lateralis skeletal muscle biopsies were obtained pre- and post-immobilization and after recovery. Immunohistochemistry was used to assess fibre-cross sectional area, and capillarization, in both type 1 and 2 fibers. Results: Results regarding fibre cross-sectional area (fCSA) and muscle capillarization are not yet available as not all samples have undergone analysis at this point. However, we hypothesize that results will demonstrate a reduction in fCSA and muscle capillarization in both type 1 and type 2 fibres following the immobilization protocol. Conclusion: We are currently conducting analyses of muscle samples and are awaiting results to determine if leg immobilization in elderly individuals leads to a decrease in muscle fCSA and muscle capillarization in type 1 and 2 fibres.

Wilson, Daniel

Investigating Masculine Embodiment in Team Sports

Faculty Advisor: Dr. Michael Atkinson
University of Toronto / Faculty of Kinesiology and Physical Education

Statistics Canada reports that men are nearly twice as likely as women to participate in sport (2019). While this statistic does reflect the consequences of current barriers to women in sport, it is also a reflection of the importance of sport to men in Canada. The origination of sport was by males for males and did not consider the needs and experiences of females, resulting in every generation of girls and women fighting to write themselves into the history of sport (Kidd, 2013). Feminist scholarship has had a tremendous impact on the study of sport, identifying its gendered nature and questioning the conventional exclusion and marginalization of most females (Kidd, 2013). That being said, Kidd (2013) identifies the effect of sports on men as "often overlooked in the feminist struggle for opportunities and the politics of gender equity" (p.553). Sport provides a setting where the body can be utilized to express different aspects of an individual's identity. Dunning (1999) describes modern sport as a principal locus for males and their expression of traditional standards of masculinity. This qualitative study utilized a grounded theory approach to investigate current perspectives of male university team sport athletes' conceptualization of their masculine identity and how they use their bodies to express said identity. The study was carried out via semi-structured interviews with 5 University of Toronto student-athletes. This presentation will offer preliminary conclusions about masculine embodiment in current male university team sport athletes and suggestions for future research and practical applications.

Wong, Joey

Perceptions of Parent-Child Relationships and Sport Experiences among East-Asian Women

Faculty Advisor: Dr. Katherine Tamminen
University of Toronto / Faculty of Kinesiology and Physical Education

Parents play crucial roles in supporting and influencing their child's sport experience. The existing research on parent-child relationships in sport is primarily based on Western parenting styles; thus, investigation of other cultures is important given that the consequences of parenting practices can vary across different ethnic groups due to different

cultural understandings of parenting. Given the gender inequalities that exist within East Asian culture and the contrast between East Asian values and Western values, this study focused on second-generation East Asian Canadian women and their experiences in sport. The purpose was to examine the different cultural beliefs that may exist between a foreign-born parent and their native-born child and investigate how the differences in values may influence the child's sport experience. Ten participants (M age = 21 years) took part in semi-structured interviews; five participants continued to play sports competitively beyond high school and five participants played competitive sports in high school but stopped participating beyond high school. Three over-arching themes were identified from the initial qualitative content analysis: (a) athletes' internalization of parental support (b) parents' willingness to compromise their values (c) athletes' perceptions of their parent's actions and intentions. Results indicate differences in the ways athletes internalized parental support. In general, athletes who continued to participate in sport perceived more parental support than athletes who did not continue sport participation. Participants in both groups described the extent to which parental and child values are understood by one another, and the degree to which they were willing to compromise, especially when the values of a parent and a child differ significantly. These results shed light on the ways values influence actions and intentions, and how the appraisal of the actions and intentions affect the overall parent-child relationship and subsequently, the child's sport experience.

Yaghi, Noor

Factors that Impact the Sport and Physical Activity Participation of a Hijab-Wearing Woman in North America: An Autoethnography

Faculty Advisor: Dr. Janelle Joseph
University of Toronto / Faculty of Kinesiology and Physical Education

Muslim women who wear the hijab (headscarf) in Canada are faced with unique experiences as they navigate their lives. The overarching objective of this study is to use an autoethnographic approach to explore my personal experiences as a hijabi (hijab-wearing) woman in Canadian sport spaces. Autoethnography is a form of qualitative research that seeks to understand a cultural phenomenon through a comprehensive analysis of the author's accounts of their past experiences. In this study, I use this reflexive methodology to critically analyze the social forces that influence my sport and leisure experiences as a hijabi woman. Analysis of my stories reveals themes of inclusivity, belonging, positive and negative representation, visibility, and identity. Furthermore, this study utilizes an analytical and evaluative approach to explore the literature surrounding factors that promote and inhibit the sport and physical activity participation of hijabi women such as inclusivity, representation, access, and belonging. This study identifies a gap in the academic literature surrounding the sporting experiences of Muslim women who wear the hijab in Canada. The previous literature is scarce regarding the insights of hijabis on the role that hijab plays in their sport participation. Furthermore, efforts need to be made to place hijabi women in positions where they can express themselves freely in sport spaces and define sport on their own terms.

Yong, Claudia

The relationship between physiological markers of stress and mood in Oral Contraceptive Users"

Faculty Advisor: Dr. Jeremy Walsh

McMaster University / Faculty of Kinesiology

Mood disruptions are a leading cause of voluntary hormonal contraceptive discontinuation; however, there is a lack of consensus on the relationship between hormonal contraceptive use and mood. Heart rate variability (HRV) and brain-derived neurotrophic factor (BDNF) levels vary across the natural menstrual cycle and may contribute to alterations in mood. Changes in these factors have also been observed in oral contraceptive pill (OCP) users; however, the relationship between mood disruptions and changes in HRV and BDNF in OCP users is currently unknown. PURPOSE: to compare changes in mood between OCP users and naturally menstruating women (NMW) across the menstrual cycle, and to test the hypothesis that mood disruptions will be related to lower HRV and BDNF. METHODS: 26 women (n=15 OCP users; n=11 NMW; age = 21±2 years) completed two experimental visits. In randomized order, participants were tested during the high (mid-luteal or active OCP) and low hormone phase (early follicular or placebo OCP) - approximately 2 weeks apart. HRV was measured using electrocardiogram during quiet supine rest for 5 minutes. Fasting venous blood was drawn to determine plasma BDNF, and analyzed using enzyme-linked immunosorbent assay. Mood was assessed using the Depression Anxiety and Stress Scale-21 item Questionnaire (DASS-21). RESULTS: We observed a significant effect of time on measures of overall mood (P=0.025), such that mood was significantly lower during high compared to low hormonal phases for both OCP (Δ -3.0±5.8 items) and NMW (Δ -3.9±7.0 items). Contrary to our hypothesis, there were no changes in HRV over time in OCP users and NMW. BDNF results forthcoming. CONCLUSION: Like NMW, OCP users demonstrate significantly lower mood during the high versus low hormone phase. Mood disruptions were not related to autonomic function, as indicated by HRV. Future studies should continue to characterize the physiological impacts of OCP on mood.

Zeynalli, Vagif

Investigating the Effects of Acute Single-leg Immobilization on the Contralateral, Non-Immobilized Leg

Faculty Advisor: Dr. Stuart Phillips
Co-Author(s): Jonathan McLeod, James Mckendry, Changhyun Lim, Stuart Phillips
McMaster University / Faculty of Science, Department of Kinesiology

Between-person parallel-group and within-person models are often used in studies investigating the effects of muscle loading. However, a parallel-group design is limited by the variability between individuals, which is eliminated in a within-person model. Within-person comparisons evaluate two or more interventions consecutively sometimes with a washout period between interventions; however, there is still the potential for carryover effects from one treatment to another. The unilateral immobilization model can increase statistical power, improve time and cost-effectiveness, and reduce participant attrition. In the unilateral immobilization model, the limbs of a participant are randomized to 1 of 2 treatments that can be applied concurrently or sequentially. Nonetheless, this model is criticized due to potential systemic carryover effects, particularly in unloading models where only one limb is immobilized. A common critique of the model is that a contralateral (to the immobilized limb) limb is not an appropriate control as it bears a greater percentage of a person's body weight than otherwise during normal ambulation. Thus, I aim to investigate the effects of acute single-leg immobilization on the contralateral, non-immobilized leg to determine if the weight-bearing leg can be used as an appropriate control during unilateral immobilization studies. I will recruit and test four healthy young men to undergo 5d of single-leg immobilization using

an immobilizing knee brace. Dual-energy x-ray absorptiometry scans will be used to assess changes in fat-free mass, ultrasonography will be used to measure muscle cross-sectional area, and an isokinetic dynamometer will be used to measure changes in isometric muscle strength in both limbs. I hypothesize that: (i) the immobilized limb will undergo significant decrements in muscle mass and strength; (ii) the non-immobilized leg will not undergo significant changes in muscle mass and strength; and thus, (iii) the non-immobilized limb will serve as an appropriate control during a bout of single-leg immobilization.

Zhan, Jian Kun

Critical Analysis of Coping Measures in Sport

Faculty Advisor: Dr. Katherine Tamminen
University of Toronto / Faculty of Kinesiology and Physical Education

Coping is a critical process that can contribute to the successful adaptation in an achievement setting such as sports (Crocker, Tamminen & Gaudreau, 2015). In order to measure and assess coping strategies that a person exhibit in times of stressful situations in sport, various coping measures are used, such as Dispositional Coping Inventory for Competitive Sport (Hurst et al., 2011), Modified COPE (Crocker & Graham, 1995), and Coping Function Questionnaire (Kowalski & Crocker, 2001). However, Nicholls and Polman (2007) argue that many measures of coping in sport do not consider factors such as gender, ethnicity, and/or age differences. As a result, these measures may not capture various coping strategies that some athletes may use to deal with stressors in sport. The purpose of this project is to critically examine the existing measures of coping in sport and to consider whether existing measures of coping are appropriate for diverse populations of athletes. Student-athletes at the University of Toronto from the ages of 18 to 22 were purposefully sampled from a range of social identities (e.g., athletes who identify as a racial/ethnic minority or equity-deserving group, athletes from different religious backgrounds, athletes who self-identify as having a disability). Semi-structured interviews lasting approximately 60 minutes were conducted with participants to ask about their experiences of coping with stressors in sport and their perceptions of the items used to assess coping in sport. The interviews were transcribed and analyzed using thematic analysis. This study will contribute information to the current coping measures used among athletic populations. This information could be useful for making changes to coping measures to ensure that they are more appropriate for use among diverse populations of athletes.

Zia, Amna

The impact of stair climbing-based high intensity interval training on cardiorespiratory fitness in varsity student athletes: a preliminary analysis

Faculty Advisor: Dr. Maureen MacDonald
Co-Author(s): Sydney Valentino, Jennifer Williams, Jenna Stone
McMaster University / Faculty of Science

Introduction. Cardiorespiratory fitness, indicated by peak oxygen uptake (VO2peak), reflects the capability of the body to use oxygen during exercise. Increased VO2peak can translate to better sports performance in athletes. Varsity student-athletes are under pressure to optimize their sport and academic schedules. Stair climbing-based high intensity interval training (STAIR) is an exercise modality that can improve VO2peak in untrained populations, has a relatively low time commitment, is cost-effective, and can be performed in free-living

conditions. The effect of STAIR on VO2peak in varsity student-athletes is unknown and the utility of STAIR during the COVID-19 pandemic was particularly evident when access to many facilities was restricted. The purpose of this study was to determine the effects of four weeks of STAIR, in addition to sport-specific exercise training, on VO2peak in male and female varsity student-athletes. We hypothesized that VO2peak would increase to a greater extent with STAIR compared to sport-specific training alone (CONTROL). Methods. This randomized control trial used a between participants, repeated measures design. STAIR involved 60s of stair climbing with 60s of rest for a total of 6min, repeated three times per week for four weeks, in addition to sport-specific training. Heart rate was monitored continuously during the training. VO2peak was assessed at baseline (BL) and after 4 weeks. Results. Five varsity student-athletes (4F/1M) were recruited. Visual inspection of the preliminary data suggests an increase in VO2peak after 4wks in both STAIR (n=3, BL: 46.6±2.5 vs. 4wks: 50.1±1.6 mL/kg/min) and CONTROL (n=2, BL: 47.4±1.8 vs. 4wks: 57.9±10.1 mL/kg/min). The average HRpeak of the STAIR sport-specific training was 180.8±17.4 bpm compared to CONTROL sport-specific training (174.7±20.9 bpm). Conclusion. 4 weeks of STAIR did not seem to increase CRF above CONTROL in varsity-student athletes. The research is still ongoing, therefore the current findings must be interpreted with caution.