ANNUAL REPORT (2016-2017)
The McGill Research Centre for Physical Activity and Health
July 01, 2016 – June 30, 2017

“Creating a path to better health through research”
# Table of Contents

About McGill’s Research Centre for Physical Activity and Health........................................ 2  
Message from the Interim Director.................................................................................. 3  
Administrative Structure, Research Axes & Membership............................................. 5  
  Research Axes........................................................................................................... 6  
  Membership.............................................................................................................. 7  
  Primary (Regular) Members....................................................................................... 7  
  Associate Members................................................................................................... 8  
  External Members...................................................................................................... 9  
Annual Symposium....................................................................................................... 10  
  Keynote Speakers, 2016 PATH Annual Symposium............................................... 11  
  Plenary Speakers, 2016 PATH Annual Symposium.................................................. 12  
  Research Poster Presentation Competition, 2016 PATH Annual Symposium............ 13  
  Summary of 2016 PATH Annual Symposium......................................................... 14  
Seminar Series............................................................................................................. 15  
Financial Statement, 2016-17....................................................................................... 16  
Miscellaneous............................................................................................................... 17  
Goals for PATH for 2017-18........................................................................................ 18  
Appendix A: List of Publications, 2016-17................................................................. 19  
Appendix B: McGill Research Centre for Physical Activity and Health (PATH): Members’  
  Survey, 2016............................................................................................................. 31  
Appendix C: 2016 PATH Annual Symposium: Scientific Program............................... 41  
Appendix D: 2016 PATH Annual Symposium: Abstract Booklet................................... 46  
Appendix E: 2016 PATH Annual Symposium: Summary of Responses by Attendees to  
  Post-Symposium Survey............................................................................................ 63
About McGill’s Research Centre for Physical Activity & Health

Established in 2012, the Research Centre for Physical Activity and Health (PATH) at McGill University builds on evidence that is undeniable: physical inactivity is one of the most powerful and modifiable risk factors contributing to the development and progression of human disease and disability.

PATH is unique at McGill and beyond for its membership, research activities and aspirations. It supports transdisciplinary research related to the promotion of health through physical activity and behavior modification by establishing links between investigators from different research axes with expertise in basic, applied, clinical, psychological, behavioral and social science.

The mission of PATH is to facilitate, conduct and disseminate transdisciplinary research of the highest caliber that addresses fundamental questions related to promotion of health across the lifespan through physical activity and behavior modification. The specific goals of PATH are:

- To create an environment that supports and promotes transdisciplinary research in the promotion of health through physical activity and behavior modification;
- To generate and disseminate evidence of the benefits that can be advantaged from physical activity and behavior modification in the promotion of health as well as in the prevention, treatment and management of human disease and disability;
- To support the research activities of students and postdoctoral fellows, providing the next generation of researchers with the tools to address novel questions related to the promotion of health through physical activity and behavior modification;
- To facilitate the translation of knowledge gained through research into practical solutions for promoting health of the general population through physical activity and behavior modification.

The administrative functions of PATH are located in the Department of Kinesiology and Physical Education of the Faculty of Education at McGill University. The majority of PATH’s research activities are supported by 12 laboratories: Biomechanics Laboratory: Ice Hockey Research Group; CHAMPS Physical Activity Laboratory; Clinical Exercise & Respiratory Physiology Laboratory; Health and Fitness Promotion Laboratory; Human Brain Control of Locomotion Laboratory; Muscle Physiology and Biophysics Laboratory; Neuromuscular Control Laboratory; Occupational Biomechanics and Ergonomics Laboratory; Sport Psychology Research Laboratory; Theories and Interventions in Exercise and Health Psychology Laboratory; and Physical and Health Pedagogy Research Center. Dr. Dennis Jensen, a Tier 2 Canada Research Chair in Clinical Exercise and Respiratory Physiology, is the Centre’s Interim Director.
Message from the Interim Director

I was honoured to start a 1-year appointment as Interim Director of PATH on July 15, 2016. Over the past year, PATH and its members have continued to provide evidence that the Centre is generating and disseminating research of the highest quality in the areas of physical activity and health by publishing more than 125 scientific articles and book chapters (Appendix A) and by also building on the success of its core flagship events, most notably the annual symposium. At the same time, PATH took a strategic “step back” to reassess and redefine the ways in which it satisfies its mission and goals, with a particular emphasis on the role it plays in promoting and supporting the research activities of its members and their trainees. The ultimate goal of this evaluative process was and continues to be to help PATH begin to realize its potential of becoming a leader in the promotion of health across the lifespan through physical activity and behaviour. We initiated this process by asking our members to complete a questionnaire and describe in their own words: (i) what PATH is now, and what it could and should be in the future; (ii) the nature and scope of PATH’s role in their past, current and future research activities; and (iii) the activities and services that PATH should aim to provide its researchers and the community at large. The responses to this questionnaire may be viewed in Appendix B and highlighted the importance of our ongoing efforts to reassess and redefine the ways that PATH satisfies its mission and goals in order to realize its recognized potential of becoming a leader in understanding and promoting health through transdisciplinary research in the area of physical activity.

This past year, in consultation with its members, PATH decreased the number of research axes from 7 to 3 and redefined them as follows: *Psychology and Pedagogy of Sport and Exercise; Human Movement and Ergonomics; and Physiology of Health and Disease*. By all accounts, these 3 axes better reflect the breadth and scope of transdisciplinary research being done by our members and their trainees and collaborators.

In April 2017, PATH established its first Executive Committee consisting of the Director and of Drs. Lindsay Duncan, Caroline Paquette and Ross Andersen who agreed to lead their respective research axes. The Executive Committee will meet regularly to discuss strategies and identify opportunities for PATH to expand its contributions to science, education and community through transdisciplinary collaborations and integration of its research axes.

Over the past year, PATH and several of its members from each of the 3 research axes, namely Drs. Duncan, Sweet, Scheede-Bergdahl, Andersen, Knauper, Cote and myself, started the process of forging strategic research partnerships with various groups from within the McGill community, most notably the Women’s Healthy Heart Initiative of the McGill University Health Centre, the Pensions and Benefits Division of McGill University’s Human Resources department, and McGill Athletics and Recreation. Discussions are ongoing and we are excited to see what scientific investigations emerge over the next year.
In February 2017, PATH was very fortunate to hire Ms. Trina Mitchell as its first administrative assistant (0.2 FTE). Trina’s hiring represented an important step forward for PATH, particularly as it relates to management of day-to-day operations and advancement of various strategic initiatives. Among many other things, Trina has been instrumental in helping to: redesign and maintain the content of our website; disseminate the scientific results and promote the accomplishments of our researchers and their trainees on our website and Twitter account; and create short video vignettes of our researchers for promotional use on our website and Twitter account.

In November 2016, PATH hosted its 3rd annual symposium, the focus of which was on *Balance and Mobility in Health, Aging and Neurological Disorders*. By all accounts, this year’s symposium was a resounding success, with 152 registrants and 135 attendees; 21 poster presentations by students and postdoctoral fellows; 6 plenary speakers; and 2 keynote speakers, one from Université Laval and the other from the Toronto Rehabilitation Institute. Due in large part to the efforts of Dr. Caroline Paquette (Chair, Organizing Committee) and her dedicated team of volunteers, the number of attendees was increased by ~80% from our 2nd annual symposium in 2015. In addition to the Faculty of Education (McGill University) and the Department of Kinesiology and Physical Education (Faculty of Education, McGill University) - steadfast sponsors of this flagship event - we were very pleased to receive financial support for this year’s symposium from both the Centre de recherché Interdisciplinaire en réadaptation du Montréal métropolitain (CRIR) and Urban Poling.

As we look to the future, we will continue to reassess and redefine the ways that PATH satisfies its mission and goals. We will also continue to build a strong and solid foundation on which to realize our potential of becoming leaders in the promotion of health across the lifespan through transdisciplinary research in the areas of physical activity and behaviour modification. Central to the continued growth and success of PATH will be creating new opportunities for financial support of its researchers and their trainees as well as its scientific, educational and community outreach/engagement activities.

Sincerely and respectfully,

Dennis Jensen, PhD
Interim Director
The McGill Research Centre for Physical Activity and Health
Administrative Structure, Research Axes & Membership

**Interim Director**
Dennis Jensen, PhD
Associate Professor
Department of Kinesiology and Physical Education
Faculty of Education, McGill University

**Administrative Assistant**
Trina Mitchell, BSc, MSc Candidate
Department of Kinesiology and Physical Education
Faculty of Education, McGill University

**Advisory Board**
*Dean (or Associate Dean, Research) of the Faculty of Education at McGill University*
Dilson Rassier, PhD, Professor (or Nancy Heath, PhD, Professor)

*Vice-Principal (or Associate Vice-Principal) of Research and Innovation at McGill University*
Martha Crago, PhD, Professor (or Anne McKinney, PhD, Professor)

*Representative from the Faculty of Medicine at McGill University*
Jean Bourbeau, MSc, MD, Professor (Division of Respiratory Medicine), 2017-present.

**Active Regular (Primary) Members, 3-year term**
Ross Andersen, PhD, Professor, Department of Kinesiology and Physical Education, Faculty of Education, McGill University, 2012-present.

Lindsay Duncan, PhD, Assistant Professor, Department of Kinesiology and Physical Education, Faculty of Education, McGill University, 2017-present.

**Graduate Student Member, 1-year term**
Dorelle Hinton, MSc, PhD Candidate, Department of Kinesiology and Physical Education, Faculty of Education, McGill University, 2017-present.

**Member from outside McGill University, not directory involved in the Research Centre**
Philip Gardiner, PhD, Professor, Faculty of Kinesiology & Recreation Management, University of Manitoba, 2012-present.
**Research Axes**

PATH and its researchers and their trainees are unique in investigating physical activity and health across the lifespan through diverse perspectives: from cell and molecular biology to pedagogy. The transdisciplinary nature of PATH’s research activities are represented by the following 3 research axes: *Psychology and Pedagogy of Sport and Exercise; Human Movement and Ergonomics; and Physiology of Health and Disease.*
**Membership**

PATH’s constituency encompasses a breadth of disciplines with **13 primary (regular) members** from the Department of Kinesiology and Physical Education at McGill University, all leading productive research programs in *sport psychology, exercise and health psychology, health behavior change, adapted physical activity, physical education and pedagogy, exercise physiology, muscle biophysics, ergonomics, motor control, biomechanics, and neurorehabilitation*. PATH collaborates with **8 associate members** from within the McGill community representing all 3 research axes and spanning the Departments of Medicine, Emergency Medicine, Respiratory Medicine, Oncology, and Psychology; the School of Physical and Occupational Therapy; the Research Institute of the McGill University Health Centre; and the School of Dietetics and Human Nutrition at McGill University. Collaborations also exist between PATH and **4 external members** representing the Toronto Rehabilitation Institute-University Health Network, the Children’s Hospital Research Institute of Manitoba, and the Departments of Physical Therapy and Physiology & Function Genomics in the College of Medicine at the University of Florida.

Over the past year, PATH was pleased to welcome **5 new members**, including Drs. Lee Schaefer (McGill University), Olivier Beauchet (McGill University), Timothy Wideman (McGill University), Avril Mansfield (University of Toronto) and John McGavock (University of Manitoba).

**Primary (Regular) Members**

<table>
<thead>
<tr>
<th>Name</th>
<th>Position</th>
<th>Area(s) of research</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr. Ross Andersen</td>
<td>Professor</td>
<td>Exercise Physiology, Obesity, and Epidemiology</td>
</tr>
<tr>
<td>Dr. Julie Cote</td>
<td>Associate Professor</td>
<td>Chair, Department of Kinesiology &amp; Physical Education</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CIHR-IRSST Chair, Gender Work &amp; Health</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Area(s) of research: Ergonomics, Fatigue, and Musculoskeletal Disorders</td>
</tr>
<tr>
<td>Dr. Gordon Bloom</td>
<td>Professor</td>
<td>Area(s) of research: Sport Psychology, Coaching knowledge, and Concussions</td>
</tr>
<tr>
<td>Dr. Ted Milner</td>
<td>Professor</td>
<td>Area(s) of research: Neurophysiology and Motor Control</td>
</tr>
<tr>
<td>Dr. Caroline Paquette</td>
<td>Assistant Professor</td>
<td>Parkinson Canada New Investigator</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Area(s) of research: Motor control of Human Locomation, and Neurological Rehabilitation</td>
</tr>
<tr>
<td>Dr. David Pearsall</td>
<td>Associate Professor</td>
<td>Area(s) of research: Biomechanics and Hockey Research</td>
</tr>
</tbody>
</table>
Dr. Lindsay Duncan  
Assistant Professor  
William Dawson Research Scholar  
*Area(s) of research:* Exercise and Health Psychology, Health Behaviour Change

Dr. William Harvey  
Associate Professor  
*Area(s) of research:* Adapted Physical Activity, and Physical Education

Dr. Shane Sweet  
Assistant Professor  
FRQS Chercheurs-Boursiers, Junior 1  
*Area(s) of research:* Physical Activity Maintenance in Special Populations

Dr. Dennis Jensen  
Associate Professor  
Canada Research Chair in Clinical Exercise and Respiratory Physiology (Tier 2, CIHR)  
*Area(s) of research:* Clinical Physiology

Dr. Dilson Rassier  
Professor  
Dean, Faculty of Education  
Canada Research Chair in Muscle Biophysics (Tier 1, CIHR)  
*Area(s) of research:* Muscle Physiology and Biophysics

Dr. Celena Scheede-Bergdahl  
Faculty Lecturer  
*Area(s) of research:* Exercise Prehabilitation in Cancer and Effects of Chemotherapy

Dr. Lee Schaefer  
Assistant Professor  
Chair, Physical and Health Education Canada Research Council  
*Area(s) of research:* Physical Education and Indigenous Health, Pedagogy

Dr. Dennis Jensen  
Associate Professor  
Canada Research Chair in Clinical Exercise and Respiratory Physiology (Tier 2, CIHR)  
*Area(s) of research:* Clinical Physiology

Associate Members

Dr. Jean Bourbeau  
Professor, Division of Respiratory Medicine, Department of Medicine, McGill University  
*Area(s) of research:* Disease Management in COPD and Cardiorespiratory Exercise Physiology

Dr. Barbel Knauper  
Professor, Department of Psychology, McGill University  
*Area(s) of research:* Efficacy of Physical Activity and Weight Loss Interventions

Dr. Scott Delaney  
Division of Emergency Medicine, Department of Medicine, McGill University  
*Area(s) of research:* Sport Medicine, Concussion, and Neck Injury

Dr. Jose Morais  
Associate Professor and Chair, Division of Geriatric Medicine, McGill University  
*Area(s) of research:* Protein and Energy Metabolism in Healthy and Frail Elderly
Dr. Thomas Jagoe
Associate Professor, Division of Experimental Medicine, Department of Medicine, McGill University
*Area(s) of research: Clinical management of cancer cachexia, cancer and COPD-related muscle wasting; complimentary medical treatment*

Dr. Timothy Wideman
Assistant Professor, School of Physical and Occupational Therapy, Department of Medicine, McGill University
*Area(s) of research: Effect of Pain on Exercise and Clinical Implications*

Dr. Benjamin Smith
Assistant Professor, Division of Respiratory Medicine, Department of Medicine, McGill University
FRQS Chercheurs-Boursiers, Cliniciens, Junior 1
*Area(s) of research: Epidemiology and Physiology of COPD, and Lung Cancer*

Dr. Olivier Beauchet
Professor, Division of Geriatric Medicine, Department of Medicine, McGill University
*Area(s) of research: Age-related mobility and cognitive decline; Gait and balance disorders; Age, risk factors, care pathways and the health care system*

External Members

Dr. Russell Hepple
Professor, Department of Physical Therapy, College of Public Health and Health Professions, University of Florida
*Area(s) of research: Physiology of Aging Skeletal Muscle*

Dr. Avril Mansfield
Scientist, Toronto Rehabilitation Institute. Affiliate Scientist, Sunnybrook Research Institute. Assistant Professor, Department of Physical Therapy, University of Toronto.
*Area(s) of research: Gait and Posture, Stroke Rehabilitation*

Dr. Tanja Taivassalo
Associate Professor, Department of Physiology and Functional Genomics, College of Medicine, University of Florida
*Area(s) of research: Neuromuscular Disease, Exercise Physiology, and Skeletal Muscle Metabolism*

Dr. John McGavock
Associate Professor, Department of Pediatrics, Faculty of Health Sciences, University of Manitoba
CIHR Applied Public Health Chair in Resilience and Childhood Obesity
*Area(s) of research: Prevention and management of type 2 diabetes in youth (Indigenous and non-Indigenous), with particular focus on physical activity*
**Annual Symposium**

PATH’s core flagship event – the annual symposium – aims to serve the Centre’s mission and goals by bringing together members of the scientific community from McGill University and beyond who have a shared interest in promoting health through physical activity and behaviour modification. Each year, researchers, trainees, practitioners, professionals and industry stakeholders are treated to scholarly presentations from established and emerging research leaders across a broad spectrum of selected themes: from Exercise and the Aging Brain in 2014 to Sport-Related Concussion in 2015 to Balance and Mobility in Health, Aging and Neurological Disorders in 2016. In addition to advancing knowledge on the promotion of health through physical activity and behaviour change, the annual symposium provides attendees the opportunity to establish new research synergies with PATH and its members and their trainees.

PATH’s 3rd annual symposium was hosted at the McGill University Faculty Club on November 04, 2016 and was an undeniable success, with 152 registrants and 135 attendees from 11 different institutions. The program for the day may be viewed in Appendix C and included: 2 keynote speakers; 6 plenary speakers; 21 poster presentations by undergraduate, graduate and postdoctoral trainees; a complimentary buffet lunch; and a complimentary Wine & Cheese reception that closed the day and provided all those in attendance an opportunity to share in the discussion of how to promote health through physical activity.

The success of this year’s symposium is a direct reflection of the remarkable efforts put forth by the following members of the Organizing Committee who volunteered many hours to create a high-quality scientific program: Dr. Caroline Paquette (Chair); Dorelle Hinton, PhD Candidate; Trina Mitchell, MSc Candidate; David Conradsson, Postdoctoral Research Fellow; Anna Otto, MSc Candidate; and Dr. Dennis Jensen (Interim Director, PATH).

There were also 12 graduate student volunteers from the Department of Kinesiology and Physical Education who assisted with on-site activities (e.g., photography, registration, etc.) the day of the symposium, including: Aleksandra Budarick; Sara Abdallah; Erin Berry; Nathan Chiarlitti; Sunghoom Minn; Marcus Waskiw-Ford; Jessica Insogna; Samantha Taran; Maxana Weiss; Susanna Cere; Keryn Chemotob; and Kelly Perlman.

With respect to sponsorship, PATH received a total of ~$13,400 from the Faculty of Education (McGill University; $7,671), the Department of Kinesiology and Physical Education (Faculty of
Education, McGill University; $4,025), the Centre de recherché Interdisciplinaire en réadaptation du Montréal métropolitain ($1,500) and Urban Poling ($200) to help support this year’s symposium. These monies covered the cost of the venue, catering, poster board rental, presentation prizes, as well as travel and accommodation for all speakers from outside of Montreal.

**Keynote Speakers, 2016 PATH Annual Symposium**

**Falls after stroke: Causes, consequences and cures**

Dr. Avril Mansfield, Scientist, Toronto Rehabilitation Institute; Affiliate Scientist, Sunnybrook Research Institute; Assistant Professor, Department of Physical Therapy, University of Toronto

**Anticipatory locomotor adjustments: Evidence, knowledge gaps and potential applications**

Dr. Bradford McFadyen, Professor, Department of Rehabilitation, Université Laval; Researcher and member of the research council, Centre for Interdisciplinary Research in Rehabilitation and Social Integration (CIRRIS/CIUSSS-CN) within the Quebec Rehabilitation Institute
**Plenary Speakers, 2016 PATH Annual Symposium**

**Control of Balance During Voluntary and Involuntary Disturbances to Posture**  
Dr. Theodore Milner, Professor, Dept. of Kinesiology & Physical Education, McGill University

**Using robotics and elastics to study locomotor control and locomotor learning**  
Dr. Laurent Bouyer, Professor, Dept. of Rehabilitation, Faculty of Medicine, Université Laval

**Hippocampal volume, early cognitive decline and gait variability: which association?**  
Dr. Olivier Beuchet, Professor, Div. of Geriatric Medicine, Dept. of Medicine, McGill University

**Postural instability and freezing of gait in individuals with Parkinson’s disease**  
Dr. Julie Nantel, Associate Professor, Faculty of Health Sciences, University of Ottawa

**Brain control of complex walking**  
Dr. Caroline Paquette, Assistant Professor, Dept. of Kinesiology & Physical Education, McGill University

**Effects of highly challenging balance training in elderly with Parkinson’s disease**  
Dr. David Conradsson, Postdoctoral Fellow, Dept. of Kinesiology & Physical Education, McGill University
**Research Poster Presentation Competition, 2016 PATH Annual Symposium**

21 poster presentations were delivered by undergraduate, graduate and postdoctoral trainees under two research themes: (1) *Posture and Gait*; and (2) *Physical Activity*. A book of research abstracts may be viewed in Appendix D. Posters were on display from the beginning of the day until just before the start of the Wine & Cheese reception. There were 8 volunteer judges, including 3 of the invited speakers (Drs. Nantel, Mansfield and Bouyer) and 5 members of PATH (Drs. Duncan, Cote, Scheede-Bergdahl, Pearsall and Milner). Poster judging occurred over the lunch hour and each judge was responsible for scoring 5 presentations. Presenters were given 5-minutes to present the content of their poster followed by 5-minutes for discussion. Each poster was given a score based on the evaluation of 2 judges. Prizes were awarded to the presenters with the 2 highest scores within each of the two research themes. Prizes were announced during the closing ceremony, with 1st place receiving a $150 prize and 2nd place receiving a $100 prize.

Within the *Posture and Gait* theme, **Maxime Maheu, PhD Candidate** (École d'orthophonie et d'audiologie, Université de Montréal) was awarded 1st prize for his presentation on *Balance and vestibular function in hearing impaired adults*, while **Dorelle Hinton, PhD Candidate** (Department of Kinesiology and Physical Education, McGill University) was awarded 2nd prize for her presentation entitled, *Does an auditory distraction affect gait adaptation to a split-belt treadmill?*

Within the *Physical Activity* theme, **Felipe De Souza Leite, PhD Candidate** (Department of Kinesiology and Physical Activity, McGill University) was awarded 1st prize for his presentation on *Microfluid perfusions applied to the study of inter-sarcomere dynamics*, while **Laura Hallward, MSc Candidate** (Department of Kinesiology and Physical Education, McGill University) was awarded 2nd prize for her presentation on *Reformation of the neural control of the lower limb in older adults*. Prizes were announced during the closing ceremony, with 1st place receiving a $150 prize and 2nd place receiving a $100 prize.
University) was awarded 2nd prize for her presentation entitled, Exploring barriers and facilitators to physical activity among women in treatment or post-treatment for cancer.

From Left to Right: Dr. Caroline Paquette (Chair, Organizing Committee, 3rd Annual PATH Symposium), Felipe De Souza Leite, PhD Candidate, Dorelle Hinton, PhD Candidate, Laura Hallward, MSc Candidate, and Dr. Dennis Jensen (Interim Director, PATH).

Summary of 2016 PATH Annual Symposium

Overall, we organized and hosted an event that: (1) brought together members of the scientific community from McGill and beyond who had a shared interest in promoting health through physical activity and behaviour modification; (2) provided attendees the opportunity to establish new research synergies with PATH and its members and their trainees; (3) provided opportunities for students and postdoctoral fellows to participate in scholarly activities related to the promotion of health through physical activity and behaviour modification; and (4) advanced knowledge on how to improve health through physical activity and behaviour modification with practitioners, professionals and the community at large. In addition to the ~80% increase in attendance from our 2nd annual symposium in October 2015, the results of a post-symposium survey (Appendix E) suggested that the majority of attendees were satisfied-to-very satisfied with the quality of this year’s symposium and that PATH should continue to offer this flagship event on an annual basis.

We are very pleased to report that Dr. Lindsay Duncan has agreed to Chair the Organizing Committee of our 4th annual symposium, the focus of which will be on Physical Activity and Women’s Health. A considerable amount of planning has already begun and we are looking forward to another successful event in November 2017!
Seminar Series

The seminar series is another core program of PATH. Each year, presentations by PATH members and visiting scholars are organized under the banner of the seminar series, which brings together researchers, health professionals and practitioners, trainees, and industry stakeholders to share important findings at the forefront of physical activity and health research as well as to create new research synergies/collaborations. Below are the 3 seminar series presentations organized in 2016-17. Attendance was excellent, discussions were lively, and 2 of the 3 seminar series speakers (Drs. McGavock and Wideman) were welcomed as new members to the Psychology and Pedagogy of Sport and Exercise research axis of PATH.

Indigenous approaches to promoting child health in schools
November 23, 2016, 11:30 am – 12:45 pm
Stratcona Anatomy & Dentistry Building, 3640 University Ave., Room 2/36
Dr. John McGavock, Associate Professor, Department of Pediatrics, Faculty of Health Sciences, University of Manitoba; CIHR Applied Public Health Chair in Resilience and Childhood Obesity

High performance sport: Research partnership opportunities
March 17, 2017, 12:00 – 1:00 pm
Currie Memorial Gymnasium, 475 Pine Ave. West, Adriano Tassone Teaching Laboratory, Room 304
Marc Gelinas, B.Ed., M.A., Executive Director of McGill Athletics and Recreation; Former CEO of the Institut National du Sport du Quebec

When more activity means more pain: Exploring the clinical and theoretical importance of sensitivity to physical activity
March 31, 2017, 9:00 – 10:00 am
Currie Memorial Gymnasium, 475 Pine Ave. West, Adriano Tassone Teaching Laboratory, Room 304
Dr. Timothy Wideman, Assistant Professor, School of Physical and Occupational Therapy, Department of Medicine, McGill University
Financial Statement, 2016-17

The Faculty of Education at McGill University provided PATH’s operating budget for 2016-17 in the amount of $10,000. Below is a summary of the allocation of these funds.

<table>
<thead>
<tr>
<th>Allocation</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Administrative assistant salary (0.2 FTE), including associated benefits</td>
<td>$1,472.53</td>
</tr>
<tr>
<td>Receptions / special events</td>
<td>$6,985.98</td>
</tr>
<tr>
<td>Travel / accommodation</td>
<td>$686.24</td>
</tr>
<tr>
<td><strong>TOTAL (as of June 30th, 2017)</strong></td>
<td><strong>$9,144.75</strong></td>
</tr>
</tbody>
</table>
**Miscellaneous**

- PATH participated in the McGill Human Resources Health and Wellness Fair for Faculty and Staff on October 14, 2016.

- At our 3rd annual symposium, as well as other activities that we participated in throughout the year, we were proud to show off our new banner, which was donated by Dr. Jensen and can be seen as a backdrop during several photo opportunities.

- Thanks to a donation from Dr. Jensen, PATH was pleased to offer a commemorative and complimentary mug to each of its Primary (Regular) Members as well as to each of the researchers who presented at the 3rd Annual Symposium and as part of the seminar series.

- For information about taking advantage of PATH’s webpage, Twitter account and/or YouTube channel to help facilitate recruitment of study participants, promote the accomplishments of you and your research team members, etc., please email PATH and/or Ms. Trina Mitchell.
Goals of PATH for 2017-18

1. Continue to reassess and redefine the ways in which PATH satisfies its mission and goals, with a particular emphasis on the role it plays in supporting and promoting the research and scholarly activities of its Faculty members and their trainees.

2. Fundraising* to provide ongoing financial support for PATH and its administrative assistant, its community outreach/engagement activities, its annual symposium and its seminar series.

3. Fundraising* to provide financial support for the implementation of new strategic initiatives designed to help advance the research and scholarly activities of PATH’s Faculty members and their trainees, including:
   - Undergraduate summer research studentship award(s) to support the training of future health scientists and facilitate transdisciplinary collaboration among Faculty members of PATH;
   - Graduate student (Masters, Doctoral) and postdoctoral research fellowship(s) to support the training of emerging health scientists and facilitate transdisciplinary collaboration among Faculty members of PATH;
   - Travel and mobility award(s) for Faculty members of PATH and their trainees to (a) present their research (oral or poster) at national or international meetings, conferences or symposia conferences and (b) visit other laboratories outside Quebec to learn a new experimental technique(s).
   - Knowledge translation and dissemination award(s) to support, for example, preparation of an infographic summarizing research findings for distribution to targeted audiences within the community or publication of research findings in a peer-reviewed journals.
   - Community outreach and engagement award(s) to support Faculty members of PATH in organizing community-based activities designed to promote health of general and/or targeted populations through physical activity and behaviour change.
   - Research fellowship(s) to provide current Faculty members of PATH an opportunity to advance their research and scholarly activities via release time from teaching duties (up to one 3-credit course release per year) for a 12-month period;
   - Collaborative research development grant(s) to support the initial stages of research projects (i.e., seed funding) aimed at positioning new and existing teams in securing external funding from competitive sources (e.g., CIHR, NSERC, SSHRC).

*Fundraising opportunities to support Goals 2 and 3 may include, but will not be limited to:
   - Collaborate with University Advancement / Development and Alumni Relations Officers of McGill University and the Faculty of Education to develop strategies for obtaining philanthropic support
   - Apply to various foundations, organizations, societies and industry partners; for example, Max Bell Foundation, AstraZeneca Canada, etc.
   - Apply to CIHR for a Planning & Dissemination Grant
   - Apply to the Groups, Centres and Theme Networks program of the FRQS
Appendix A
List of Publications, 2016-17


75. Leite HT; Choque IE; Werner D, Morais JA. Psicofármacos. IN : Edição 4, Tratado de Geriatría e Gerontologia. Eds De Freitas EV, Py L. Guanabara Koogan. 2016, 426-432


27


Appendix B
McGill Research Centre for Physical Activity and Health (PATH): Members’ Survey, 2016
**Question 1.** What 3 words/phrases come to mind when you think of what the McGill Research Centre for Physical Activity and Health (PATH) is currently?

| Respondent | 
|---|---|
| Respondent 1 | Potential for interdisciplinary research; seminars; unclear vision |
| Respondent 2 | Disjointed; potentially being outrivaled by the PERFORM center; has great potential with expertise in exercise pathophysiology and behaviour; |
| Respondent 3 | Good Potential, Not doing much, Unclear mission |
| Respondent 4 | Dormant; great idea but lacks faculty member engagement; needs to be more than sum collection of current DKPE members activities |
| Respondent 5 | Promising, irrelevant, inefficient |
| Respondent 6 | Research, interdisciplinary, networking |
| Respondent 7 | I don't have a sense of the purpose of PATH or what has actually been taking place there. |
| Respondent 8 | Under-utilized; untapped potential |
| Respondent 9 | Work in progress |
| Respondent 10 | Potential; reviving; developing |
| Respondent 11 | Name, website, symposium |

**Question 2.** What 3 words/phrases come to mind when you think of what PATH should be?

| Respondent | 
|---|---|
| Respondent 1 | Interdisciplinary research; collaboration; strong network |
| Respondent 2 | Unique expertise in exercise pathophysiology, health promotion and behavioural strategies to promote physical activity within McGill, Montreal, Canada; promote 'exercise is best medicine' to clinical populations; forum for collaboration, subject recruitment, team-grant proposals |
| Respondent 3 | Increase visibility for KPE and McGill, Build across campus relationships, Great for philanthropy |
| Respondent 4 | Promote professional status of both PE and KIN studies; exploit its link with schools / community to promote health; a means to leverage research funds by exploiting our skills and infrastructure |
| Respondent 5 | Multidisciplinary, relevant, supportive |
| Respondent 6 | Research, interdisciplinary, collaboration |
| Respondent 7 | Not sure |
| Respondent 8 | Health promotion; improving quality of life; community involvement |
| Respondent 9 | Leader of physical activity research at McGill |
| Respondent 10 | Externally-funded; researcher support platform; networking brokering |
| Respondent 11 | Facilitate research (shared resources material and human), provide opportunities and support (not necessarily financially) for HQP |

**Question 3.** What 3 words/phrase come to mind when you think of what PATH could be?

<p>| Respondent |
|---|---|
| Respondent 1 | Leader in understanding and promoting physical activity from a physio-psycho-social lens. |
| Respondent 2 | Same as #2 |
| Respondent 3 | World class, Trans-disciplinary, Supportive |
| Respondent 4 | An equal partner in health promotion; a link (&quot;path&quot;) between schools and health promotion research and teaching; a true international center in |</p>
<table>
<thead>
<tr>
<th>Respondent</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Exposure to research to seminar presentations and the symposium</td>
</tr>
<tr>
<td>2</td>
<td>Minimal due to my minimal research;</td>
</tr>
<tr>
<td>3</td>
<td>Does not support me</td>
</tr>
<tr>
<td>4</td>
<td>Zero</td>
</tr>
<tr>
<td>5</td>
<td>Through PATH symposia I have met researchers with whom I now collaborate; however, in each case I would likely still be collaborating with them had I not met them initially through PATH.</td>
</tr>
<tr>
<td>6</td>
<td>PATH has provided an opportunity to present research activities.</td>
</tr>
<tr>
<td>7</td>
<td>None that I know of</td>
</tr>
<tr>
<td>8</td>
<td>None</td>
</tr>
<tr>
<td>9</td>
<td>This is difficult to answer. In practice, very little because the centre is virtual, has no tangible structure, and whether I decide to include PATH as one of my affiliations on a grant or manuscript has essentially zero impact to my research. On the other hand, including PATH as an affiliation is important to help build awareness of the centre.</td>
</tr>
<tr>
<td>10</td>
<td>None</td>
</tr>
<tr>
<td>11</td>
<td>Symposium was an outstanding opportunity for me as I organized it this year (provided networking opportunities) but not much other than that.</td>
</tr>
</tbody>
</table>

**Question 4.** What role, if any, does PATH have in your research activities now?

**Question 5.** What role, if any, do you see PATH having in your research activities in the future? If you see a role, please describe the nature and scope of PATH’s role in your future research activities. If you do not see a role, please provide a brief explanation why.
| Respondent 6 | I see PATH playing a role in future collaborations, perhaps researchers that I have not yet been acquainted with. |
| Respondent 7 | It would be great to be involved in a research space that supported both multi-sectorial and multi-disciplinary research collaboration with and outside of KPE. Having administrative support for editorial tasks, grant writing, research program design, and graduate student support are all ways that I could see PATH being supportive of what we do as a department. |
| Respondent 8 | Doesn’t matter. My research program runs well on its own, but I would be happy to contribute to the center if there is a clear and united goal and vision. |
| Respondent 9 | None (moving to UF) |
| Respondent 10 | PATH could provide an infrastructure to accept requests for research partnerships between PATH members and research "end-users" (e.g. online platform where needs and offer packages could be built and submitted). PATH could have a repository of equipment that researchers or partners could offer as tools to use in establishing research partnerships. PATH could offer expertise (e.g. contract negotiation,...) to facilitate connections between researchers and end-users. PATH could provide regular visibility on members' research output, and easily digestible updates on research advances on the role of physical activity towards health (e.g. newsletter,...). PATH could develop mechanisms for regular surveillance of needs of the community (especially the McGill community) on knowledge and expertise regarding physical activity and health research. PATH could offer events where it would position itself as the community (especially McGill community) leader on physical activity and health research (e.g. public lectures, workshops, online courses). |
| Respondent 11 | 1 - In the future, I would see help with supporting HQP in activities other than what is already available to them at McGill. These could be providing them with tools required for their future careers as researchers: how to look for funding opportunities, how to write applications to fit with specific granting agencies, how to optimize networking opportunities at conferences, how to plan for your career, how to improve your productivity, etc.  
2 - Support for me would be access to shared equipment and personnel |
(which I could buy into). Administrative help and access to shared research assistants, techs, computer programmer, statistician, etc. would be facilitating my research.

**Question 6.** What role, if any, do you see yourself playing in PATH and its activities in the future?

| Respondent 1 | Working on projects; promoting its research activities; |
| Respondent 2 | External member, collaborations |
| Respondent 3 | I would be happy to serve as PATH board member |
| Respondent 4 | Provide ergonomic assessment in sport e.g. gait retraining; comprehensive clinical gait assessment for special populations |
| Respondent 5 | I see myself contributing ideas, time, and personnel to collaborative projects and grants. I see myself helping to plan a symposium. I see myself presenting my work and helping to review the work of others. I also see myself promoting the mission and activities of PATH within and outside McGill (e.g., at events like the health fair, etc). |
| Respondent 6 | I would like to become a better contributing member to PATH activities. |
| Respondent 7 | I would hope to be involved in PATH in the future, especially given that at this point I don't necessarily see a stream identified within PATH's priorities for the work that I do. |
| Respondent 8 | Depends on the goal and vision |
| Respondent 9 | Minimal (moving to UF) - there will be continued collaboration with some members of PATH (Jose Morais). |
| Respondent 10 | I can play any advisory role at the request of the director |
| Respondent 11 | Contribute to the organization of activities and as needed. |

**Question 7.** One funding model employed by some research centres is to have its members make an annual financial contribution from their research funds and/or annual professional development fund allocation to support the centre activities (pls. refer to Questions 7a-b below).

**Question 7a.** If you were to make an annual financial contribution to help support PATH, what support services would you expect to have access to; for example, training grant(s) to support undergraduate, graduate and/or postdoctoral fellows; seed funding; small equipment grant; grant assistant, etc?

| Respondent 1 | Grant assistant; training grants; assistant to help link researchers on similar ideas or bridge ideas for multidisciplinary rather than unidisciplinary grant applications. |
| Respondent 2 | All of the above listed (would have helped me out tremendously if were already in place!) |
| Respondent 3 | Hard to say |
| Respondent 4 | Research / technical assistant(s) e.g. electronic / software programming |
| Respondent 5 | Money for students; grant and/or manuscript review by colleagues; seed funding; promotion of my work through invitations to speak at symposia; promotion of my work (and the work of my students) though social media, the website, and maybe a newsletter; access to equipment (e.g., |
| Respondent 6 | Grant assistance (feedback, having access to successful applications), training seminars for students |
| Respondent 7 | I think everything mentioned here would greatly helpful for us as a department. I would also perhaps add dissemination opportunities on behalf of PATH, administrative assistance with budget, editing, CV creation etc., social aspects that allow for more inter-department collaboration, a venue for graduate students to present, develop within, professional development opportunities for faculty etc. |
| Respondent 8 | I don't have any expectations |
| Respondent 9 | I would suggest we approach central administration to have a portion of the indirect costs funnelled into the centre to make this contribution. As it stands, tri-council funding lines are tight and always come with a 20-25% cut in budget from what was approved by the review panel. Taking money away from the investigator's operating funds at this point is unfair. Central admin approved the centre and it is time for them to make a commitment. |
| Respondent 10 | Training grants: ok Seed funding: ok Small equipment: I am not sure (maybe just equipment sharing mechanisms) Maybe student and PI travel support? others: see suggestions above. Generally speaking: I would expect support that would not normally be expected from direct access to operating grants. Logically, I would expect 1) support that fits within the guidelines for RSF, 2) support that helps develop partnerships with external partners. I would expect PATH to expect commitment or contribution from me in return of obtaining support from PATH. |
| Respondent 11 | Ok, but I think that the aim of PATH is to develop an externally funded structure. I would prefer something on a pay per consumption based on our needs. Not interested in providing funds for students or seed grants (ie, I prefer using my own resources for my own needs). Applying for a training grant as a group to support such initiatives and leverage our own funding would be very interesting on the other hand. Not so much for redistributing the wealth but more for leveraging it (no Robin Hood initiatives please). |

**Question 7b.** How much would you be willing to contribute annually to PATH if some of the membership benefits you outlined in your response to Q7a above were provided ($0 to $1,000/year)?

| Respondent 1 | $300/year + % of my grant for grant/admin support (e.g., 1/2 day a week) |
| Respondent 2 | |
| Respondent 3 | It seems to me that it would be hard to ask people for $ until we have resources to offer and a clear vision for the Centre |
| Respondent 4 | If grant and/or professional development fund rules permit, up to $1000/year |
### Question 8. An additional source of funding used by some research centres is through direct fees for membership and/or symposia type events (Pls. refer to Questions 8a-c below):

**Question 8a. How much would you be willing to pay annually for a PATH membership if some of the membership benefits you outlined in your response to Question 7a above were provided ($0 to $250)?**

<table>
<thead>
<tr>
<th>Respondent</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Respondent 1</td>
<td></td>
</tr>
<tr>
<td>Respondent 2</td>
<td></td>
</tr>
<tr>
<td>Respondent 3</td>
<td>$125? Not sure really</td>
</tr>
<tr>
<td>Respondent 4</td>
<td>If professional development fund rules permit then $250</td>
</tr>
<tr>
<td>Respondent 5</td>
<td></td>
</tr>
<tr>
<td>Respondent 6</td>
<td>A fee of $50 is reasonable and can be paid personally by researcher even if they do not have funding to use.</td>
</tr>
<tr>
<td>Respondent 7</td>
<td>I would see this fitting in to my membership fees. $100 - $200 depending on what benefits were provided.</td>
</tr>
<tr>
<td>Respondent 8</td>
<td></td>
</tr>
<tr>
<td>Respondent 9</td>
<td>This is another way of taxing members to have the privilege of belonging to the club where there are as yet no tangible benefits for doing so.</td>
</tr>
<tr>
<td>Respondent 10</td>
<td>250$ (although I personally have not seen this funding model anywhere; it would be important that the personal benefits be demonstrable, and at least show evidence of efforts to obtain the majority of funding another way, i.e. externally)</td>
</tr>
<tr>
<td>Respondent 11</td>
<td>I don’t think we should be paying for membership.</td>
</tr>
</tbody>
</table>

**Question 8b. How much do you believe non-PATH members would be willing to pay as a registration fee to attend the annual PATH research symposium ($0 to $100)?**
Respondent 1: $20
Respondent 2: $75
Respondent 3: $50 (we could advertise widely and do it when people could travel to attend)
Respondent 4: $50
Respondent 5: $80
Respondent 6: At this point in time, a fee of $25 to $50 would be reasonable (to help cover food expenses and contribute to speaker travel costs).
Respondent 7: Very little right now, but perhaps if a brand was created, and it became a professional development opportunity, I could see individuals paying between $30 and $50 to be involved.
Respondent 8: $50 right now
Respondent 9: Just a guess - but I doubt they would be willing to pay unless some tangible benefits can be provided.
Respondent 10: Difficult to say!! hopefully enough to cover the costs of food and the event, i.e. so that the event itself would be at zero cost to PATH.
Respondent 11: $60-$80 without alcohol provided

**Question 8c.** How much do you believe graduate student and postdoctoral fellows should pay annually for a PATH membership, if anything at all?

| Respondent 1 | No fee |
| Respondent 2 | None |
| Respondent 3 | $20 |
| Respondent 4 | $25, with free admission to PATH symposium |
| Respondent 5 | No more than $40 |
| Respondent 6 | I believe that students should not be required to pay. Payers vs non-payers can cause a 2 tier system among the students. |
| Respondent 7 | $0 |
| Respondent 8 | Nothing |
| Respondent 9 | Nothing. Trainees should always be exempt from such fees. |
| Respondent 10 | Nothing |
| Respondent 11 | $30 (ie half price) |

**Question 9.** With the exception of philanthropic donations and/or corporate sponsorships, what other potential source(s) of funding do you think PATH should pursue to help support its activities and, by extension, its members?

| Respondent 1 | Service provision (testing; assessments); corporate talks on health and well-being; grant applications |
| Respondent 2 | Form a stronger alliance with Athletics department and raise funds at home games (football, soccer, swimming, track and field) |
| Respondent 3 | Perhaps a Speaker’s Bureau to offer talks. We could also apply for Cafe Scientifique funding |
| Respondent 4 | Strategic services e.g. fitness testing of elite teams/athletes/special populations |
| Respondent 5 | I could see PATH making some money through fee for service if we identified services that we could offer (e.g., physical activity counselling |
| Respondent 6 | Training workshops or presentations can be offered to outside groups for a fee that goes towards PATH operating costs. |
| Respondent 7 | In the past centres I have been involved with, they were attached to someone that provided funding for a post-doc each here...It would be great to find someone that could support a post-doc each year, that would then have their name attached to the award. This past centre also ran a summer institute that was aligned with the Ghandi Institute. The curriculum had to be somewhat tailored towards the institute, but they provided a decent amount of funding to support the summer institute. |
| Respondent 8 | Nothing in addition to what you wrote |
| Respondent 9 | McGill central administration, Dean of the Faculty of Education |
| Respondent 10 | Federations, associations, INS |
| Respondent 11 | FRQS, FRQNT support research centres and networks. Provide services to the population or research community to support our activities (ie, become a business). |

**Question 10.** To increase the role that PATH plays within the research community and to enhance the activities and services provided by PATH to its members, strategic partnerships (research, community, industry, etc.) must be put in place. As a member of PATH, what strategic partnerships do you believe PATH should pursue/develop and make available to its members, and why?

<p>| Respondent 1 | Community groups promoting active living for enhance knowledge mobilization; City of Montreal to invite PATH to health/active events or initiative to evaluate its effectiveness; Industry/Corporate partners (e.g., Health Insurance companies) who may want research to be conducted on some of their programs. |
| Respondent 2 | Highlight research findings and activities of PATH members to Jill Barker, columnist for the Montreal Gazette who works in Athletics to get the word out to the community; partner with the PERFORM center |
| Respondent 3 | Bio Stat support. Grant assistance. Core lab support (Nursing, Blood storage, Technicians, web support) |
| Respondent 4 | Institute Nationale du Sport |
| Respondent 5 | I feel the most strategic thing to do at this point is to create better research partnerships between existing members and to worry about external partnerships next. |
| Respondent 6 | I believe that PATH should be the McGill &quot;go to&quot; for exercise information/activities/presentations. An outreach to programs, such as &quot;Exercise is Medicine&quot; and physician training in physical activity would be a benefit to PATH. Also, community outreach programs can highlight PATH's activities. |
| Respondent 7 | This is tough for me lacking context of what PATH is now...and the context of Quebec and McGill. |
| Respondent 8 | Need to have a forum to discuss, but I believe corporate sponsorships with |</p>
<table>
<thead>
<tr>
<th>Respondent 1</th>
<th>Knowledge mobilization series to move PATH research beyond the academic walls; Collaborations with other research centers within or outside of McGill.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Respondent 2</td>
<td>Think tank for team grant proposals;</td>
</tr>
<tr>
<td>Respondent 3</td>
<td>Lunch Bag seminars for Undergrads and Grad students.</td>
</tr>
<tr>
<td>Respondent 4</td>
<td>Hire student support to produce 1 minute video vignette of current research labs / activities / studies for self-promotion on web as well as create monthly PATH research news highlight webpage</td>
</tr>
<tr>
<td>Respondent 5</td>
<td>A writing retreat for members Project design consultation (almost like we do for graduate student proposals, but for our own research plans)</td>
</tr>
<tr>
<td>Respondent 6</td>
<td>Student training seminars (practical skills), Montreal-wide student networking opportunities</td>
</tr>
<tr>
<td>Respondent 7</td>
<td>Perhaps a summer institute that included compressed graduate courses, International scholar residency opportunities, weekly time set for research issues/collaboration. And the others you mention above would be great additions.</td>
</tr>
<tr>
<td>Respondent 8</td>
<td></td>
</tr>
<tr>
<td>Respondent 9</td>
<td>Again, this is very challenging to organize given the very diverse research interests of the centre members. Until a unified direction is identified, it is difficult to suggest what PATH activities might be most relevant and important.</td>
</tr>
<tr>
<td>Respondent 10</td>
<td>Enhancing research services to its members: see earlier suggestions. Maybe get involved more closely in some research-focused graduate student initiatives such as the 4min thesis, etc.?</td>
</tr>
<tr>
<td>Respondent 11</td>
<td>I don't know that we need more research activities (ie, events) at this point.</td>
</tr>
</tbody>
</table>

**Question 11.** With the goal of enhancing research services provided by PATH to its members, what other kinds of research activities (beyond the seminar series and annual symposium) do you think PATH should organize?
Appendix C

2016 PATH Annual Symposium: Scientific Program
3rd Annual PATH Research Symposium:
Balance and Mobility

November 4th, 2016
McGill Faculty Club

Presented by...
# Event Schedule

## Morning

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>8:45 A.M.</td>
<td>Welcome and Opening Remarks</td>
</tr>
</tbody>
</table>
| 9:00 A.M. | **Keynote**  
Bradford J. McFadyen, Université Laval  
“Anticipatory Locomotor Adjustments: evidence, knowledge gaps and potential applications” |
| 10:00 A.M. | Break                                                                |
| 10:15 A.M. | **Symposium** - chaired by Julie Côté  
Theodore Milner, McGill University  
“Control of Balance During Voluntary and Involuntary Disturbances to Posture”  
Laurent Bouyer, Université Laval  
“Using robotics and elastics to study locomotor control and locomotor learning”  
Olivier Beauchet, McGill University  
“Hippocampal volume, early cognitive decline and gait variability: which association?” |

## Noon

Buffet Lunch and Poster Session

## Afternoon

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
</tr>
</thead>
</table>
| 2:00 P.M. | **Symposium** – chaired by David Pearsall  
Caroline Paquette, McGill University  
“Brain control of complex walking”  
Julie Nantel, University of Ottawa  
“Postural instability and freezing of gait in individuals with Parkinson’s disease”  
David Conradsson, McGill University  
“The effects of highly challenging balance training in elderly with Parkinson’s disease” |
| 3:45 P.M. | Break                                                                |
| 4:00 P.M. | Dean’s Address                                                       |
| 4:10 P.M. | **Keynote**  
Avril Mansfield, Toronto Rehab Institute  
“Falls after stroke: causes, consequences, and cures” |
| 5:00 P.M. | Closing Comments and Poster Awards followed by Wine and Cheese      |
Poster Listing

Gait and Posture (Heritage Room)

Sex/gender differences in perceptual responses to experimental pain following a fatiguing task. Annamaria Otto & J. Côté

Balance and vestibular function in hearing impaired adults. Maxime Maheu, A. Sharp & F. Champoux

Exploring the effect of aging on motor adaptations during shoulder fatigue from fine and gross motor tasks. Christopher Bailey & J. Côté

Does an auditory distraction affect gait adaptation to a split-belt treadmill? Dorelle Hinton, D. Conradsson & C. Paquette


Fast walking condition increases gait range of motion in children with cerebral palsy who walk in a crouch. Yosra Cherni, A. Pouliot Laforte, A. Parent, M. Begon & L. Ballaz

A more severe crouch gait after a continuous walking exercise is not related with muscle co-activation in children with cerebral palsy. Audrey Parent, A. Pouliot-Laforte, M. Raison, P. Marois & L. Ballaz


Gait Initiation Mechanisms in Dysvascular Transtibial Amputees. Mary Roberts & F. Prince

Healthy young adults implement different locomotor strategies while avoiding animate vs. inanimate. Wagner Souza Silva, G. Aravind, S. Sangani & A. Lamontagne
**Poster Listing**

**Physical Activity (Main Lounge)**

**Does a between-sex difference exist in Functional Movement Screen™ scores in a student-athlete population?** Kristie Liu, D. Frost, D. Richards, C. Hincapié & T. Beach

**Preventive action of a normal physical fitness level on cardiovascular risk factors.** Maxime Caru, L. Kern, M. Bousquet & D. Cumier

**Physical fitness training and task-set cost in older adults.** Tudor Vrinceanu, M. Renaud & L. Bherer.

**The Effects of Physical Training Cessation on Cognitive Performances in Older Adults.** Lynden Rodrigues, T. Vrinceanu, N. Berryman, L. Bosquet, S. Nadeau, S. Lauzière, L. Lehr, F. Bobeuf, MJ. Kergoat, V. Tuong & L. Bherer

**Exploring Barriers and Facilitators to Physical Activity among Women in Treatment or Post-treatment for Cancer.** Laura Hallward, M. Workun-Hill & L. Duncan

**Microfluidic perfusions applied to the study of Inter-Sarcomere Dynamics.** Felipe de Souza Leite & D. Rassier

**Effects of an acute bout of exercise on brain connectivity: are they associated with improvements in motor memory consolidation?** Fabien Dal Maso, MH. Boudrias & M. Roig

**The Intersection of Sexual Orientation and Physical Activity: A Scoping Review.** Shannon Herrick & L. Duncan

**Four-week moderate intensity exercise program can minimize post-surgical insulin resistance in colorectal cancer patients: a pilot study.** Vanessa Ferreira, F. Carli, C. Scheede-Bergdahl

**Efficacy of interventions aimed to increase physical activity levels in individuals with stroke: A systematic review.** Larissa Aguiar, S. Nadeau, J. Martins, L. Teixeira-Salmela, R. Britto & C. Faria
Appendix D

2016 PATH Annual Symposium: Abstract Booklet
The 3rd Annual PATH Symposium:

Balance and mobility

The Faculty Club, 3450 McTavish St.
McGill University

We acknowledge our sponsors, the organizing committee, and volunteers in making this event possible
Theme: Gait and posture
Heritage room

Poster Presentations
Main Lounge and Heritage Room at 12 p.m.

Theme: Gait and posture

Sex/gender differences in perceptual responses to experimental pain following a fatiguing task

Otto, Annamaria; Côté, Julie

Work-related musculoskeletal disorders (WMSDs) of the neck/shoulder are common and affect many Canadians. Previous research demonstrates a clear sex/gender (s/g) difference in the prevalence of WMSDs, such that women report injuries of the neck and shoulder more frequently than men. While several factors likely influence this s/g difference, one proposed mechanism is s/g differences in pain perception. Women in general are known to report more pain, as well as pain that is more intense, of longer duration, and more frequent. Furthermore, in experimental pain, women demonstrate lower pressure pain thresholds and pressure pain tolerances compared with men. However, little research has investigated whether men and women have similar perceptual responses to pain after a fatiguing task. The purpose of this project was to describe the s/g-specific characteristics of the pain experience following exercise-induced neck/shoulder fatigue. We hypothesized that pressure pain threshold (PPT) would increase with fatigue, and men would have higher PPT before and after the fatiguing task compared with women. We also hypothesized that men and women would differ in their verbal descriptions of the pain experience. In order to test our hypotheses, we used a quasi-experimental design to compare s/g differences in experimental pain and perceived exertion. Participants underwent an experimental pain test on 3 muscles (Biceps Brachii, Anterior Deltoid, and Upper Trapezius) to identify pressure pain threshold followed by a pain questionnaire (McGill-Melzack Pain Questionnaire) before and after the fatiguing task. The fatiguing task consisted of a manual dexterity task performed at shoulder height until a stoppage criterion was reported. The results presented are preliminary results from 28 participants (14 men and 14 women). Paired T test analysis of PPT in the Upper Trapezius revealed a significant difference between pre- (377.3) and post- (326.27) fatigue conditions; t(27)=4.052, p=0.000. Paired T test analysis of PPT in the Anterior Deltoid showed a significant difference for women only between pre- (273.24) and post- (228.98) fatigue conditions; t(13)=2.741, p=0.017. No significant differences between pre- and post-fatigue conditions were found for PPT in Biceps Brachii. For the Short-form McGill Pain Questionnaire total scores, significant differences were found between pre- (5.29) and post- (7.61) fatigue conditions t(27)=−2.399, p=0.024. However, when gender was taken into consideration, only women had significant differences between pre- (4.57) and post- (6.5) fatigue conditions; t(13)=−3.333, p=0.005. Preliminary findings from this study suggest that s/g differences in the musculoskeletal pain experience in the neck/shoulder area may be dependent on the characteristics of the muscle being investigated. Additionally, these findings also suggest that men and women verbally describe their perception of pain differently.
Theme: Gait and posture
Heritage room

Balance and vestibular function in hearing impaired adults
Maheu, Maxime; Sharp, Andréanne; Champoux, François
In order to maintain our posture in different conditions, it is believed that the central nervous system integrates informations from the visual, the somatosensory and the vestibular systems. In case of a sensory loss, it has been shown that the dominance can change. Some studies investigated the influence of hearing loss on postural control and observed deficits in individuals with sensorineural hearing loss. They found that hearing impaired individuals have poorer postural control and were more at risk of falls. However, it is still unknown if congenital hearing impaired individuals uses the same strategies to compensate for the auditory cues similarly to normal healthy controls in static postural tasks. The aim of our study was to compare the impact of the presence and absence of auditory cues on postural control as in congenital hearing impaired participants as opposed to healthy controls. Our results indicate that auditory input reduce differences in postural control between both groups. However, congenital hearing impaired did not seem to be influenced by the presence or absence of auditory cues. Further studies will be necessary to understand if early auditory deprivation as a different impact compared to late hearing impaired on the use of auditory cues.

Exploring the effect of aging on motor adaptations during shoulder fatigue from fine and gross motor tasks.
Bailey, Christopher; Côté, Julie
Background: Since the workforce is diversifying and aging, workers of all ages perform fine and gross motor tasks repetitively, resulting in muscular fatigue. Fatigue is a prominent risk factor for the development of musculoskeletal disorders (MSDs), with many injuries occurring at the shoulder. To reduce the risk of shoulder MSDs while maintaining task performance, movements can be adapted at the local (muscle, joints) or whole-body levels under the principles of motor abundance (where people take advantage of their many muscles to find new motor solutions) and motor variability (where people vary their patterns from one repetition to the next to delay fatigue). Since the sensorimotor system of older adults is less adaptable, especially for multi-joint tasks, older adults may have a lower capacity to adapt to muscular fatigue. However recent evidence has been unclear. Older adults may actually adapt less during gross motor tasks than fine motor tasks, so both need to be used to better analyze the effect of age on motor adaptations during fatigue.
Objective: Investigate the effect of aging on motor adaptations during shoulder fatigue from fine and gross motor tasks.
Methods: Two groups of healthy adults from the normal working age range will be recruited from the community: young adults (20-29 years old) and older adults (55-64 years old). Participants will complete two visits separated by one week, performing one of two randomized tasks: a fine motor task and a gross motor task. Both tasks will be performed at an established frequency, measured using an audible metronome. For the fine motor task, participants will stand and repetitively twist a screw with their dominant hand at 100% of forward arm length. For the gross motor task, participants will stand and repetitively reach forward with their dominant arm between targets positioned at 30% and 100% of arm length. Both tasks will be completed to a self-perceived level of exertion of 8 on the 10-point Borg scale related to the shoulder region. Data will be collected for the final 30 s of each minute using electromyography to quantify the muscle activation of 16 shoulder muscles, a three-dimensional motion capture system to quantify segment and joint kinematics and center of mass (COM), and a force plate to
Theme: Gait and posture
Heritage room

quantify center of pressure (COP). All measures will be analyzed with two-way repeated measures ANOVAs to test for time, age and task main effects, and for interactions.
Expected Results: We expect similar times to task termination for all participants across tasks, and lower kinematic, COM and COP adaptations for older adults, especially for the gross motor task. The results from this study will provide evidence of how older adults adapt to shoulder fatigue during different types of work tasks. As the Canadian workforce is rapidly aging, this research is needed to provide new insights for injury prevention in older workers.

Does an auditory distraction affect gait adaptation to a split-belt treadmill?
Hinton, Dorelle; Conradsson, David; Paquette, Caroline

INTRODUCTION: On a daily basis, we must adapt the way we walk to our surroundings in order to avoid falling. A split-belt treadmill, capable of driving each leg a different speed, allows for the study of locomotor adaptation to a symmetry perturbation. Healthy adults are capable of quickly adapting their gait patterns to the asymmetry induced by a split-belt treadmill as well as “de-adapting” their gait patterns back to normal [1]. A visual distraction alters how healthy adults are able to adapt back to normal walking from a symmetry perturbation induced by a split-belt treadmill [1], however it is not yet understood how the duration or frequency of an auditory distraction affects the efficiency of adaptation. This project aimed to understand how an auditory distraction affects our inherent ability to adapt locomotion to our environment. It was expected that the addition of an auditory distraction would create larger step asymmetries, and require participants to take more steps before they are able adapt their gait both to the limp produced by the treadmill and back to their normal walking pattern. METHODS: Five groups of healthy adults (n=54, 23.33 years) walked on a split-belt treadmill for 24 minutes. The first 5-minutes were spent walking at each subject’s typical walking speed. Throughout the middle 14 minutes, the belt driving the dominant leg decreased to one third of the original walking speed (Adaptation Phase). During the Adaptation Phase, the experimental participants simultaneously completed an auditory n-back distraction task while the control group did not. Experimental participants received one of 4 conditions: First Half (FH), Second Half (SH), Intermittent or Complete, referring to the time periods where the n-back task was administered. FH, SH and Intermittent participants all received 8 minutes of the distraction task while Complete participants received 14 minutes. For all participants, both belts returned to their original speed for the last 5 minutes (De-Adaptation Phase) The main outcome measures (step symmetry, time required to reach step symmetry,) were analyzed during adaptation and de-adaptation phases. RESULTS: All participants increased spatial and temporal step asymmetry with the onset of adaptation (p<0.05). Spatial step symmetry did not return to baseline by the end of the adaptation period (p>0.05; See Figure 1). Preliminary results indicate the presence of auditory dual-task did not alter spatial step symmetry, time to adaptation or time to de-adaptation to normal gait (p>0.05). CONCLUSIONS: Spatial gait adaptation to the split-belt treadmill did not occur within the adaptation period with or without an auditory distraction. All participants were able to return to their baseline gait pattern within the de-adaptation period. The use of an auditory n-back distraction task requires further investigation into its effects on locomotor adaptation. [1] Malone LA and Bastian AJ (2010) J Neurophysiol 103(4); p. 1954-62.
Theme: Gait and posture
Heritage room

Locomotor asymmetry and walking abilities in the community in persons post-stroke: Preliminary results.

Duclos, Noëmie C; Parent, Gerald; Aissaoui, Rachid; Duclos, Cyril; Nadeau, S

After stroke, individuals often walk slowly and with an asymmetric pattern: both steps are different. Walking speed is usually considered as the main limiting factor for community-ambulation and daily walking activity. Locomotor asymmetry (LocAsym) may also be a limiting factor for post-stroke community-ambulation. To date, it is not clear how LocAsym changes between clinical/laboratory and community/ecological environments, or how it evolves with fatigue involved by a prolonged walking task (as required for excursions in a shopping mall) or by a demanding walking task (as access ramps or stairs). Our main questions are: 1) Does LocAsym exhibit the same pattern when post-stroke individuals walk in the community, as in a shopping mall, compared to when they walk in a controlled environment, such as a lab? 2) Is there a correlation between LocAsym and the daily community-ambulation of post-stroke individuals? 3) Does LocAsym vary with the duration and level of effort during walking activity?

Preliminary data were collected for three chronic hemiparetic individuals, who were independent walkers with residual lower-limb motor deficits. A 350m walking circuit including level walking, stairs and a slope was tested in the lab (at CRIR’s Laboratory of Pathokinesiology) and in Alexis Nihon’s mall (downtown, Montreal) during two separate sessions. Participants wore 6 wearable inertial sensors (OPAL, APDM inc.) fixed at the ankles, thighs, pelvis and chest levels. In the lab, a GAITRite system was used to measure spatial parameters (step length, SL) during level walking. The temporal parameters (stance and swing time) were estimated by OPAL system. For each parameter, ratios (non-paretic/paretic) were analyzed on 10m sections over level ground and on the slope.

Between sessions (7 days), participants wore a step-count monitor (Fitbit One, at the non-paretic ankle) and kept a daily diary in which all their trips, outside their home, were noted.

In the lab, initial walking speed of the three participants was 0.95, 0.78, and 0.52 m/s. In the lab, none of the participants showed spatial asymmetry (0.95<SL ratio<1.05), expect the slowest participant at the end of the circuit (0.94). In both environments, none of the participants showed temporal asymmetry during level walking, except the slowest participant who became slightly asymmetrical (1.06) at the end of the circuit. The fastest participant became asymmetrical when going up the slope in the lab (1.08) at the end of the circuit. All of them reported outside activities, and a mean (SD) of 11 228 (2 274), 4 531 (361), and 6 168 (1 494) steps/day, respectively.

For these three participants, LocAsym was absent, with little effect of the environment, level of effort or fatigue. Future recruitment should look at individuals with various levels of LocAsym. An algorithm is currently being optimized to calculate spatial parameters both in ecological and lab environments. Also, performances in stairs will be analyzed.

Fast walking condition increases gait range of motion in children with cerebral palsy who walk in a crouch gait

Yosra Cherni, Annie Pouliot Laforte, Audrey Parent, Mickael Begon, Laurent Ballaz

Introduction: Cerebral palsy (CP) is often associated with gait impairments due to abnormal muscle tone, bone deformities and muscle weakness. Crouch gait is one of the most common gait patterns among children with CP, characterized by persistent flexion of the knee during the stance phase. In children who walk in a crouch gait, the comfortable walking speed is lower compared to typically developed children and may compromise their autonomy. Indeed, the capacity to increase walking speed is of utmost
Theme: Gait and posture

Heritage room

importance to perform some daily living activities. A fine description of the kinematic adaptations during fast walking may help to precise physical exercise recommendation to improve this ability.

Are children with bilateral CP who walk in crouch gait able to increase their walking speed, and what are the gait pattern strategies?

Methods: Eight CP children who walked with a knee flexion ≥ 20° in the stance phase were included (age: 13±2 years, body mass: 37±10 kg; height: 149±15 cm). Children were asked to walk barefoot along a 10-meter walkway at their self-selected speed and as fast as possible without running. In both conditions, a kinematic analysis was performed using the full body conventional gait model. More specifically, the maximal angles as well as the range of motion (RoM) were reported for each condition. A Wilcoxon test was used to compare these outcomes measurements.

Results: The walking speed was significantly higher in fast walking condition (+40%). The increase of walking speed resulted both from step length and cadence increase. In fast walking condition, children who walk in crouch gait increased their maximal anterverion and retroversion of pelvic. The hip RoM was increased by greater maximal extension and flexion. They also increased their maximal knee extension during the stance phase. No significant changes was found concerning the pelvis and ankle RoM in the sagittal plane. No significant changes were observed in the other planes.

Discussion: This study aimed to evaluate the ability of children with bilateral CP who walk in crouch gait to increase their walking speed, and to report the gait pattern adaptations. To the best of our knowledge, the present study is the first to report gait adaptations at fast walking in CP children who walk in crouch gait. In contrast with typically developed children who increase their hip flexion to walk faster, children with CP increased rather their hip and knee extensions resulting into a less crouched posture. The fast walking speed seems to be an interesting condition to solicit higher lower limb RoM.

A more severe crouch gait after a continuous walking exercise is not related with muscle co-activation in children with cerebral palsy

Parent, Audrey; Pouliot-Laforté, Annie; Raison, Maxime; Marois, Pierre; Ballaz, Laurent

Introduction: Cerebral palsy (CP) is related to movement and posture disorders due to an injury in a developing brain. The abnormal motor control, associated with muscle weakness and increased muscle tone, results in a deterioration of functional abilities, including gait. Crouch gait is one of the most common walking pattern in children with spastic diplegia CP. This is characterized by an excessive knee flexion during the stance phase of gait. Crouch gait is related to an increased muscle force requirement in children with CP, which may lead to muscle fatigue during daily activities. A pilot study reported a more severe crouch gait after a short walking exercise representative of daily distances in children with CP. A modification of the muscle coordination could appear with fatigue and may increase muscle co-activation during continuous walking. The objective of the study was to evaluate if the more severe crouch gait could be related to muscle co-activation modifications in children with CP.

Methods: To date, 10 children with spastic bilateral CP (mean age [SD]: 13[3] years) who walk with a crouch gait were included in this study. Children were asked to walk at their comfortable speed for 6 minutes around a 25-meter pathway. Lower limbs’ kinematic and electromyographic (EMG) data were acquired before and after the exercise. The outcomes measurements were: (1) the muscle co-activation indices of the rectus femoris/semitendinosus (RF/ST) and tibialis anterior/gastrocnemius lateralis (TA/GL); (2) the cadence, step length and walking speed; (3) Angle values of the pelvis, hip, knee and ankle in sagittal plane, of the hip and knee in the frontal plane, and of the pelvis in the transverse plane. Angle
values were analysed at the initial contact and during the single-limb stance. Data were compared before and at the end of the 6-minute walking exercise.
Results: The muscle co-activation indices of the RF/ST and TA/GL were not significantly different at the end of the walking exercise. No significant differences were found concerning the spatio-temporal parameters. Significant differences were found at the pelvis, knee and ankle ($p<0.05$). The knee and ankle flexion angles increased, whereas the pelvis angles decreased.
Discussion: Children with CP who walk with a crouch gait walked with a more severe crouch gait at the end of the walking exercise performed at comfortable speed. The pelvis angle modifications were probably influenced by the use of walking aids by 3 children. However, these modifications in kinematics were not related to muscle co-activation. Even if the co-activation indices were greater than normative data, they did not change significantly after the walking exercise. Further EMG analyses are needed in order to better understand the mechanisms of the gait pattern adaptation following a walking exercise in children walking with a crouch gait.

Ice hockey skating mechanics: Transition from start to maximum speed for elite male and female athletes
Budarick, Aleks; Shell, Jaymee; Renaud, Philippe; Robbins, Shawn; Dixon, Philippe; Wu, Tom; Pearsall, David
Maximal forward skating transition from standing to maximum speed is vital for in-game ice hockey performance. In order to understand locomotion performance factors related to maximal skating speed, as well as to identify if movement differences exist between male and female skaters, the purpose of this study was to compare kinematic profiles of elite male and female ice hockey players skating at maximal speed on the ice surface. Specifically, the variables of interest were centre of gravity (COG) and lower body kinematics. An eighteen-camera 3D motion capture system was placed on the ice surface to record four steps of maximal-speed skating, comparing 10 female and 9 male elite ice hockey athletes. Including the initial skate acceleration strides following a standing start, skating kinematics within a 34 m long skating corridor were collected.
Overall, the results highlight differences in elite male and female skating patterns in terms of velocity progression, as well as hip and knee joint angles. In particular, after starting from standing, males demonstrated greater net positive acceleration during the initial three strides and continued to accrue higher forward velocity at 34m than females by way of combined faster stride rate and longer stride lengths. In terms of technique, female athletes were consistently less abducted at the hip and less flexed at the knee at ice contact and through the stance phase. Both males and females exhibit a similar “knee plateau” phenomenon, in which a temporary cessation of knee flexion/extension occurs at ice contact, but females exhibit this phenomenon to a greater extent. This information has implications for ice hockey coaches and athletes, equipment manufacturers, and rehabilitation professionals by showing that skating mechanics differ between the sexes, even at an elite level, and may have some relation to lower body injuries’ etiology. This is the first study to describe in detail the complete forward COG velocity-time trajectories of elite ice hockey skaters, and to compare the trajectories of male and female athletes. Future kinematic analysis would be beneficial to understand sex differences in other skating tasks such as backward skating or change-of-direction tasks.
Theme: Gait and posture
Heritage room

Does kinematics at different phases of the gait cycle explain gait efficiency in children with cerebral palsy?

Pouliot-Laforté, Annie; Parent, Audrey; Cherni, Yosra; Marois, Pierre; Lemay, Martin; Ballaz, Laurent

Introduction: Cerebral palsy (CP) is often associated with gait impairments and they generally expend a greater amount of energy to walk than typically developing children, leading to an inefficient gait. The step-to-step transition, as well as the inverted pendulum analogy during the single leg stance, is crucial to maximize gait efficiency. In regards to CP gait pattern at initial contact, during single leg stance and toe-off, these theories seem greatly compromised. In order to optimise treatment decision, it is important to highlight main kinematic parameters which alter gait efficiency. The main goal of the study was to investigate the relationship between gait kinematic and gait efficiency at different phases of the gait cycle. Methods: Twenty-two children (mean age [SD]: 11.9 [4.3] years, body mass: 34.3 [12.3] kg; height: 139.9 [22.3] cm) with spastic diplegia were included. All children were able to walk with or without assistive device. A clinical gait analysis was performed to measure trunk and pelvis kinematic as well as hip, knee and ankle angles in the sagittal plane at (1) initial contact, (2) during single leg stance, and (3) toe-off. The energy expenditure index (EEI) was calculated based on heart rate measurement during a continuous walking exercise performed at preferred speed. Pearson correlation coefficients (r) were calculated to quantify the relationships among the measures. Three regression models, one for each gait cycle phase, were fitted using a stepwise selection procedure to quantify the relationship between EEI and gait parameters. Results: The average walking speed was 0.92 [0.34] m/s and the average EEI was 1.30 [0.73] beats/min. At initial contact, the r was 0.64 (p<0.01) and 0.50 (p=0.02) for the trunk and pelvis respectively. During single leg stance, the r was 0.67 (p<0.01), 0.45 (p=0.04) and -0.48 (p=0.03) for the trunk, pelvis and ankle respectively. At toe-off, the r was 0.67 (p<0.01), 0.52 (p<0.01), 0.47 (p=0.03) and -0.64 (p<0.01) for the trunk, pelvis, hip and ankle respectively. The R² for the equation of regression models, were 0.56 (p<0.05), 0.69 (p<0.05) and 0.70 (p<0.05) for initial contact, single leg stance and toe-off, respectively. These equations included trunk and pelvis kinematic for initial contact; trunk, ankle and pelvis for single leg stance, as well as trunk, ankle and hip kinematic for toe-off. Discussion: These findings suggest that a more anterior trunk and pelvis are associated with higher energy expenditure. Toe-walking seems to be critical for gait efficiency as an ankle in plantar flexion during single leg stance leads to poorer gait efficiency. Moreover, an excessive plantar flexion during both single leg stance and toe-off may reduce power generation and then contribute to increase energy expenditure. In conclusion, trunk, pelvis and ankle kinematics are good contributors to gait efficiency and they should be considered in the therapy of these children.

Gait Initiation Mechanisms in Dysvascular Transtibial Amputees

Roberts, Mary; Prince, François

With the ever-growing population affected by dysvascularity, especially in the lower limb, the population of transtibial amputees is increasing in Canada every year. Because of the importance of this sizeable population, improving care and quality of life is essential. First, understanding of the specific biomechanical differences which exist while walking is needed in order to meet these needs. Specifically, there is a lack of literature in the study of walking initiation in the transtibial amputee population. Thus, the purpose of the current study is to understand the underlying biomechanical differences in the gait mechanisms of dysvascular transtibial amputees when compared to healthy age-matched controls. It was hypothesized that transtibial amputees would require more steps to reach steady-state walking speed,
Theme: Gait and posture
Heritage room

that this speed would be reduced when compared to controls and that the gait pattern employed to initiate gait would differ from controls. A gait initiation task was carried out by 5 transtibial amputees and 5 control subjects across a 5-meter walkway and both kinematic and kinetic data were collected using motion capture and embedded forceplates. It was found that transtibial amputee subjects require more steps to reach steady-state walking, and more steps are needed in achieving steady-state walking when gait was initiated with the sound limb. As well, an overall lower walking speed was achieved by the transtibial amputee population. The hypotheses put forward were therefore supported and corroborate with previous studies. This research should provide important feedback to physicians and other care providers and continued research in other like populations and other functional tasks in this population should be investigated. To our knowledge this is the first study to compare both limbs as leading limbs in gait initiation in such a sample. Future kinetic and kinematic analyses will be carried out in order to understand the mechanisms leading to the reduced walking speed and step length.

Healthy young adults implement different locomotor strategies while avoiding animate vs. inanimate obstacles in a virtual reality environment
Souza Silva, Wagner; Aravind, Gayatri; Sangani, Samir; Lamontagne, Anouk
Introduction: Studies on obstacle avoidance were limited to inanimate objects or failed to address the influence of different sensory cues. This study aimed to describe the extent to which three types of obstacles (cylinder, visual human-like avatar and visual human-like avatar with footsteps sounds) affect avoidance strategies. Methods: Healthy young adults (n=16, 50% male, aged 25.2 ±2.5 years (mean ±1SD)) were tested while walking overground and viewing a virtual environment (VE) displayed in a helmet mounted display (HMD). The VE simulated a large room that included a target located 11m straight ahead. Three identical obstacles were positioned 7m ahead the subject (±40° right/left, and straight ahead). As the subjects walked 0.5m, one of the three obstacles approached them towards a theoretical point of collision located 3.5m ahead at the midline. The two remaining obstacles moved away from the scene. The ability of the subjects to steer toward the target while avoiding the obstacles was characterized using the 3D position and orientation of the head recorded from reflective markers (Vicon) placed on the HMD. Results: Smaller minimal distances (p<0.01) were observed when interacting with visual human-like avatars (left: 1.14±0.3; center: 1.26±0.14; right: 1.23±0.3) as compared to cylinders (left: 1.23±0.3; center: 1.23±0.14; right: 1.33±0.3). The addition of footsteps sounds to visual human-like avatars did not modify (p>0.05) minimal distance values compared to when no footsteps sounds were provided (left: 1.11±0.27; center: 1.19±0.11; right: 1.17±0.3). Onset times of avoidance strategies were similar across all conditions (p<0.05), although a trend towards smaller distances to the obstacles (left and right approaches) at the onset of avoidance was observed with the addition of footsteps sounds. Conclusions: Invariant onset times suggest that participants had equivalent perception of obstacle movement across conditions. Smaller clearances in the presence of human-like entities may occur due to resemblance to real life situations and the use of avoidance strategies as applied in daily locomotion. The proximity of results following the addition of footsteps sounds compared to the visual-only condition suggests that avoidance strategies primarily rely on visual cues.
Theme: Physical activity
Main lounge

Theme: Physical activity

Does a between-sex difference exist in Functional Movement Screen™ scores in a student-athlete population?
Liu, Christie; Frost, David; Richards, Doug; Hincape, Cesar; Beach, Tyson

Introduction: There is a body of evidence suggesting between-sex differences in athletic injury rates [1,2]. The Functional Movement Screen™ (FMS) is an instrument used to identify individuals at risk for injury based on the hypothesis that poor performance on the FMS (i.e., low scores) is indicative of movement “dysfunction” and injury predisposition. The objective of this study is to compare the FMS scores of male and female varsity athletes, using a subset of data collected as part of a larger investigation.

Methods: The FMS was administered using standardized procedures on 26 men and 22 women from the University of Toronto’s varsity soccer and volleyball teams. Performance on FMS tasks was graded using a four-point ordinal scale (i.e., scores of 0, 1, 2, or 3 are assigned based on published criteria [3]). The distribution patterns of scores of individual FMS tasks were compared between the male and female participants.

Results: Individual FMS task score distribution demonstrate between-sex differences in two of the seven FMS tasks. Women performed better on the shoulder mobility task, while men scored better on the trunk stability push up task. No differences were observed in the composite scores of men and women.

Conclusion: Between-sex differences exist in individual FMS task scores in a student athlete population. These findings suggest that men and women may require sex-appropriate injury risk screening tools and prevention programs when training for athletic competition.

Preventive action of a normal physical fitness level on cardiovascular risk factors
Maxime, Caru; Laurence, Kern; Marc, Bousquet; Daniel, Curnier

BACKGROUND — Cardiovascular diseases (CVDs) remains the main cause of death in the world with, in 2014, 17.5 million deaths. According to the American Heart Association, one American on three has a cardiac pathology. The contraction of different risk factors exposes, more easily, to CVDs. We do not know the impact of physical fitness on the risk factors in patients who have developed CVDs. Consequently, the aims of this work were to quantify the preventive fraction of physical fitness on the risk factors in patients with CVDs.

METHODS — 249 subjects (205 men and 44 women) suffering from CVD took part in the study. They all performed an exercise stress test on ergocycle and were categorized into four groups, according to their percentage of physical fitness. Commons risk factors used were abdominal circumference, depression, diabetes, dyslipidemia, hypertension, obesity, overweight and smoking. We calculated the odds ratio for obtained the preventive fraction in order to evaluate the impact of physical fitness level on the risk factors.

RESULTS — The prevalence of risk factors for the entire cohort was: abdominal circumference (69.9%), depression (23.3%), diabetes (24.0%), dyslipidemia (88.4%), hypertension (64.7%), obesity (22.9%), overweight (42.2%) and smoking (74.7%). Overall, the subjects with a good physical fitness had a better peak VO2 than the subjects with a poor physical fitness. Moreover, it is observed that a good physical fitness level is sufficient to induce a preventive action on abdominal circumference, diabetes, hypertension, obesity and overweight. The preventive fraction increases with the level of the physical fitness in particularly for hypertension and overweight, but it does not induce a preventive action for
Theme: Physical activity
Main lounge

diabetes and obesity. Except for depression, a high physical fitness level does not induce necessarily a preventive action in most risk factors. CONCLUSIONS — Our study demonstrates that the simple fact of reaching a good physical fitness level is enough to induce a protection for some risk factors despite having a CVD. Overall, there is an inverse relationship between physical fitness and the preventive fraction of the risk factors. Our work provides new insights on the aggregate role of physical fitness in the development of risk factors in patients with CVDs.

Physical fitness training and task-set cost in older adults

Vrincaeanu, Tudor; Renaud, Melanie; Bherer, Louis

The effect of physical fitness training on attentional control has already been shown to be affected by age and initial fitness level (Renaud et al., 2010). To further investigate this, 49 older adults from two age categories (57-69 vs. 70-80) participated in a cardiorespiratory exercise-training program or were assigned to a control group (waiting list). The training comprised of stretching, fast walking and aerobic dancing for three months. Before and after the training program all participants completed a computerized cognitive dual-task (with audio/visual stimuli) and the Rockport one-mile test. Participants in the training group improved their walking speed while the control group did not. No significant interaction was found between training and age category or initial fitness level. However, amongst the 57-69 group, a regression analysis showed that the improvement in the speed of walking predicted the task set cost improvement, standardized b = -.58, R² = .34, F (1, 13) = 6.22, p = .028, such that higher speed improvement predicts better cost reduction.

Those findings suggest that physical fitness improvement can help improve task-set cost, one specific parameter of dual-task performance and that this effect could be stronger in relatively younger older adults. This means that the improvement in the ability to prepare and maintain multiple task sets is related to the fitness improvement.

The Effects of Physical Training Cessation on Cognitive Performances in Older Adults

Rodrigues, Lynden; Vrincaeanu, Tudor; Berryman, Nicolas; Bosquet, Laurent; Nadeau, Sylvie; Lauzière, Sélena; Lehr, Lara; Bobeuf, Florian; Kerigoat, Marie Jeanne; Yu, Thieng Tuong, Minh; Bherer, Louis

Combined strength and aerobic exercise (S+A) and gross motor skills programs (GMS) have shown promise in selectively improving executive functions (EF) in older adults. However, interruptions in training may occur, resulting in losses of training-induced physiological benefits. So far, little is known about the effects of physical training cessation on EF.

Forty older adults (70.5 +/- 5.51 years; 67.5% female) who had completed an 8-week S+A or GMS program followed by an 8-week training cessation period were included in this study. Performances in the Random Number Generation (RNG) test (inhibition and working memory) in a single task (ST) and a dual-task (DT, walking at 4 km.h⁻¹) were analyzed.

Two-way ANOVAs, with repeated measures for time (pre, post intervention and follow-up), revealed a significant time effect for inhibition scores. Turning Point Index (TPI - occurrence of sequence changes from ascending to descending numbers) improved in ST for all time comparisons (pre to post intervention and post to follow-up) whereas TPI performances in DT improved from pre intervention to follow-up and from post intervention to follow up (p < 0.05). However, participants exhibited worse performances (p <
Theme: Physical activity
Main lounge

0.05) from pre intervention to follow-up (ST and DT) and from post intervention to follow-up (ST) for one working memory score (redundancy index). Results of this study suggest that training cessation can selectively impact EF but that performance in inhibition does not seem to decrease after a period of physical training cessation.

**Microfluidic perfusions applied to the study of Inter-Sarcomere Dynamics**
*de Souza Leite, Felipe; Rassier, Dilson*

Introduction: Within every muscle cell there are hundreds of thousands of sarcomeres working cooperatively to produce force. Although the physiological processes underlying force development have been explained using the single sarcomere mechanics, in reality, sarcomeres in series undergo complex dynamics to produce force. Due to the lack of techniques to study the inter-sarcomere dynamics, it is still an important gap into the muscle literature. To address this issue, we developed a new experimental system that uses microfluidic perfusions that locally control individual sarcomeres within a myofibril. For the first time, single sarcomeres within a myofibril system could be studied and the mechanics behind the inter-sarcomere dynamics further clarified. Methods: Isolated rabbit psoas myofibrils were attached between pre-calibrated micro-needles and tested at three initial average sarcomere lengths (SLi): (a) between 2.4-2.65µm, (b) between 2.65-2.9µm, and (c) above 2.9µm. All experiments were recorded in video in order to measure force and sarcomere motion. Results: Shortening of the target sarcomere propelled displacement of the adjacent sarcomeres in series towards the activation point. Force produced by the myofibril, and the displacements of sarcomeres situated adjacent to local activation were larger at increasing SLi ((a) 1.01 ±0.03µm, (b) 1.17 ±0.03µm, (c) 1.28 ±0.04µm). The displacement of adjacent sarcomeres was further increased when the myofibril was tested in rigor conditions (1.08 ±0.03µm) in comparison with relaxing conditions (0.92 ±0.04µm), suggesting that the interaction among sarcomeres is regulated by myofibril stiffness. Sarcomeres produced similar active forces (21.07 ±0.56nN/µm2) within a myofibril at a fixed SLi. Full myofibril activation showed that long myofibrils produced less force per sarcomere than expected. We hypothesized that long myofibrils are more non-uniform than short myofibrils and that sarcomere non-uniformity would affect the final force produced. Thus, we used the microfluidic perfusions to test how non-uniformity affects myofibril force. We found that sarcomeres following on the descending limb of the force-sarcomere length relationship negatively affect shortening and force production. Conclusion: Force produced by the local contraction of one sarcomere within a myofibril is spread to adjacent sarcomeres. The magnitude of this effect is dependent on SLi and myofibril stiffness, suggesting a length dependent regulation of the inter-sarcomere dynamics. Sarcomere non-uniformity has a large impact over force development in myofibrils.

**Effects of an acute bout of exercise on brain connectivity: are they associated with improvements in motor memory consolidation?**
*Dal Maso, Fabien; Boudrias, Marie-Hélène; Roig, Marc*

Performed immediately after motor skill practice, an acute bout of cardiovascular exercise improves motor memory consolidation and skill learning, which has been associated with motor cortex (M1) increased excitability. However, the precise brain networks modulated by acute bout of exercise and their effect on muscle activity have yet to be determined. Our objective was to assess short-term neuroplasticity events that take place in the brain and their relation to improvement in motor performance. We hypothesize that acute bout of exercise leads to greater modulation of M1 oscillations,
and increased functional connectivity between M1 and muscles, as assessed by corticomuscular coherence (CMC). These changes may differ in magnitude according to the participant’s gain of motor performance. Seventeen healthy participants volunteered to the experiment. On the 1st visit, the VO2peak was determined through a graded exercise protocol performed on a cycle ergometer. Participants were then matched for age and VO2peak and assigned to the exercise (EXE, n = 10) or control (CON n = 7) group. On the 2nd visit, participants were fitted with electroencephalography and surface electromyography electrodes. They performed resting and matching tasks consisting of remaining relaxed with the eyes open and performing hand-grip contractions, respectively. This was followed by a visuomotor accuracy-tracking learning task (AT). Participants were then taken to the cycle ergometer. The EXE group performed 3×3 min blocks at 90% of their maximum power interspersed with 3×2 min blocks at 50W in between. The CON group rested on the cycle ergometer. After that, the resting and matching tasks were repeated at +30 min, +60 min, and +90 min, and the AT at +8h (3rd visit) and +24h (4th visit). M1 oscillations and CMC in the alpha (8-13 Hz) and beta (13-31 Hz) frequency bands, and gain of motor performance, improvement in the AT score between baseline and retention tests, were assessed. Results are based on qualitative preliminary observations. Resting M1 alpha and beta spectral power oscillations increased for both groups from the pre- to post-exercise or rest on the cycle ergometer. This increase tended to be greater in the alpha frequency band for the EXE group. Increased spectral power of M1 oscillations may indicate an increased excitability of the motor cortex areas after the motor learning, which may be more effective for the EXE group. No difference was noted on alpha and beta task-related spectral power among groups. Finally, a significant positive correlation was obtained between the CMC and the gain of motor performance. Despite M1 activation tended to be similar between groups during the matching task, the CMC-performance correlation may indicate that acute exercise has influenced the brain-muscles functional connectivity. This result may suggest that increased performances result from altered the corticospinal communication.

The Intersection of Sexual Orientation and Physical Activity: A Scoping Review
Herrick, Shannon; Lindsay, Duncan
Background: LGBTQ+ persons are subject to high rates of chronic diseases and health concerns, many of which can be addressed through regular participation in physical activity. However, the LGBTQ+ community faces an array of unique challenges to engaging in physical activity. Purpose: To conduct a systematic literature search and scoping review to describe the dominant narratives related to the intersection of sexual orientation, gender identity, and physical activity. Design and Methods: A scoping review of existing literature was conducted using a recommended five-stage process. Studies were identified through searching nine electronic databases. Data were then extracted, summarized, and organized according LGBTQ+ sub-groups. Through an iterative process of review and discussion amongst co-authors, a conceptual map of prominent narratives was created. Results: Separate narratives were identified for sexual minority men and women. Sexual minority men have increased physical activity levels and a social sphere that emphasizes adherence to a body ideal of being thin and/or muscular. Sexual minority women have decreased physical activity levels and are situated in a social norm centered on bodily acceptance. Both narratives drew upon prevalent sport stereotypes in different ways. Sexual minority men actively rejected stereotypes of being un-athletic and subsequently, ‘weak’ or ‘feminine’. Alternatively, sport stereotypes for sexual minority women insinuate a high-level of athleticism that feeds high expectations for success in sport. As such, sexual minority women typically view sporting spaces as
being too exclusive and competitive. Despite the differences in these narratives, both originated from the same concept of cultural norms, specifically body norms born out of external stereotyping and internal cultural standards. Conclusions: Sexual orientation affects engagement in physical activity differentially by gender. Our findings suggest that physical activity interventions need to be targeted to unique sub-groups of the LGBTQ+ population.

Four-week moderate intensity exercise program can minimize post-surgical insulin resistance in colorectal cancer patients: a pilot study.
Ferreira, Vanessa; Carli, Francesco; Scheede-Bergdahl, Celena
The primary treatment for colorectal cancer involves removal of the cancerous tissue through resective surgery. Unfortunately, as a result of the surgical stress imposed on the body, the post-surgical period is associated with a 20-40% reduction in physiological and functional capacity and post-operative complications remain as high as 25-60%. Surgery triggers a cascade of events that are broadly referred to as the stress response. This response is characterized by systemic inflammation and hormonal release causing metabolic changes which consequently result in insulin resistance. Insulin resistance is one of the most fundamental reactions to surgical stress and represents one of the main pathogenic factors modulating post-operative outcomes. There is a strong association between insulin resistance and postoperative complications. Factors such as poor preoperative physical status intensify the stress response and further contribute to poor postoperative recovery. Unfortunately, colorectal cancer patients are at an increased risk for being physiologically compromised prior to surgery due to the metabolic consequences of cancer. Prehabilitation refers to an active intervention that focuses on prescribed exercise and protein supplementation prior to surgery in order to enhance post-surgical recovery. It is important to ensure that the exercise program incorporated into the pre-operative pathway provides a sufficient stimulus to improve insulin sensitivity within a short period of time. A total of 10 colorectal cancer patients referred electively for tumor resection were enrolled in this pilot study. Prior to surgery, all subjects participated in a 4-week prehabilitation program (from time of diagnosis to surgery) comprised of aerobic moderate intensity continuous training (MICT), measured at 90% of their anaerobic threshold, and resistance training, complemented with protein supplementation and relaxation strategies. Subjects received in-hospital supervised training sessions once a week and were asked to complete the program at-home on two other days of the week in order to meet the current exercise guidelines. Subjects underwent physical function assessments such as cardio-pulmonary exercise testing and blood sampling at 3 different time points: baseline (beginning of prehabilitation), immediately prior to surgery (end of prehabilitation), and at 4 weeks post-surgery. Insulin resistance was measured by the homeostatic model assessment (HOMA), a measurement based on the concentration of fasting serum insulin and plasma glucose. The primary finding from my pilot research was that MICT combined with resistance training improved insulin sensitivity prior to surgery and subsequently minimized postoperative insulin resistance in 80% of subjects. This is critical because it can improve post-operative outcomes, reduce hospitalization time and readmission, accelerate the recovery process and preserve patient quality of life.
Efficacy of interventions aimed to increase physical activity levels in individuals with stroke: A systematic review

Aguir, Larissa; Nadeau, Sylvie; Martins, Júlia; Teixeira-Salmela, Luci; Britto, Raquel; Faria, Christina

Introduction: Stroke is the leading cause of disability worldwide. Stroke survivors usually show low levels of physical activity and increases in physical activity levels may improve function and health. Therefore, the aims were to identify which interventions have been employed to increase physical activity levels after stroke, their efficacy, and gaps in the literature. Methods: This systematic review of randomized controlled trials (RCTs) followed the PRISMA statement guidelines. The protocol was registered. Electronic searches were performed in the MEDLINE, PEDro, EMBASE, LILACS, and SCIELO databases, followed by hand searches. Search strategy included words related to stroke, RCT, and physical activity levels. Two independent reviewers screened the titles/abstracts/full texts. A third reviewer solved any disagreements. The quality of the RCT was assessed by the PEDro rating scale. Results: The search returned 9,107 papers and after removing duplicates and the screening phases, 11 RCT (n=634, mean time since stroke: 22 days to 9 years) were included. The mean PEDro score was 6.8 (3-8). The interventions showed varied greatly, but in more than one trial, aerobic, lower limb (LL) resistance, and functional training were included. Physical activity levels were evaluated by questionnaires (45%), accelerometers (36%), pedometers (9%), and physiological cost indices (9%). However, the trials employed different parameters (duration, amount, intensity) or only number of steps to quantify physical activity levels. In five studies (46%), no significant differences in physical activity levels were found for any of the groups (interventions: physical activity plan, according to the participants' resources/preferences; LL stretching exercises plus the use of a toe spreader during walking and conventional rehabilitation; counselling sessions; and circuit video-game play). In two studies (18%), no significant treatment by time interaction effects were found, but when the groups were combined, one RCT showed declines in physical activity levels with aerobic training, whereas the other showed increases (three groups: aerobic training; LL resistance training; low sham arm resistance training). In four studies (36%), the experimental group showed greater increases in physical activity levels (interventions: aerobic training plus LL resistance training, and home exercises; LL electrical stimulation during walking; functional activity training; and arm robot-assisted therapy). Meta-analysis was not performed due to the high heterogeneity. Conclusion: Only few RCTs evaluated the effects of interventions on physical activity levels after stroke. The interventions, measurement instruments, and results were quite heterogeneous. However, some types of interventions may improve physical activity levels after stroke. Therefore, more RCTs are necessary to verify the effects of interventions on physical activity levels of individuals with stroke.

Exploring Barriers and Facilitators to Physical Activity among Women in Treatment or Post-treatment for Cancer

Hallward, Laura; Workun-Hill, Michelle; Duncan, Lindsay R.

Engaging in regular physical activity (PA) can reduce many cancer-related symptoms such as fatigue, depression, anxiety, and improve other factors such as strength, self-esteem, and overall health. Although being active is safe and feasible for cancer patients, up to 70% of cancer patients are not meeting recommended PA guidelines. The purpose of this study was to gain a better understanding of the barriers and facilitators to PA participation among women cancer survivors. We conducted interviews with 15 women who were undergoing or had completed treatment for any type and stage of cancer within the past five years. Participants were recruited from a hospital and an associated wellness center. Verbatim
transcripts were analyzed and coded, and four primary themes emerged. First, the women discussed the levels and types of PA they performed prior to diagnosis, during, and after treatment. Many women had decreased activity levels during and after treatment. Second, the women discussed environments that were most conducive to exercising, mainly the wellness center. Third, fatigue and time were discussed as the principal barriers to engaging in PA. Finally, the primary motivational factors encouraging PA were discussed, such as reclaiming an identity related to being active. Overall, our findings are consistent with previous research. One important and novel finding from our research is the critical importance of a PA identity in motivating return to PA after cancer treatment. Cancer patients and survivors face unique PA experiences and could benefit from tailored exercise promotion interventions that focus on fostering a PA identity.
Appendix E

2016 PATH Annual Symposium
Summary of Responses by Attendees to Post-Symposium Survey
2016 PATH Annual Symposium
Balance and Mobility in Health, Aging and Neurological Disorders
Summary of Responses to Post-Symposium Survey

Overall, how satisfied were you with the quality of the PATH symposium?

Overall, how satisfied were you with the quality of the scientific programme?

Overall, how satisfied were you with the quality of the oral presentations?

Overall, how satisfied were you with the quality of the poster presentations?

Overall, how satisfied were you with the opportunity for networking and sharing of ideas?

How much would you be willing to pay as a registration fee to attend future symposia?