# Table of Contents

Welcome ................................................................................................................................. 1  
Guide to Quercus and Blackboard Collaborate ................................................................. 6  
Schedule of the Day ................................................................................................................ 7  
Sponsorships ........................................................................................................................ 9  
Student Oral Presenters ........................................................................................................ 10  
  3 Minute Presenters ............................................................................................................. 10  
  7 Minute Presenters ............................................................................................................. 11  
Awards and Contests ............................................................................................................. 12  
Abstracts ................................................................................................................................. 13  
  3 Minute Presentations .......................................................................................................... 14  
  7 Minute Presentations .......................................................................................................... 27  
Poster Abstracts ..................................................................................................................... 31
Welcome

A message from the Director of RSI, Dr. Angela Colantonio

Every year our student led Rehabilitation Sciences Institute (RSI) research day exceeds our expectations. While everywhere conferences have been cancelled and postponed due to COVID-19, our students are making their annual research day happen. RSI students, we are so proud of you. Thank you for bringing us all together at a time when community is most needed and very much look forward to your presentations and overall exciting program.

I wish to thank you for all the ways in which you have supported one another, especially over the last few months through your vibrant student led committees. These include hosting virtual “Move & Game Nights”, “Food & Friends” a “5 Week Self-Care Challenge” continued mentorship, newsletters. Overall, the number of events and initiatives supporting student wellness and mental health are truly impressive. You also presented at our new Leadership Rehab Rounds while continuing to advance in your studies.

The University of Toronto continues to be ranked first in the world in Rehabilitation Science in citations and publications. For the first time in our Faculty history, increasing rehabilitation research is a strategic priority. Our faculty members, second to none, provide great foundation trainee scholarship. In addition, our unit has the highest percentage of graduate faculty teaching awards in the Faculty of Medicine. Last year, our faculty won graduate mentorship awards at the early, mid and senior career levels! Our students also continue to attract prestigious awards and distinctions.

I would like to thank all those who supported our students today. This includes faculty supervisors, our very dedicated executive and administrative team, all the members of the RSI research day committee and our invaluable sponsors and partners.

The current pandemic will be recognized as a challenging time in history for the entire world. We will always remember our RSI student leaders during this time who provided us with so much inspiration and hope for the future.

Sincerely,

Dr. Angela Colantonio
RSI Director
A message from the Graduate Coordinator of RSI, Dr. Yana Yunusova

Welcome to the RSI Research Day 2020, an exciting and long-anticipated virtual event for our students and faculty! At this event, we will showcase the breadth of theoretical and clinical research conducted by our students across rehabilitation sciences, including research on balance, community engagement, indigenous health, neuroscience of speech and language, occupational health, neurostimulation, swallowing disorders, telehealth, and others. The research of our students directly impacts individuals living with traumatic brain injury, stroke, amyotrophic lateral sclerosis, spinal cord injury, Parkinson’s disease, mental health issues, to name a few. Today everyone will have an opportunity to deepen their knowledge, expand understanding, and excite passion for scientific discovery. Further, everyone will get a chance to connect with others and network with current and future collaborators.

This day is entirely organized by our students. It was their idea to deliver this important event entirely online. This effort took extra creativity, organizational abilities, dedication, and resilience. I would like to thank the Research Day Organizing committee for their tireless work. Our appreciation goes to: Fiona Höbler, Sara Hanafy, Chen Xiong, Celeste Lumia, Ifah Arbel, Analyssa Cardenas, Stephanie Scodras, Kristina Kokorelias, Jacqueline Nestico, Josh Shore, Anita Kaiser, Nithin Jacob, Raabeae Aryan, Stephanie Posa, and Sunny Bui.

Enjoy the day!

Dr. Yana Yunusova

RSI, Graduate Coordinator
A special message from Dr. Antony Duttine
Advisor on Disability and Rehabilitation, Pan American Health Organization/World Health Organization

Dear Participants,

I am delighted that RSI is still able to host a Research Day in 2020. It is a testament to your dedication and flexibility that you are getting together virtually this year to share the latest evidence and research that you have been generating.

COVID-19 has caused significant disruption to the world of rehabilitation and rehabilitation science. However, this disruption has also brought about opportunities to adapt and advance our field. The science world has had to move incredibly quickly to understand and provide evidence related to COVID-19 and the rehabilitation science sector is rising to this challenge too. We are learning more and more of the importance of rehabilitation for people with COVID-19, and this emerging evidence is shaping our work accordingly.

Rehabilitation science is of major importance to my work at the Pan American Health Organization/World Health Organization. I look to data and evidence to drive decisions and shape policy in order to further the field of rehabilitation. Rehabilitation has been called the “health strategy of the 21st century” due to the increase in demands of our services that are likely to be seen. Rehabilitation science is set to play a key role in this evolution. The work you are doing today will make a difference to the lives of many people tomorrow.

I wish you a very enjoyable and productive day and good continuation of your research. I look forward to hearing more about it.

Sincerely,

Antony Duttine
Advisor, Disability and Rehabilitation
Pan American Health Organization/World Health Organization
A message from the Rehabilitation Sciences Graduate Students’ Union

The RSI Research Day is a student-led initiative that is organized and supported by the Rehabilitation Sciences Graduate Students’ Union (RSGSU). Welcome to another year and another exciting research showcase of our student body! We, as the RSGSU, are excited to take part in highlighting all of our hard work and the diversity of our research. This year in particular, we are happy to have this opportunity to connect with each other. We want to thank the Research Day Committee co-chairs, student members, and department representatives for their hard work transitioning to the online platform. We also want to highlight the mental-health focus of this Research Day and encourage students and faculty to take part in break sessions to support physical and mental health.

“Research is formalized curiosity. It is poking and prying with a purpose.” - Zora Neale Hurston

Ask challenging questions, encourage each other, and most importantly, have fun!

To learn more and find out how to get involved, email us: rehabsciencegsu@gmail.com and follow us on Twitter: @RSGSU, Instagram: @uoft_rsi, and Facebook: Rehabilitation Graduate Student Union

Sincerely,

The RSGSU Executive Team
2020 RSI Research Day Committee

Sara Hanafy
PhD Candidate

Anita Kaiser
PhD Candidate

Fiona Höbler
PhD Candidate

Ifah Arbel
PhD Candidate

Chen Xiong
PhD Candidate

Nithin Jacob
MSc Student

Kristina Kokorelias
PhD Candidate

Raabeae Aryan
PhD Candidate

Analyssa Cardenas
MSc Student

Celeste Lumia
MSc Student

Jacqueline Nestico
MSc Student

Sunny Bui
MSc Student

Stephanie Scodras
PhD Student

Dr. Yana Yunusova
Graduate Coordinator

Stephanie Posa
MSc Student

Diane Wiltshire
Business Officer

Josh Shore
MSc Student


A very special thank you to the following staff members for their continuous assistance:

Rob Page
Manager of Information Technology

Jessica Boafo
Administrative Assistant

Loida Ares
Administrative Coordinator

Diane Wiltshire
Business Officer
Guide to Quercus and Blackboard Collaborate

Please use Google Chrome as your browser to access Quercus and Blackboard Collaborate.

- Alternative browsers will not support your access to Blackboard Collaborate and will cause you to experience technical difficulties with both audio and video.

1. First, log in to Quercus using your UTORid via https://q.utoronto.ca
   - If you are a guest joining from outside the University of Toronto community, you will receive a temporary UTORid and password by email for you to join.

2. After logging in, you will find the RSI Research Day 2020 “Course page” by clicking on the Courses icon on the left-side panel of icons.

3. Once you have selected RSI Research Day 2020, you will be brought to the Home page of this year’s event. Here you will be able to access materials for the following:
   - Welcome page and event schedule
   - Morning session: 3-minute and 7-minute presentation slides
   - Breaks: exercise, yoga and mindful meditation videos
   - Poster Presentations* in downloadable video format

*Poster Presentations will be available download in MP4 format, view and listen to in advance of May 29th.

4. On May 29th, Research Day will commence at 9:00am.
   - Please log in to Quercus in advance and access the presentation hub via Bb Collaborate, which you will find on the left-side menu.

Bb Collaborate is only accessible via Google Chrome, and will have the following rooms available:

- Main Room: for the morning and afternoon sessions, including all oral presentations.
- Coloured Rooms: available for networking on breaks and at the end of the event.
- Poster Presentations: meet RSI poster presenters and participate in Q&A during the poster sessions:
  - Session 1: Poster presentations denoted with odd numbers, i.e. 1, 3, 5, 7, ...
  - Session 2: Poster presentations denoted with even numbers, i.e. 2, 4, 6, 8, ...

In the event that you are experiencing difficulties logging in to the Main Room on event day, you may also dial in via the phone number +1-416-978-3435, with the PIN: 143 869 0291.
**Schedule of the Day**

Friday, May 29th, 2020: 9:00 a.m. – 3:30 p.m.
Online via **Quercus** and **Blackboard Collaborate**

<table>
<thead>
<tr>
<th>MORNING SESSION</th>
<th>9:00 – 9:10</th>
<th>Opening Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Main Room, Blackboard Collaborate</td>
<td>Dr. Angela Colantonio, PhD, RSI Director</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Dr. Trevor Young, MD, PhD, FRCPC, FCAHS, Dean, Faculty of Medicine</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>MORNING SESSION</th>
<th>9:10 – 10:00</th>
<th>Student Presentations: 3 Minute Presentations</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Main Room, Blackboard Collaborate</td>
<td>The Percy Papers: The Man Behind the Trauma</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Atik Bird, MSc Student</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The catch-22 of traumatic brain injury rehabilitation when depression is comorbid</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Adora Chui, PhD Candidate</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Toronto Rehabilitation Institute - Hand Function Test: Feasibility of 3D printing and Evaluating psychometric properties in individuals with stroke and spinal cord.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Naaz Desai, PhD Candidate</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Effectiveness of the rim-mounted grab bar for assistance during bathing transfers</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Rebecca Greene, MSc Student</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Developing music programs for persons with stroke: a qualitative study</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sarah Gregor, PhD Candidate</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Using photo-elicitation to explore health promotion concepts with children and adolescents with disabilities: a scoping review</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Celeste Lumia, MSc Student</td>
</tr>
<tr>
<td></td>
<td></td>
<td>What Factors Contribute to Concussion Reporting in High School Aged Youth?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Kylie Mallory, PhD Candidate</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Beyond acute care: Assessing the content validity of the Physical Therapy Competence Assessment for Airway Suctioning (PT-CAAS) from the perspective of patients, caregivers and clinicians in chronic and community care settings</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Erin Miller, PhD Candidate</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Does increased gait variability improve stability when faced with an expected balance perturbation during treadmill walking?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Jacqueline Nestico, MSc Student</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Investigating athletic identity and return-to-play behavioural intentions among young athletes.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Tian Renton, PhD Candidate</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Looking back to go forward: Creating historical maps to facilitate deadoption of low-value clinical interventions</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Samantha Seaton, PhD Candidate</td>
</tr>
<tr>
<td>Time</td>
<td>Event</td>
<td></td>
</tr>
<tr>
<td>--------------</td>
<td>----------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>10:00 – 10:10</td>
<td>Break – Exercise Session</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Quercus via video link</td>
<td></td>
</tr>
<tr>
<td>10:10 – 10:55</td>
<td>Student Presentations: 7 Minute Presentations</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Main Room, Blackboard Collaborate</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Inpatient Rehabilitation Exergames For Children With Cerebral Palsy After Lower Extremity Orthopedic Surgery</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Analyssa Cardenas, MSc Student</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Health Care Service Use across Phases of Alzheimer’s Disease Caregiving</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Kristina Kokorelias, PhD Candidate</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Remotely delivered spatial navigation intervention for individuals living with Multiple Sclerosis</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Julia Rybkina, MSc Student</td>
<td></td>
</tr>
<tr>
<td>10:55 – 11:15</td>
<td>Break – Yoga</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Quercus via video link</td>
<td></td>
</tr>
<tr>
<td>11:15 – 11:45</td>
<td>“It’s a marathon, not a sprint: Addressing the mental health of grad students during COVID”</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Main Room, Blackboard Collaborate</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Prof. Bonnie Kirsh, PhD</td>
<td></td>
</tr>
<tr>
<td>11:45 – 12:30</td>
<td>Lunch and Networking</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Coloured Rooms, Blackboard Collaborate</td>
<td></td>
</tr>
</tbody>
</table>

**AFTERNOON SESSION**

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>12:30 – 12:40</td>
<td>Break – Mindful Meditation</td>
</tr>
<tr>
<td></td>
<td>Quercus via video link</td>
</tr>
<tr>
<td>12:40 – 1:10</td>
<td>Poster Presentation and Judging – Session 1</td>
</tr>
<tr>
<td></td>
<td>Blackboard Collaborate (odd numbered rooms) / Quercus</td>
</tr>
<tr>
<td>1:15 – 1:45</td>
<td>Poster Presentations and Judging – Session 2</td>
</tr>
<tr>
<td></td>
<td>Blackboard Collaborate (even numbered rooms) / Quercus</td>
</tr>
<tr>
<td>1:55 – 2:25</td>
<td>Awards Ceremony</td>
</tr>
<tr>
<td></td>
<td>Main Room, Blackboard Collaborate</td>
</tr>
<tr>
<td>2:25 – 2:30</td>
<td>Closing remarks</td>
</tr>
<tr>
<td></td>
<td>Main Room, Blackboard Collaborate</td>
</tr>
<tr>
<td>2:30 – 3:30</td>
<td>Online Networking and Celebration</td>
</tr>
<tr>
<td></td>
<td>Coloured Rooms, Blackboard Collaborate</td>
</tr>
</tbody>
</table>
Sponsorships

Thank you very much to our valued sponsors!

Platinum Level

![Platinum Level Logos]

Silver Level

![Silver Level Logos]

Bronze Level

![Bronze Level Logos]

Donors

Thank you to our valued donors!

![Donor Logos]
Student Oral Presenters
3 Minute Presenters

Atik Bird
MSc Student

Adora Chui
PhD Candidate

Naaz Desai
PhD Candidate

Rebecca Greene
MSc Student

Sarah Gregor
PhD Candidate

Celeste Lumia
MSc Student

Kylie Mallory
PhD Candidate

Erin Miller
PhD Candidate

Jacqueline Nestico
MSc Student
Awards and Contests
We appreciate our sponsors and in-kind donors for making these opportunities possible.

Three Minute Presentation Competition
The top 3 presentations will win a student award.

Poster Competition
We have 5 student awards up for grabs:

- Best Poster – MSc
- Best Poster – PhD
- Best Poster – People’s Choice (MSc)
- Best Poster – People’s Choice (PhD)
- Best Poster – Sex and Gender Award

Submit your online ballots for 3-Minute Presentation and Poster Presentation by 2:00pm!

The winners will be announced at the afternoon Awards Ceremony!

Social Media Contest

What better way to kick off RSI Research Day 2020 than with a giveaway! Here’s how to win:

Step 1: Follow us on Twitter @RSIUofT and/or @RSGSU to enter.

Step 2: All you have to do is RETWEET the #RSIResearchDay #ApartTogether #Giveaway post!

If you already follow us on Twitter, simply proceed to Step 2 for your chance to win!

The deadline to enter is Friday, May 29th, 2020 at 2:00pm!

All contest winners will be announced at the end of the Research Day Awards’ Ceremony.

Make sure to also join the conversation by using the hashtags #RSIResearchDay #ApartTogether

Good luck!
Abstracts
3 Minute Presentations
(in order of presentation)
Presentation 1:

The Percy Papers:
The Man Behind the Trauma

Atik Bird, Rehabilitation Sciences Institute, University of Toronto; Laara Fitznor, University of Manitoba; Janet Smylie, Dalla Lana School of Public Health, University of Toronto; Raglan Maddox, University of Canberra; Stephanie Nixon, Department of Physical Therapy, University of Toronto.

Field of Research: Rehabilitation Health Services Studies

Background/Purpose: The Indian Residential School era took its toll on the health and wellbeing of the entire Indigenous population in Canada. How does one rehabilitate after suffering tremendous loss of culture, language, voice, and self? Percy James Bird spent 15 years in Indian Residential School. He then worked nineteen years with the federal government. After retirement he took a creative writing course, producing 21 stories. The objective of my MSc thesis, The Percy Papers, is to explore the disabling effects of colonization through analysis of my father’s short stories, and his life.

Methods: As a Cree/Nehiyaw woman, I am interested in the methodological approaches advanced by Indigenous scholar, Margaret Kovach, using stories, or story work, to pass on knowledge, teachings, medicines, and practices, and that can assist members of the collective. I conducted a critical analysis of Percy Bird’s 21 stories, using Indigenous story telling methods, to support the process of tearing down a negative colonized version of Percy. Cree scholar Neal McLeod states that “narrative functions as an intergenerational knowledge transfer” (Kovach, 2009, p.95), and this is how my father’s stories function: making connections through story, a way to continue a relationship, even though Percy has passed on to the Spirit World.

Results: First, I share reflections I have written for each of my father’s 21 stories. I then present, “The Stories Across the Stories”, which is my attempt to understand my father’s writings holistically. What messages is he offering across his stories, what do they teach us about the disabling effects of colonization, and how might they give rise to new ways of thinking about “rehabilitation”.

Summary/Implications: This analysis pursues this research within a rehabilitation science framework, rooted in a desire to dissect patterns of healing and to examine how Percy’s personal healing lead to his later aspirations to create systems of healing for his people. As a silent survivor, Percy Bird’s stories diffuse much of the violence from his past. Core rehabilitation science concepts, including “rehabilitation” and “recovery,” are explored using an Indigenous storywork research lens.
Presentation 2:

The catch-22 of traumatic brain injury rehabilitation when depression is comorbid

Adora Chui, Rehabilitation Sciences Institute, University of Toronto; Katie Dainty, Institute of Health Policy, Management and Evaluation, Dalla Lana School of Public Health, University of Toronto; Bonnie Kirsh, Department of Occupational Science and Occupational Therapy, University of Toronto; Heather Colquhoun, Department of Occupational Science and Occupational Therapy, University of Toronto; Deirdre Dawson, Department of Occupational Science and Occupational Therapy, University of Toronto;

Fields of Research: Rehabilitation Health Services Studies, Practice Science

Funding: Peterborough K.M. Hunter Charitable Foundation Graduate Award

Background: A catch-22 is a dilemma where the bureaucracy is inherently contradictory, yet which binds individuals within that system to a no-win situation. Adults with TBI and comorbid depression are in a catch-22 and the system must change: despite a third of Canadians with traumatic brain injury (TBI) being depressed (1), they are underrepresented in the rehabilitation sciences literature and in clinical practice guidelines (CPGs). Therefore, we question whether current “best practice” is effective for this subgroup. Adults with TBI and depression experience more disability and worse quality of life (2,3), poorer psychosocial outcomes (4), and unmet healthcare needs especially regarding mood (5). These unmet needs stem from a fragmented system of care and a lack of strong evidence base (6). While CPGs are evidence-based tools meant to improve patient care and outcomes (7), most poorly account for comorbidities (8,9) and patient values and preferences regarding their care (10). Eliciting patient-relevant outcomes, values, and preferences is critical learning which can lead to recommendations on how to promote effective TBI rehabilitation for those with comorbid depression.

Presentation Purpose: To describe a novel approach to understanding how rehabilitation care can be improved when the evidence is limited for TBI and depression. Research Objective: To understand perspectives of adults with TBI and depression on meaningful outcomes, values, and preferences.

Methods: A qualitative descriptive study is underway involving semi-structured interviews and thematic analysis to probe patient perspectives on their rehabilitation experiences, unmet needs, priorities, and preferences. Interviews are audio-recorded, transcribed verbatim, and analyzed with NVivo software. The initial three to five interview transcripts will be coded independently by two investigators, who will generate a coding scheme for use. Codes will be analyzed into themes for discussion before being finalized by team consensus.

Results: Data collection has begun. We will recruit 10-12 adults with any TBI severity, who self-identify as having low mood post-TBI, and who have received TBI rehabilitation services. We present preliminary results from ongoing analysis.

Implications: Knowing the perspectives and priorities of persons with TBI and depression will enable rehabilitation researchers and healthcare professionals to better understand what best practice means for comorbid subgroups for improved outcomes.
Presentation 3:

Toronto Rehabilitation Institute - Hand Function Test:

Feasibility of 3D printing and Evaluating psychometric properties in individuals with stroke and spinal cord.

Naaz Desai, Rehabilitation Sciences Institute, University of Toronto; KITE - Toronto Rehab – University Health Network; Mathew Myers, Institute of Biomaterials and Biomedical Engineering, University of Toronto; KITE - Toronto Rehab – University Health Network; Kirsten Mussleman, Department of Physical Therapy, University of Toronto; KITE - Toronto Rehab – University Health Network; Rosalie Wang, KITE - Toronto Rehab – University Health Network; Milos R. Popovic, KITE - Toronto Rehab – University Health Network.

Field of Research: Rehabilitation Technology Science, Practice Science

Funding: CIHR Frederick Banting Fellowship, Ontario Neurotrauma Foundation, Morton Cure for Paralysis and Toronto Rehabilitation Institute-UHN.

Background: Advances in medical care has resulted in an increased rate of survival following neurological injuries to the brain and spinal cord, this in turn has resulted in an increase in the number of individuals living with the sequelae of the condition. There is an eminent pressure to develop therapies that can retrain lost function and thereby improve quality of life of these individuals. Rehabilitation is the main stay of treatment for restoring function in this population. While extensive research is being done to develop newer rehabilitation interventions; effectiveness of these interventions needs to be tested using outcome measures that are reliable, valid and easily accessible. To this end we tested the feasibility of 3D printing a gross motor hand function assessment tool called the Toronto Rehabilitation Institute - Hand Function Test (TRI-HFT) and we aim to assess the psychometric properties of the 3D printed test in individuals with stroke and spinal cord injury (SCI).

Methods: The TRI-HFT is a clinical assessment tool used to measure specifically unilateral gross motor hand function focusing specifically on lateral pinch, pulp pinch and palmar grasp. The test consists of two parts. The first part of the test assesses the patients’ ability to manipulate objects and the second part of the test measures the strength of lateral pinch or pulp pinch, and palmar grasp. A 3D version of the TRI-HFT was developed and printed. Inter-rater reliability and construct validity of the 3D printed test was assessed in individuals with chronic stroke as well as in individuals with sub-acute and chronic SCI. Criterion validity was assessed in stroke using the CAHAI and FMA-hand items and in SCI using the GRASSP scores (data in SCI individuals is still being collected and hence not reported here).

Results: Dimensions of the 3D printed TRI-HFT were found to be within 10% error margin of the original test. We found the 3D printed test to be highly reliable and valid in chronic stroke. ICC scores for inter-rater reliability between three raters was 0.99 (n=7). A moderately strong co-relation was found between both FMA-hand and 3D TRI-HFT (ICC= 0.719) and CAHAI and the 3D TRI-HFT (ICC=0.644) (n=9).

Summary/Implications: The study results show that the 3D TRI-HFT is a reliable and valid tool for the assessment of unilateral gross motor hand function in individuals with stroke and given that the test is 3D printed it can be easily accessed from anywhere in the world.
Presentation 4:

Effectiveness of the rim-mounted grab bar for assistance during bathing transfers

Rebecca Greene, Rehabilitation Sciences Institute, University of Toronto; KITE - Toronto Rehab – University Health Network; Iris C. Levine, KITE - Toronto Rehab – University Health Network; Roger E. Montgomery, KITE - Toronto Rehab – University Health Network; Alison C. Novak, Department of Occupation Science and Occupation Therapy, & Faculty of Kinesiology and Physical Education, University of Toronto; KITE - Toronto Rehab – University Health Network.

Field of Research: Movement Science, Rehabilitation Technology Science

Funding: CHIR, NSERC

Background: Bathroom accidents account for 35% of fall-related emergency department visits in older adults. Grab bars are recommended to reduce fall risk during bathing and support aging-in-place. Temporary rim-mounted grab bars are recommended when installation of permanent grab bars is not feasible; however, evidence of their safety and effectiveness is limited. We examined the effect of rim-mounted grab bars on balance control, postural requirements, and grab bar loading during bathtub transfers.

Methods: Older adults with bathing difficulty stepped in and out of a wet/soapy bathtub while using a (1) high and (2) low rim-mounted grab bar, (3) a permanent vertical grab bar (mounted on side wall in line with bathtub rim), and (4) wall-only support. Center of mass measures (peak velocity, variability) were determined via 3D motion capture. Peak frontal- and sagittal- plane trunk flexion will quantify postural requirements. Load cells mounted to each grab bar permitted the determination of grab bar loading.

Results: Eleven participants completed the study. Data analyses are ongoing. Preliminary results indicate that during both entry and exit, peak grab bar loading and peak trunk flexion may be greater while using the rim-mounted grab bars for assistance compared to the vertical grab bar or wall.

Implications: Three of eleven participants were uncomfortable completing the transfer without a grab bar, reinforcing the need for grab bars to support independent bathing. Findings may inform bathroom design standards and clinical recommendations aimed to support aging-in-place and reduce fall risk during bathing.
Presentation 5:

**Developing music programs for persons with stroke:**

A qualitative study

Sarah Gregor, Rehabilitation Sciences Institute, University of Toronto; Yashoda Sharma, KITE - Toronto Rehab - University Health Network; Kara K. Patterson, Department of Physical Therapy, University of Toronto; KITE - Toronto Rehab - University Health Network.

Field of Research: Movement Science

Funding: Canadian Partnership for Stroke Recovery Catalyst Grant, Peterborough K.M. Hunter Graduate Scholarship, Ontario Graduate Scholarship, Neuroscience Division Scholarship - Physiotherapy Foundation Canada

Background: Music has numerous therapeutic benefits for persons with stroke, such as improving mood and attention, as well as enhancing motor outcomes. However, there are no clear recommendations on how to deliver music interventions for this population, especially when the program has specific goals such as improving rhythm abilities. Therefore, the objective of this study is to gather insights from community stakeholders about how to develop music programs for people with stroke. Secondly, we aim to determine how to adjust such programs to target improvements in rhythm abilities, as improved rhythm abilities may subsequently enhance the effectiveness of other rhythm-based therapies currently used in rehabilitation.

Methods: Focus groups were conducted with three stakeholder groups including a) people with stroke (n=5), b) music therapists, music teachers and musicians (n=5), and c) neurological rehabilitation therapists (n=4). Groups included discussions about participants’ previous experience with music in rehabilitation, as well as their perspectives on how to develop music programs for people with stroke. Focus groups were audio recorded, transcribed verbatim, and uploaded into NVivo 12 for data management. Analysis was completed using interpretive descriptive methodology, including a read through of transcripts to create an initial scaffolding of the data, two researchers independently completing and then comparing line-by-line coding, followed by mapping of the data.

Results: Data analysis is ongoing. Preliminary results show that in order to attain participant’s goals with a music program, the program delivery needs to be individualized to the participant. Furthermore, there are three main concepts to be considered when individualizing a program including who the participant is (i.e. their music interests, stroke deficits), how the program can be individualized (i.e. teaching techniques, program structure), and why individualization is important (i.e. engagement in program, ability to reach goals). Finally, despite efforts of individualization, it is important to evaluate other barriers (e.g. cost of program) that may influence the ability to implement a music program to reach a certain goal.

Summary/Implications: This study aims to create practical knowledge about how to develop music programs for persons with stroke, with additional insights about how to adjust music programs to improve rhythm abilities as a primary goal.
Presentation 6 & Poster 28:

**Using photo-elicitation to explore health promotion concepts with children and adolescents with disabilities: A scoping review**

Celeste Lumia, Rehabilitation Sciences Institute, University of Toronto; Bloorview Research Institute; Fiona J. Moola, Rehabilitation Sciences Institute & Dalla Lana School of Public Health, University of Toronto; Bloorview Research Institute; Kelly P Arbour-Nicitopoulos, Faculty of Kinesiology and Physical Education, University of Toronto; Bloorview Research Institute; Amy C McPherson, Rehabilitation Sciences Institute & Dalla Lana School of Public Health, University of Toronto; Bloorview Research Institute.

**Field of Research:** Social and Cognitive Rehabilitation

**Background and Purpose:** It is important to understand how children and adolescents with disabilities (CAWD) perceive health, as this may affect how they make health behaviour choices, including physical activity (PA) and dietary habits. Arts-based research techniques may reduce barriers associated with traditional qualitative interviews and help CAWD better express their ideas. Photo-elicitation is one such method and uses self-captured photographs to enhance descriptions of complex concepts. The primary objective of this scoping review was to explore how photo-elicitation has been used in health promotion research with CAWD to convey perceptions of health and health behaviours.

**Methods:** A scoping review was conducted using rapid review principles. Four health and social science databases were searched (2009-2019) using terms related to children and adolescents, disabilities, and photo-elicitation. Articles were included if they: a) focused on CAWD (<19 years); b) used photo-elicitation in research methods; c) were health promotion related; d) were available in English; and d) full text was accessible online. Articles were excluded if they a) described a review; and/or b) used photo-elicitation to explore parent and sibling perspectives. A single reviewer first independently screened titles and abstracts of each unique article identified. Subsequently, the full text of articles selected as potentially matching inclusion criteria were assessed for eligibility.

**Results:** Eight articles met inclusion criteria and used photo-elicitation to explore a range of health promotion concepts, including perceptions of: health and well-being (n=2), PA participation (n=4), and leisure activity (n=2). Four recommended practices for conducting photo-elicitation with CAWD were identified: 1) brainstorming prior to photo-taking; 2) photo-taking training; 3) having participants select photographs for discussion; and 4) limiting the number of photographs participants could capture. Several benefits of this method were reported by authors, including the ability to direct CAWD’s focus back to the interview topic, enhanced engagement and discussion, and ability to mediate communication between researchers and participants.

**Implications:** Evidence-informed use of photo-elicitation can help researchers more fully understand CAWD’s perceptions of health and health behaviours, to ensure the health promotion interventions we deliver are sensitive to their needs.
Presentation 7:

What Factors Contribute to Concussion Reporting in High School Aged Youth?

Kylie Mallory, Rehabilitation Sciences Institute, University of Toronto; Katherine Wilson, Bloorview Research Institute; Andrea Hickling, Bloorview Research Institute; Nick Reed, Department of Occupation Science and Occupation Therapy, University of Toronto.

Field of Research: Field of Research: Occupational Science

Funding: Ontario Graduate Scholarship

Background: Concussion is an increasing public health concern. Youth with a concussion can experience physical, cognitive, behavioural, and emotional symptoms, with high school aged youth experiencing a greater number and severity of symptoms compared to younger children. Among high school aged youth concussions are underreported. Existing concussion reporting surveys for youth are primarily developed for athletes, despite all youth being at risk for sustaining a concussion. To address this gap, a novel concussion survey grounded in the Theory of Planned Behaviour was delivered to athletes and non-athletes.

Purpose: (1) To identify high school aged youths’ intended behaviours towards reporting a concussion to an adult; and (2) to examine if demographic factors influence these intended behaviours.

Methods: This novel concussion survey was completed by 191 high school aged youth (M=15.3 years, SD=1.50 years, range: 13 – 19 years). Participants completed the survey online or on paper depending on their preference. The survey included questions about demographics, concussion knowledge, attitudes, subjective norms, perceived behaviour control, and intended concussion reporting behaviours. The survey was comprised of checkbox, yes/no, open-ended, true/false, and 4-point Likert scale questions, and took approximately 10-20 minutes to complete.

Results: Overall, total concussion reporting scores ranged from 42 – 90 (M=73.31, SD=9.548, maximum score of 92). Females scored significantly higher on attitudes (p=0.001), intended behaviours (p<0.0005), and overall concussion reporting scores (p=0.001). Interestingly, high school aged youth with a concussion history had significantly lower attitudes than those without a concussion history (p=0.001). Additionally, participants who knew someone with a concussion history had a significantly higher intention to report a concussion to an adult (p=0.038). Concussion knowledge and participation in high risk sports had no significant effect on concussion reporting.

Implications: These results identify factors such as gender, concussion history, and knowledge that may increase high school aged youths’ likelihood of reporting a concussion to an adult. This study has the potential to inform targeted youth concussion education initiatives, particularly those aimed at improving concussion reporting. This work emphasizes the importance of ensuring youth have the appropriate knowledge and skills to report a concussion to an adult.
Presentation 8:

**Beyond acute care: Assessing the content validity of the Physical Therapy Competence Assessment for Airway Suctioning (PT-CAAS) from the perspective of patients, caregivers and clinicians in chronic and community care settings**

Erin Miller, Rehabilitation Sciences Institute, University of Toronto; Brenda Mori, Department of Physical Therapy, University of Toronto; Mika Nonoyama, Rehabilitation Sciences Institute, University of Toronto; Pankaj Vaza, West Park Healthcare Centre; Dina Brooks, School of Rehabilitation Science, McMaster University.

**Field of Research:** Practice Science

**Funding:** The Lung Health Foundation (formerly the Lung Association)

**Background/Purpose:** Airway suctioning is a treatment technique that falls within the scope of practice of a variety of health care professionals (HCPs), including physical therapists (PTs). Given the high-risk nature of this technique, it is important to ensure the competence of HCPs who perform it.

Recently, we conducted a scoping review exploring the nature and extent of research related to airway suctioning competence assessment for HCPs working with adults. In that review, we were unable to locate a rigorously developed, comprehensive and well validated measure that would be appropriate for use with PTs. Therefore, we developed a new measure: The Physical Therapy Competence Assessment for Airway Suctioning (PT-CAAS).

In our initial development study, we were limited in our ability to integrate the perspectives of HCPs working outside of acute care and those of patients and caregivers. This was addressed in our current study, where we sought to: 1) describe how patients, caregivers and HCPs define the construct of competence for airway suctioning; and 2) assess the content validity of the PT-CAAS from the perspective of patients, caregivers and HCPs in chronic care and community care settings.

**Methods:** This qualitative descriptive study used one-on-one semi structured interviews, conducted in-person or by video conference. Participants included HCPs, patients and caregivers with experience related to airway suctioning. Participants were recruited purposefully from the chronic and continuing care units of a health care centre in Toronto, as well as from the community in Toronto and the surrounding area, with the assistance of a community health care agency. Directed content analysis was used to interpret meaning from the interview data.

**Results:** Eight HCPs (four respiratory therapists, three PTs and one registered practical nurse), one patient and two caregivers participated in the study. The majority of the elements included in participants’ definitions of competence for airway suctioning were well aligned with the domains, sub-domains and items included in the PT-CAAS. The PT-CAAS was also found to be comprehensive and relevant for use with PTs who perform airways suctioning with adults.

**Summary/Implications:** This study built on our previous work and was novel in including the perspectives of patients and caregivers in the assessment of competence for airway suctioning. We found evidence in support of the PT-CAAS’s content validity, while further assessment of its measurement properties is ongoing.
Presentation 9 & Poster 4:

Does increased gait variability improve stability when faced with an expected balance perturbation during treadmill walking?

Jacqueline Nestico, Rehabilitation Sciences Institute, University of Toronto; Alison Novak, KITE - Toronto Rehab – University Health Network; Stephen D. Perry, Wilfrid Laurier University; Avril Mansfield, KITE - Toronto Rehab – University Health Network.

Field of Research: Movement Science

Funding: Toronto Rehabilitation Institute Student Scholarship

Background: Currently, there is uncertainty as to whether variability during motor performance is negative (errorful) or positive (exploratory). For example, increased spatiotemporal variability in walking is correlated with increased fall risk. Conversely, previous work found that increased movement variability during quiet standing improves stability after a postural perturbation. The purpose of this study was to determine if gait variability represents exploration to improve stability. We hypothesized that 1) spatiotemporal gait features will be more variable prior to an expected perturbation than during unperturbed walking, and 2) increased spatiotemporal gait variability pre-perturbation will be correlated with improved stability post-perturbation.

Methods: Sixteen healthy young adults completed 15 treadmill walking trials under two conditions (unperturbed & when expecting a perturbation) within a motion simulator. In unperturbed trials, participants were told that the simulator would not move. In perturbation trials, participants were instructed to expect a mediolateral balance perturbation. Three-dimensional step kinematic data were collected during the trials. Twenty steps were recorded post-perturbation. Unperturbed and pre-perturbation gait variability were defined by the short- and long-term variability of step length, width, and time, using 100 steps in both pre-perturbation and unperturbed trials. Stability was defined as the number of steps to centre of mass restabilization post-perturbation.

Paired t-tests identified differences between conditions for each step kinematic measures. A general linear model determined the effect of pre-perturbation variability and post-perturbation.

Results: Long-term step width variability was significantly higher pre-perturbation (1.92cm±0.48cm) compared to unperturbed walking (1.75cm±0.40cm; p=0.016), with no significant differences between conditions for step length or step time variabilities. There was no significant relationship between pre-perturbation variability and post-perturbation restabilization.

Implications: We found that the increased pre-perturbation step width variability was neither beneficial nor detrimental to stability. However, the increased variability in mediolateral foot placement suggests participants adopted an exploratory strategy in anticipation of a perturbation. These findings can be used to inform fall prevention and gait rehabilitation approaches.
Presentation 10:

Looking back to go forward:
Creating historical maps to facilitate deadoption of low-value clinical interventions

Samantha Seaton, Rehabilitation Sciences Institute, University of Toronto; Adora Chui, Rehabilitation Sciences Institute, University of Toronto; Katherine Stewart, Western University; Helene Polatajko, Department of Occupational Science and Occupational Therapy, University of Toronto; Heather Colquhoun, Department of Occupational Science and Occupational Therapy, University of Toronto.

Field of Research: Rehabilitation Health Service Studies, Occupational Science

Background: While systematic reviews assist in determining if a rehabilitation practice should be deadopted, their focus on summaries of efficacy studies is insufficient for understanding historical publication trends which may serve to perpetuate low-value practice use. Understanding historical publication trends may assist in identifying determinants that work to maintain adoption despite contrary evidence, and support efforts to reduce the use of low-value rehabilitation practices.

The objectives of the current project were 1) To describe historical publication trends for a longstanding, low-value rehabilitation practice; and 2) To understand how trends have contributed to continued use.

Methods: A novel approach to scoping review (ScR) termed ‘historical mapping’ was employed to describe trends in research on sensory-based interventions (SBIs), a set of occupational therapy practices that are heavily researched and practiced without sufficient evidence of efficacy. We visually depicted trends in study design, intervention type, and population, and discerned potential relationships between these trends and SBI practice over time. ScR methodological and reporting (PRISMA-ScR) guidelines were followed.

Results: We screened 10842 citations from five databases to yield 370 articles. Our maps indicate that the volume of research on SBIs is steadily increasing, though not becoming more rigorous. Single-case designs were the most commonly used study designs both recently and historically. Publication rates were steady, even following the publication of a consensus paper by the American Academy of Pediatrics in 2012 that advised against the use of SBIs. The terminology describing SBIs is highly inconsistent. Pediatric populations studied with SBIs were diverse and varied over time.

Implications: Historical mapping provides an opportunity to understand the influence of publication trends of a longstanding, low-value practice. Heterogeneity of terminology describing SBIs may account for practice variation and challenges measuring the practice gap. Increases in research production despite publication of a critical consensus paper strongly suggest extra-scientific influences perpetuating research interest in SBIs.
Investigating athletic identity and return-to-play behavioural intentions among young athletes.

Tian Renton, Rehabilitation Sciences Institute, University of Toronto; Robin Green, KITE - Toronto Rehab - University Health Network; Sakina Rizvi, Department of Psychiatry, University of Toronto; Kevin E Thorpe, Dalla Lana School of Public Health, University of Toronto; Sidney Kennedy, Department of Psychiatry, University of Toronto.

Field of Research: Social and Cognitive Rehabilitation

Funding: Frederick Banting and Charles Best Canada Graduate Scholarship, Peterborough K.M Hunter Charitable Foundation Award, Ontario Graduate Scholarship, OSOTF Dalton Whitebread Award, OSOTF Judy Willcocks Award, OSOTF Unilever/Lipton Neuroscience Fellowship.

Background/Purpose: In Ontario, Rowan’s Law requires every athlete to complete a concussion education program prior to the start of their sport season. Despite being educated about the risks associated with premature return-to-play (RTP), many athletes report they would resume sport-based activities if they were still experiencing symptoms from a recent concussion. To understand this cultural phenomenon, exploratory research is needed to identify the psychosocial factors that influence a young athlete’s RTP decision-making process. The primary objective of this study was to understand RTP behavioural intentions of young athletes following a hypothetical concussion.

Method: Healthy athletes aged 13 to 25 years old, involved in any sport at any level of play were eligible to participate. Athletes were recruited from community, high school and university sport teams in the Greater Toronto Area. Participants completed a series of self-report questionnaires at one time point. Questionnaires inquired about: i) demographics and concussion history, ii) concussion knowledge, iii) RTP behavioural intentions following a hypothetical concussion, and iv) athletic identity (“the extent to which an individual identifies with the athlete role and looks to others for confirmation of that role”).

Results: To date, n=106 athletes (56.6% female, 76.4% Caucasian) with a mean age of 17.23 years (SD=2.41) have been recruited. The most commonly reported sports were ice hockey (37.5%), synchronized figure skating (20.5%) and soccer (9.8%). Approximately 38% of participants indicated they had previously sustained at least one concussion. Two multiple linear regression models were constructed, one for adolescents and one for young adults. Age, sex, athletic identity and concussion knowledge did not significantly predict RTP intentions. Among adults, sex significantly predicted RTP intentions; females had RTP intention scores (total out of 21) that were 3.39 points (95% CI: 0.399, 6.38) greater than predicted values for males (p=0.027).

Summary/Implications: Adult females were significantly more likely to agree that they would comply with existing RTP guidelines than males of the same age. Findings provide preliminary evidence that sex/gender-based differences exist among athletes with respect to their RTP behaviours. This evidence suggests that educational initiatives should seek to encourage a positive shift in RTP behavioural norms that exist among male athletes.
Presentation 12:

Making sense of the nonsense:

A narrative inquiry into the meaning related processes of resiliency in caregivers of children with TBI

Zara Szigeti, Rehabilitation Sciences Institute, University of Toronto; Bloorview Research Institute; Emily Nalder, Department of Occupational Science and Occupational Therapy, University of Toronto; Barry Trentham, Department of Occupational Science and Occupational Therapy, University of Toronto; Gillian King, Bloorview Research Institute.

Field of Research: Social and Cognitive Rehabilitation, Occupational Science

Background: Post-injury difficulties from traumatic brain injury (TBI) extend beyond the injured child, which is why TBI is known as a “family affair”. Despite the pervasive view that childhood TBI is associated with parental confusion and stress, increasing attention is being paid to the ways by which we can promote positive adjustment following adverse life circumstances (i.e. resiliency). A principle task in promoting resiliency is through finding meaning, yet little is known about how caregivers do so. Thus, the purpose of our study is to elucidate how primary caregivers of children with TBI engage in meaning-related processes of building resiliency. The specific objectives are to explore: (1) the resources and conditions that influences meaning making in caregivers of children with TBI, if it is engaged in at all; and (2) the ways that caregivers’ belief systems change following TBI to promote resiliency.

Methods: In this narrative study, storytelling was used to elicit rich descriptions. Open-ended semi-structured interviews were implemented to gather a storied account of 6 participants’ lived experiences. Analysis was guided by the TBI Resiliency Model and Narrative Thematic Analysis.

Results: Our preliminary findings reveal that ambiguity and uncertainty are central to what it means to care for someone with a TBI. In an attempt to resolve this ambiguity and uncertainty, caregivers use various resources and strategies, including self-regulatory processes, social support, and knowledge gained from healthcare professionals and previous hardships. Narratives suggest that using these resources and strategies leads caregivers to reflect on positive ways that the TBI impacted their lives, including changed belief systems, new perspectives on life, and the development of personal qualities and strengths.

Implications: Given the limited appreciation of biopsychosocial processes that underpin rehabilitation interventions. These results will enhance clinicians’ understanding of the individualized nature of positive adjustment following a loved one’s TBI. Understanding the interplay of conditions, factors, and processes that influence caregivers’ responses to disability is necessary for clinicians to provide optimal support to clients and families.
7 Minute Presentations
(In the order of presentation)
Presentation 1:

**Inpatient Rehabilitation Exergames for Children with Cerebral Palsy after Lower Extremity Orthopedic Surgery**

**Analyssa Cardenas**, Rehabilitation Sciences Institute, University of Toronto; **Daniel Warner**, Bloorview Research Institute; **Lauren Switzer**, Bloorview Research Institute; **Nick Graham**, School of Computing, Queen’s University, **Darcy Fehlings**, Bloorview Research Institute.

**Field of Research:** Rehabilitation Technology Science, Movement Science

**Funding:** Canada Graduate Scholarships- Canadian Institutes of Health research, Holland Bloorview’s Centre for Leadership

**Background:** When children with Cerebral Palsy (CP) grow, they often need lower limb surgery due to changes that occur in their muscles and bones. During recovery, pain is commonly experienced as well as fewer opportunities for fitness and social interaction. Exercise video games, or ‘exergames’, are a new approach to engage these youth. Our team developed the Liberi Exergames, a multiplayer exergame designed for children with CP to cycle on stationary bikes and use game-controllers. Opportunities for children with CP to cycle on the exergames after surgery may stretch their muscles, decrease spasms, and promote social interaction opportunities to enhance wellbeing.

**Objectives:** 1) Assess the feasibility of incorporating exergames for children with CP following lower limb surgery through indicators evaluating recruitment, outcome completion, and intervention compliance, and 2) explore the impact of the exergames on pain and wellbeing.

**Methods:** Ten children with CP, ages 7-18, recovering from lower limb surgery were recruited from Holland Bloorview’s inpatient unit. The first 5 received physiotherapy (control group), and the next 5 received physiotherapy and 15 exergame sessions, 30 minutes each, over 3 weeks (case group). Key feasibility indicators evaluated if >40% of potential eligible participants enrolled in the study, if 80% of participants completed the scheduled pain questionnaires, and if >12/15 exergame sessions were completed for each case group participant. Pain and wellbeing questionnaires were administered to both groups.

**Results:** All feasibility indicators were met. All eligible participants enrolled, all participants completed all scheduled pain questionnaires, and all case group participants completed at least 12/15 exergame sessions. Self-reported pain scores indicated reduced pain over time in both groups. The case group experienced improvements in physical (baseline: 41.7±15.1, week 3: 52.6±11.2) and psychological wellbeing (baseline: 55.4±15.5, week 3: 73.3±21.3) while the comparison group experienced a slight decline in physical wellbeing (baseline: 44.1±10.4, week 3: 42.5±2.0) and improvement in psychological wellbeing (baseline: 52.2±11.2, week 3: 58.2±12.9). Interviews revealed that exergames were enjoyable.

**Conclusions:** Incorporating exergames is feasible and has potential for improved pain and wellbeing in children with CP post orthopedic surgery. This project provides the basis for developing larger studies to explore exergames in pediatric orthopedic care.
Presentation 2:

Health Care Service Use across Phases of Alzheimer's Disease Caregiving

Kristina Kokorelias, Rehabilitation Sciences Institute, University of Toronto; Monique A. M. Gignac, Institute of Work and Health; Dalla Lana School of Public Health, University of Toronto; Gary Naglie; Rotman Research Institute, Medicine, University of Toronto; Nira Rittenberg, Department of Occupation Science and Occupation Therapy, University of Toronto; Jillian Cameron, Rehabilitation Sciences Institute; Department of Occupation Science and Occupation Therapy, University of Toronto.

Field of Research: Rehabilitation Health Services Studies

Funding: Women’s College Hospital, Toronto Rehabilitation Institute Scholarship

Background/ Purpose: Caregiving is not static and changes across the illness trajectory. Understanding caregiving phases allows the provision of timely supports and services to maximize caregiver and care recipient quality of life. Our first research objective was to determine phases of caregiving throughout the Alzheimer’s disease trajectory. Our second objective was to explore service use decision-making across these caregiving phases.

Methods: We applied a constructivist grounded theory approach to data collection and analysis. Forty spousal (10 husbands + 10 wives) and adult children (10 sons+ 10 daughters) caregivers to persons with Alzheimer’s disease were purposely recruited and interviewed using a semi-structured interview guide. Data analysis was conducted using a constant comparative analysis technique.

Results: We identified 5 caregiving phases reflecting roles related to: 1) monitoring initial symptoms, 2) navigating diagnosis, 3) assisting with instrumental activities of daily living, 4) assisting with basic activities of daily living, and 5) preparing for the future. Service use was influenced by two key factors that evolve over the caregiving phases: the goals of caregiving and the practicalities of accessing services.

Summary/Implications: We identified five distinct phases of caregiving and factors influencing service use decision making across the Alzheimer’s disease trajectory. Caregivers make health service decisions to meet care goals associated with sustaining care in the community. Care goals and the factors that influence service use evolve across the phases. Findings can be used to inform the development, evaluation, and implementation of programs and services to meet the changing needs of dementia caregivers across the illness trajectory.
Presentation 3:

Remotely delivered spatial navigation intervention for individuals living with Multiple Sclerosis

Julia Rybkina, Rehabilitation Sciences Institute, University of Toronto; Zornitza Belchev, Department of Psychology, University of Toronto; Asaf Gliboa, Rotman Research Institute at Baycrest; Psychology Department, University of Toronto; Eliyas Jeffay, KITE - Toronto Rehab - University Health Network; Tania Bruno, KITE - Toronto Rehab - University Health Network; Sarah Munce, Rehabilitation Sciences Institute, University of Toronto; Sonja Stojanovski, Department of Physiology, University of Toronto; Kadeen Johns, KITE - Toronto Rehab - University Health Network; Anne Wheeler, SickKids Hospital, Toronto; Robin Green, Rehabilitation Sciences Institute, University of Toronto; KITE - Toronto Rehab - University Health Network.

Field of Research: Social and Cognitive Rehabilitation, Rehabilitation Technology Science

Funding: Canada Graduate Scholarships- Canadian Institutes of Health research, Toronto Rehabilitation Institute Scholarship (OSOTF)

Background/Purpose: Canada has one of the highest multiple sclerosis (MS) rates in the world.1 MS is an immune-mediated, chronic disease with 75% of people with MS (pwMS) suffering cognitive deficits, particularly to memory.3 Progressive MS is characterized by continuous degeneration of brain regions including the hippocampus (HC), critical to new learning and memory.4-7 Recent studies found that HC atrophy can begin as early as a year preceding formal diagnosis, starting in the CA4/dentate gyrus (DG) subregion, then spreading to the CA1.8-10 HC degeneration has dire consequences of impaired memory, and thereby reduced community participation, independence and overall quality of life.11-13 Encouragingly, intensive allocentric spatial navigation has been found to benefit and protect HC.14 Based on previous research, our lab developed a 16-week spatial navigation intervention for improving memory and staving-off HC atrophy. It is online and requires minimal therapist involvement, permitting access to those living remotely and/or having mobility restrictions. The purpose of this study was to (i) evaluate feasibility of the intervention and (ii) measure pre-post intervention changes in memory and HC volume.

Methods: In a single-blind RCT, N=24 pwMS were randomized to spatial navigation intervention (navigating cities via Google StreetView for 1 hour/day, 5 days/week, 16 weeks) or waitlist control (standard-of-care). Outcomes. Memory: CVLT-II, BVMT-R, MST, MIC, NSQ, SOD, EMQ. Imaging: quantitative MRI. Feasibility: recruitment, retention, adherence rates; semi-structured interview. Procedures. Participants administered baseline imaging and memory outcomes then re-administered at post-intervention/waitlist.

Results: MST was found most sensitive to HC volumes (p<.05) and CA1 subregions bilaterally (p=.01). Of the clinical tests, BVMT correlated positively with right HCs and CA4/DG (p<0.5); CVLT-II correlated with HC volumes bilaterally (p<.05), left CA1 (p<.01) and CA4/DG (p<.05). Recruitment rate: 16/56; adherence rate: 469/480 (97.8%) days completed; retention rate: 15/16 (94%). Significant improvements on the MST were found post-intervention compared to control (p<.05).

Summary/Implications: Expected brain-behaviour relationships were demonstrated in pwMS. Hippocampal and subregion volumes correlated with experimental (and clinical) memory measures. Remotely delivered allocentric spatial navigation protocol is promising; preliminary findings show it is feasible and effective for staving off memory decline.
Poster Abstracts
Poster 1:

Validity and Reliability of Sample Entropy of Centre of Pressure Signals of Quiet Standing within Sub-Acute Stage of Stroke Recovery.

Raabeae Aryan, Rehabilitation Sciences Institute, University of Toronto; Elizabeth L. Inness, KITE-Toronto Rehab-University Health Network; George Mochizuki, University of York; Kara K. Patterson, Department of Physical Therapy, University of Toronto; Avril Mansfield, KITE-Toronto Rehab-University Health Network.

Field of Research: Movement Science, Rehabilitation Technology Science

Funding: CPSR, Queen Elizabeth II Graduate Scholarship, Peterborough K.M Hunter Charitable Foundation Graduate Awards (OSOTF), Unilever/Lipton Graduate Fellowship in Neuroscience, University of Toronto Graduate Student Fellowship, Toronto Rehabilitation Institute Student Scholarship (OSOTF).

Background: Difficulty controlling balance in standing and during movements is a major contributor to the increased risk of falls among individuals with stroke. It is important to use standard and objective assessment tools to detect and document balance difficulties in people with stroke as soon as possible. Force plate (FP)-based balance measures have been used in research and clinical practice to provide insights into the specific balance deficits experienced by people with stroke. Sample entropy (SE) of the centre of pressure (COP) signals is a measure that reflects complexity of the underlying physiological processes, and is thought to reflect attentional investment in balance control. The purpose of this study was to examine reliability and validity of SE of COP signals during quiet standing in sub-acute stage of stroke recovery.

Methods: 25 individuals within sub-acute stage of stroke recovery (age= 61.0±12.6 years) completed two 30-second quiet standing trials, with open eyes, in one day. For validating COP measures, 40 participants (62.0±13.8 years) completed 1 trial of quiet standing for 30s. Participants were asked to stand on 2 adjacent force plates; ground reaction forces and moments were collected at 256Hz. Net-COP, and COPs under more and less-affected sides, were computed offline.

Optimal parameters to calculate SE were determined as m= 2 and r= 0.025. Test-retest reliability was calculated using ICC3,1 and 95% confidence intervals. Validity was measured via concurrent correlation with Berg Balance Scale, and accuracy of SE of COP in differentiating between fallers and non-fallers.

Results: The highest reliability was found for SE of COP in anterior posterior (AP) direction on the more affected side of the body (ICC3,1: 0.94 [0.86-0.97]), followed by the Net-COP in AP-direction (ICC3,1: 0.88 [0.74-0.94]), and SE of COP in AP-direction on the less affected side (ICC3,1: 0.83 [0.64-0.92]). Poor reliability was observed for SE of COP in medial-lateral direction on the less affected side (ICC3,1: 0.38 [-0.01-0.67]). The highest accuracy was demonstrated for SE of COP in AP-direction on the more affected side of the body (AUC: 0.651).

Conclusion: Although moderately accurate, SE of COP in AP-direction on the more affected side was demonstrated as a measure with excellent reliability in sub-acute stroke. However, moderate to poor concurrent validities of SE measures with BBS scores might limit their clinical applicability in this stage.
Poster 2:

Development of the Challenge-Coach as a contribution towards understanding physical literacy in children with neuromotor disabilities

Kelly Hennessy, Rehabilitation Sciences Institute, University of Toronto; Kelly Arbour-Nicitopoulos, University of Toronto; Sally Lindsay, Holland Bloorview Kids Rehabilitation Hospital; Ilana Naiman, Rehabilitation Sciences Institute, University of Toronto; F. Virginia Wright, Holland Bloorview Kids Rehabilitation Hospital.

Field of Research: Movement Science

Funding: Holland Bloorview Kids Rehabilitation Hospital Chair in Pediatric Rehabilitation

Background/Purpose: Children with neuromotor disabilities and autism spectrum disorder (ASD) are often at a disadvantage in developing skills, knowledge, motivation and confidence to participate and value physical activity (i.e. physical literacy [PhysLit]). Onboarding assessments for PhysLit programming can help program leaders identify the participant’s strengths and challenges, set individualized goals, and assess changes following the program.

Research Question: The purpose of this study was to reduce the item number of two validated gross motor skills tests, the Ignite Challenge (IC) and Challenge-Fun (CF), to be feasible for use by community program leaders. 4, 5, and 6 item versions of the IC and CF were created as the Challenge-Coach versions. We hypothesised that the 4 item Challenge-Coach IC/CF will be not statistically different than the IC/CF, with ≤4% point difference between the group means.

Methods: Children with cerebral palsy (n=16), ASD (n=7), brain injury (n=1), and lower limb amputation (n=1) completed the appropriate IC or CF assessment, with Challenge-Coach scores extracted from these data. Descriptive statistics were used to calculate the mean and standard deviations of the IC/CF and Challenge-Coach IC/CF. T-tests were used (P<0.016, using a Bonferroni correction) to determine if the mean differences were statistically significant, with intraclass correlations to explore agreement between the measures.

Results: Preliminary analyses show no significant difference of IC or CF when compared to respective 4, 5, or 6 item Challenge-Coach versions (IC P-values: 0.05, 0.05, 0.09; CF P-values: 0.35, 0.91, 0.17, respectively). Due to >4% point mean difference for the 4 item IC, the 5 item version was selected, alongside the 4 item CF version to provide program instructors with similar results as the full-item versions.

Implications: The study’s findings should improve our understanding of the feasibility of the Challenge-Coach as an onboarding assessment in community PhysLit programs. As a benefit to the participants, program leaders will be better informed of each child’s needs and abilities and have the knowledge to create an inclusive physical activity program specific to the participants in their group. The information gained will inform program leaders of each child’s strengths, challenges, and use the child’s interests to increase motivation and confidence to participate. The next step is formal validation of the Challenge-Coach IC and CF.
Poster 3:


Ilana Naiman, Rehabilitation Sciences Institute, University of Toronto; Bloorview Research Institute; Virginia Wright, Bloorview Research Institute.

Field of Research: Movement Science

Funding: Chair of Pediatric Rehabilitation

Background: Children with ASD participate in less physical activity (PA) than their typically developing peers due to many challenges and barriers. Gross motor deficits related to balance, fine and gross motor skills may further contribute to reduced motivation, confidence, positive affect, physical competence, and knowledge to participate in PA (key components of physical literacy). Search for an advanced motor skills measure that tapped into these physical literacy components revealed a measurement gap. Thus, our research team created the Ignite Challenge (I-Challenge), derived from the advanced motor skills measure known as the Challenge-CP.

Objectives: The purpose of this study is to investigate the I-Challenge’s discriminant validity, individual item profiles and reported item enjoyment in a convenience sample of children with ASD undertaking the I-Challenge as part of a larger body language evaluation study. This study is the first research evaluation of the I-Challenge in North America, and is running in parallel with a two-year reliability study (2018–2020) in Adelaide, Australia with our research partners there.

Methods: Thirty-one participants with a diagnosis of ASD, age 6 to 12 years, with no medical contradictions to physical activity are being recruited. Participants completed the I-Challenge and then rated enjoyment of item performance. For these ratings, each participant first created a personalized scale (10-cm line) by drawing in anchor boxes of their favourite activity, least favourite activity and an activity that they neither like nor dislike. Photos of the researcher completing each I-Challenge item were viewed after the testing, and the participant rated enjoyment of each task on their personalized scale.

Results: Twenty-six participants (3 female) with mean age 9.0 years (SD 1.7) have completed the I-Challenge thus far. The I-Challenge mean score was 41.44/60 (SD 7.8, minimum=25, maximum=56). Item mean scores varied from 1.52 (SD 0.8) for the standing long jump and 3.4 (SD 0.9) for the stopping on a line after a 10m pathway run. Overall mean enjoyment was 7.1/10 (SD 0.6). The least enjoyed item was ‘jumping jacks’ (mean score 6.2 [SD 2.4]), while most enjoyed was ‘soccer kick’ (mean score 8 [SD 2.8]).

Summary/Implications: There was a wide range of item/total scores demonstrating the I-Challenge’s ability to detect performance skill differences among children with ASD. The interactive and positive nature of the I-Challenge appeared to support children’s engagement and enjoyment.
Poster 5:

Test-retest reliability of force plate-derived measures of reactive stepping

Tyler M. Saumur, Rehabilitation Sciences Institute, University of Toronto; Sunita Mathur, Department of Physical Therapy, University of Toronto; Jacqueline Nestico, Rehabilitation Sciences Institute, University of Toronto; Stephen D Perry, Department of Kinesiology and Physical Education, Wilfrid Laurier University; George Mochizuki, School of Kinesiology and Health Science, York University; Avril Mansfield, Toronto Rehabilitation Institute.

Field of Research: Movement Science

Funding: Ontario Graduate Scholarship; Toronto Rehabilitation Institute Student Scholarship; KM Hunter Charitable Foundation Graduate Award.

Background: Characterizing the features of reactive stepping is important for describing the response’s effectiveness. Common measures related to step initiation, execution, and termination phases have been frequently reported to characterize reactive balance control. However, the test-retest reliability of these measures has not been determined. Accordingly the purpose of this study was to determine the between- and within-session test-retest reliability of various force plate-derived measures of reactive stepping.

Methods: Nineteen young, healthy adults responded to 6 small (~8-10% of body weight) and 6 large perturbations (~13-15% of body weight) using an anterior lean-and-release system. Tests were repeated on two visits separated by at least two days. Participants were instructed to recover their balance in as few steps as possible. Step onset (perturbation onset to 4mm deviation in medio-lateral centre of pressure (ML-COP), foot-off (perturbation onset to significant shift of ML-COP towards swing limb), swing (foot-off to foot contact), and restabilization times (foot contact to antero-posterior COP velocity stabilization) were extracted using force plates. Relative test-retest reliability was determined through intraclass correlation coefficients (ICCs) and 95% confidence intervals (CIs). The absolute test-retest reliability was assessed using the standard error of the measurement (SEM).

Results: Foot-off and swing time demonstrated the highest between- and within-session test-retest reliability regardless of perturbation size (between-session ICC = 0.903-0.951; within-session ICC = 0.563-0.755). Conversely, step onset and restabilization time exhibited lower ICCs and larger CIs (between-session ICC = 0.253-0.881; within-session ICC = -0.091-0.167). Between-session test-retest reliability was higher (ICC = 0.253-0.951) for all measures than within-session test-retest reliability (ICC = -0.091-0.754). SEMs were low (3-8% of mean) for all measures, except time to restabilization (SEM = 19-24% of mean), indicating good absolute reliability.

Implications: These findings suggest multiple baseline sessions are needed if measuring restabilization and step onset time. The SEMs provide an index for measuring meaningful change due to an intervention.
Poster 6:

Feasibility of Remotely Delivered Active Rehabilitation for Youth with Concussion:

A Protocol

Josh Shore, Rehabilitation Sciences Institute, University of Toronto; Katherine Wilson, Bloorview Research Institute; Emily Nalder, Rehabilitation Sciences Institute, Department of Occupational Science and Occupational Therapy, University of Toronto; Michael Hutchison, Faculty of Kinesiology and Physical Education, University of Toronto; Nick Reed, Rehabilitation Sciences Institute, Department of Occupational Science and Occupational Therapy, University of Toronto; Bloorview Research Institute; Anne Hunt, Rehabilitation Sciences Institute, Department of Occupational Science and Occupational Therapy, University of Toronto; Bloorview Research Institute.

Field of Research: Movement Science, Occupational Science, Rehabilitation Health Services Studies

Funding: CIHR Canada Graduate Scholarship

Background: Concussion is a growing public health concern among Canadian youth. Active rehabilitation involving low-intensity exercise promotes symptom resolution and return to activities in youth with persistent concussion symptoms (≥4 weeks), and hastens recovery when initiated within 2 weeks post-concussion. Unfortunately, youth in remote communities require expensive travel to engage in active rehabilitation, and those living close to clinics often have difficulty attending therapy sessions due to long wait times or parental obligations preventing accompaniment. The purpose of this study is to explore the feasibility and potential benefits of remotely delivering a 6-week active rehabilitation program to youth with concussion through telerehabilitation.

Methods: Based on the Montreal Children’s Hospital model, the rehabilitation program will involve low-intensity aerobic and coordination exercise, education and support monitored through weekly videoconferencing appointments. A mixed-methods pre-post case series design will be used to evaluate the intervention. Ten participants will undergo quantitative clinical assessments before and after completing the intervention. Participants will provide feedback in a quantitative post-intervention questionnaire and qualitative interviews. The primary outcome measure is intervention feasibility, defined based on participant recruitment, retention, adherence to the prescribed program, as well as technology usability and satisfaction as rated by the youth and parent. Threshold values have been selected a priori to define feasibility goals. Secondary outcome measures to evaluate clinical impact include changes in post-concussion symptoms, perceived occupational performance and illness perception.

Implications: Results will inform more rigorous studies evaluating the efficacy of remotely supervised active rehabilitation for concussion. Telerehabilitation may increase access to care that improves recovery and promotes a full and timely return to activities in youth with concussion.
Poster 7:

Factors Associated with Fall History among Elderly Rollator Users

Ivan Solano, Rehabilitation Sciences Institute, University of Toronto; Toronto Rehab Institute; Jan Andrysek, Holland Bloorview Kids Rehabilitation Hospital; William McIlroy, Department of Kinesiology, University of Waterloo; Karl Zabjek, Rehabilitation Sciences Institute, University of Toronto; Toronto Rehab Institute.

Field of Research: Movement Science, Occupational Science

Funding: TD Graduate Scholarship for People with Disabilities - KITE

Background: The rollator is increasingly being prescribed to address fall risk in the elderly. However, with aging-related cognitive decline and the emerging evidence of the rollator’s significant attentional demand, there is a need to have a baseline understanding of how the elderly rollator users’ characteristics are independently associated with fall history. The following are the specific aims and hypothesis: 1. To understand the association of fall history with predictor variables (gait, balance, strength, demographics and dual task (DT) walking measures, fall and balance perception, comorbidities and medication intake). Hypothesis: Gait, balance, strength and DT walking will be strongly related to fall history. 2. To understand the relative risk (RR) of fall history between independent ambulators and rollator users. Hypothesis: Rollator users will demonstrate a significant RR for gait, balance, strength, demographics, DT).

Methods: A retrospective review was conducted involving 74 community-dwelling residents (32 males, 55 females; mean (SD) age of 86.73 (5.48) years). The sample was grouped into rollator (AMD use) and no AMD group (noAMD) (27 AMD use and 47 noAMD). Residents’ AMD use, demographics, medications, fall history, comorbidities, balance confidence and fear of falling were collected. Occipital wall distance, anteroposterior and mediolateral balance (Center of Pressure with eyes open and closed) and strength (Five-time-sit-to-stand and right-hand grip) were evaluated. Single and DT walking (25-ft walk), and 6-minute walk were assessed with the following measures extracted: distance, cadence, step time, step time variability (STV), and time completed. For the first aim, negative binomial logistic linear regression was used with the outcome measure as fall history predicted by the above variables. For the second aim, RR of fall history was estimated using significant variables individually and in combinations for AMD user in relation to the noAMD.

Results: For the first aim, the AMD user had a significantly greater kyphotic posture compared to the noAMD. For the second aim, DT STV and rollator use are significantly associated with fall history among AMD relative to the noAMD.

Summary: The interaction of DT STV and rollator use has significant contribution to fall history. This suggests that rollator users’ DT STV may be predictive of those who have cognitive impairment and high fall risk. It also suggests need for regular cognitive assessment and explore use of DT to assess safe AMD use.
Poster 8:  

Applications of Musculoskeletal Ultrasound Shear Wave Elastography: A Scoping Review

Mikaela L Stiver, Rehabilitation Sciences Institute, University of Toronto; Anne M R Agur, Rehabilitation Sciences Institute, University of Toronto.

Field of Research: Movement Science, Rehabilitation Technology Science

Funding: CIHR Vanier Canada Graduate Scholarship

Background/Purpose: Ultrasound shear wave elastography (US-SWE) is a relatively new advancement in medical imaging that is commonly used to assess soft tissues, such as the liver, thyroid, and breast. Musculoskeletal (MSK) applications of this technology, in particular, are in their early stages. US-SWE measures the speed of shear wave propagation through a tissue, yielding quantitative and/or qualitative estimates of tissue stiffness and elasticity. In this study, we conducted a scoping review of the current MSK US-SWE literature to evaluate the evolving status of the field and to identify gaps for future research.

Methods: We searched for primary, peer-reviewed literature in two databases (MEDLINE and EMBASE), resulting in a total of 587 articles dated 1995 to 2020 for initial analysis. Screening criteria included language of publication (English), species (human), age (adult), tissue(s) of interest (contractile tissues of skeletal muscles), and elastography modality (shear wave).

Results: 163 studies were included in the final analysis. We identified several broad categories of application for MSK US-SWE: a) normative tissue properties (N=61); b) pathology or injury, including assessment and treatment (N=44); c) muscle activity/force (N=16); d) aging (N=7); and e) exercise/stretching (N=35). The majority of studies evaluated the feasibility and/or reliability of US-SWE in some capacity, reporting widely variable levels of success. The most commonly discussed limitation of MSK US-SWE was the anisotropic nature of MSK tissue—a challenge that has begun to be addressed using custom-built phantoms and animal models.

Summary/Implications: MSK US-SWE is an emerging field with a diverse range of applications in both research and clinical settings. Future research should focus on optimizing and standardizing protocols, establishing consistent normative ranges of muscle stiffness, and improving the fidelity of anisotropic tissue measurement.
Poster 9:

**Augmented Reality for Regional Anesthesia (AR4RA):**

**A Mobile Education App for Image-Guided Procedures.**

John Tran, Rehabilitation Sciences Institute, University of Toronto; Philip Peng, Department of Anesthesia and Pain Medicine, University of Toronto; Anne Agur, Rehabilitation Sciences Institute, University of Toronto.

Field of Research: Movement Science, Rehabilitation Technology Science

Background: Effectiveness of image-guided procedures for acute/chronic joint pain requires a detailed understanding of three-dimensional (3D) location and course of articular branches supplying the joint. Recent cadaveric studies have documented 3D nerve trajectory relative to bony and soft tissue landmarks important for image-guided procedures. Although 3D data have been collected in our laboratory, the results are rendered as 2D images of the dissection/3D models as conventional knowledge translation strategies require publication in scientific journals. Conceptualization of 3D location based on 2D images is challenging thereby limiting the utilization of the 3D data of nerve location and course. Advances in 3D computer modeling and visualization technology have facilitated the development of platforms to visualize structures in 3D. One such platform is augmented reality, which enables the visualization of computer-generated 3D models that are superimposed onto a user’s view of the real world. The purpose of this project was to develop an augmented reality app to enable dynamic visualization of 3D models of the innervation of joints.

Methods: 3D data points of the trajectories of articular branches innervating the knee and shoulder joints, along with bony/soft tissue landmarks, were collected (MicroscribeTM Digitizer/Faro® ScanArm®). Using a reverse engineering pipeline, the data points were reconstructed to generate 3D models of the innervation of the knee and shoulder joints (Autodesk® Maya®). The Unity application programming interface, with integrated Vuforia® software development kit, was used to create an augmented reality education tool to enable users to interact with the 3D models.

Results: A novel research-informed augmented reality tool for mobile devices was developed for regional anesthesia procedures. This AR4RA tool provides a 3D dynamic environment for volumetric visualization of the location and innervation patterns of the knee and shoulder joints.

Implications: Translation of 2D images into a 3D environment presents a conceptual challenge, thereby limiting the effectiveness of image-guided procedures. The AR4RA education tool provides a novel platform to enhance understanding of 3D joint innervation patterns to improve the effectiveness of nerve blocks and ablation.
Poster 10:

Exploring the effects of Perturbation-based Balance Training on reducing falls for individuals with incomplete spinal cord injury or disease

Janelle Unger, Rehabilitation Sciences Institute, University of Toronto; Katherine Chan, KITE - Toronto Rehab - University Health Network; Avril Mansfield, KITE - Toronto Rehab - University Health Network; Mohammad Alavinia, KITE - Toronto Rehab - University Health Network; Kristin E Musselman, KITE - Toronto Rehab - University Health Network.

Field of Research: Movement Science

Funding: Ontario Neurotrauma Foundation, Praxis Spinal Cord Institute

Background/Purpose: Approximately 78% of ambulatory individuals with incomplete spinal cord injury or disease (iSCI/D) will fall each year. Falls can lead to many negative consequences, including psychosocial consequences such as decreased social participation and fear of falling. Impaired balance has been cited as one of the leading causes for falls in this population; however research into how balance training can impact falls has been limited. In other neurological populations Perturbation-based Balance Training (PBT), which involves adding unexpected perturbations to challenging balance tasks, has been shown to reduce the rate of falls when compared with conventional balance training approaches. The purpose of this study was to determine if PBT results in fewer people who who fall and a reduced number of falls when compared with conventional balance training for individual with iSCI/D.

Methods: Twenty-one participants with iSCI/D took part in either PBT or dose-matched Conventional Intensive Balance Training (CIBT) three times per week for eight weeks. After completing the training programs, participants were followed for six months and falls were tracked using a survey that was to be completed within 24 hours of experiencing the fall. A researcher also phoned or emailed each participant every three weeks to ensure the surveys were being completed. The number of fallers and total number of falls were calculated for each group and compared using a Chi Square test of independence and a Poisson regression, respectively. A risk ratio for the number of fallers and a rate ratio for number of falls in each group were also calculated.

Results: Twenty participants (10 PBT, 10 CIBT) who completed the balance training programs were included in analyses. Four PBT and seven CIBT participants fell; the difference between groups was not significantly different (p=0.18). The relative risk for the PBT group was 0.54 (95% confidence interval: 0.22-1.35). The PBT group experienced 10 falls while the CIBT group experienced 21 (incident rate: 0.48; 95% confidence interval: 0.22-1.00; p=0.058).

Summary/Implications: The risk ratio indicates that PBT participants were approximately half as likely to experience a fall compared with the CIBT group, while the rate ratio indicates that PBT participants’ fall rates were approximately half of that for the CIBT group. These findings indicate that PBT may be useful to reduce the number of falls experienced over a six month period for individuals with iSCI/D.
Poster 11:

Determinants of Sedentary Behaviour in Individuals with COPD:
A Qualitative Exploration Guided by the Theoretical Domains Framework

Adnan Wshah, Rehabilitation Sciences Institute, University of Toronto; Anne-Marie Selzler, West Park Healthcare Centre; Kylie Hill, Curtin University; Dina Brooks, McMaster University; Roger Goldstein, West Park Healthcare Centre.

Field of Research: Movement Science

Funding: Canadian Lung Association

Background/Purpose: In people with chronic obstructive pulmonary disease (COPD), there is increasing recognition that the prolonged accumulation of sedentary time (ST) is associated with adverse cardio-metabolic health outcomes. Nevertheless, changing this lifestyle, which has evolved over several decades, is likely to be challenging. This study reports the determinants, perceived by individuals with COPD, as being important for reducing ST. An in-depth understanding of this information is essential when planning an intervention to reduce ST.

Methods: Fourteen individuals with COPD completed semi-structured one-on-one interviews, which were audio recorded and transcribed verbatim. Both the interview schedule and mapping of data items extracted from the interview transcripts were informed by the Theoretical Domains Framework (TDF).

Results: A total of 867 quotes were mapped to the 14 TDF domains. Seven of the fourteen domains were identified as being important determinants for reducing ST: knowledge, beliefs about consequences, beliefs about capabilities, environmental context and resources, social influences, social/professional role and identity, and behavioural regulation. There was a lack of knowledge regarding the meaning of sedentary behaviour. Participants’ desire to be educated by knowledgeable health professionals in a formal programme was a dominant theme across multiple domains. The most frequently reported barriers to reducing ST related to the domains of social/professional role and identity and environmental context and resources, while the most frequently reported enablers were related to the domains pertaining to beliefs about consequences and social influences.

Summary/Implications: Potential strategies to reduce ST among people with COPD include education and other determinants identified in this research.
Poster 12:

Relationships between quadriceps muscle size and muscle quality with leg muscle function in adults with cystic fibrosis

Kenneth Wu, Rehabilitation Sciences Institute, University of Toronto; Anna Michalski, St. Michael’s Hospital, Toronto; Anne Stephenson, St. Michael’s Hospital, Toronto; Jenna Sykes, St. Michael’s Hospital, Toronto; Sunita Mathur, Rehabilitation Sciences Institute, University of Toronto.

Field of Research: Movement Science

Funding: Ontario Respiratory Care Society; Canadian Physiotherapy Association

Background: Cystic fibrosis (CF) is the most common fatal genetic disease affecting multiple body systems. As people with CF are living longer, secondary musculoskeletal complications have become prominent. Some studies found adults with CF have small and weaker limb muscles. However, limb muscle quality and muscle power in CF have not been studied. The factors that are associated with muscle impairments in CF are still unclear. The objectives of this study are to investigate the association between leg muscle structure (muscle size and muscle quality) and function (muscle power and strength); and to explore the associations between leg muscle function and demographic and clinical variables in adults with CF.

Methods: A prospective, cross-sectional study was conducted to evaluate rectus femoris (RF) cross-sectional area and muscle quality (RF muscle echogenicity) using ultrasound; quadriceps peak torque using fixed dynamometer; leg muscle power assessed using the stair climb power test. Adults with CF were recruited from the Toronto Adult CF Centre at St. Michael's Hospital and were excluded if they had a pulmonary exacerbation, medical conditions affecting muscle function, previous organ transplant, or were on CFTR modulator therapy. Demographic and clinical variables were collected. Pearson’s correlations and independent t-test were used to investigate the relationships between variables.

Results: Thirty-two subjects were included. The median (min-max) age was 31 (22-66) years, 16 (50%) male, FEV1 73 (27-110)% , BMI 22.6 (17.8-32.4)kg/m2, vitamin D level 57 (23-132)ng/mL. There were strong correlations between leg muscle power and quadriceps muscle quality (r=-.51, p=.0031), and between quadriceps muscle strength and muscle size (r=0.55, p=.0010). Leg muscle power was moderately correlated with quadriceps muscle size (r=0.44, p=.012). Male had higher leg muscle power (p<.001) and quadriceps muscle strength (p<.001). Nutritional status was strongly correlated with both leg muscle power (r=0.79, p<.0001) and quadriceps muscle strength (r=0.57, p=.00071). There was also a strong correction between lung function with leg muscle power (r=-0.52, p=.0021), and a moderate correlation with quadriceps muscle strength (r=.39, p=.027).

Implications: Leg muscle power is a clinically important variable. Ultrasound can be a variable tool in future research of muscle size and muscle quality. Future studies are needed comparing the leg muscle power, muscle size and muscle quality between adults with CF and healthy controls.
Poster 13:

**A Meta-Study of Qualitative Research on Oldest-Old Spousal Caregivers of People with Dementia**

*Ifah Arbel*, Rehabilitation Sciences Institute, University of Toronto; *Kristina M. Kokorelias*, Rehabilitation Sciences Institute, University of Toronto; *Sachindri Wijekoon*, Occupational Science & Occupational Therapy, University of Toronto; *Deirdre R. Dawson*, Rehabilitation Sciences Institute, University of Toronto.

**Field of Research:** Occupational Science, Rehabilitation Health Services Studies

**Funding:** Ydessa Hendeles Graduate Scholarship, Doctoral Completion Award.

**Background/Purpose:** Oldest-old spousal caregivers of people with dementia (defined as aged 80+) are a fast growing, highly vulnerable population (e.g., at high risk for frailty and cognitive decline). Caregiving literature suggests that older caregivers may have unique caregiving experiences, and needs which require age-sensitive interventions. A synthesis of qualitative research can help inform the design of age-sensitive interventions by providing a comprehensive and integrated understanding of caregivers' experiences and needs from their own perspectives. To date, no such syntheses exist. Thus, the purpose of this study was to collate, review, and synthesize the qualitative literature on the experiences of oldest-old spousal caregivers of people with dementia.

**Method:** A meta-study methodology was used which provides for analyses of the contexts (e.g., time and place of study), guiding theories, methods (e.g., sampling, data analysis), and findings of the included studies. This innovative and highly rigorous approach to qualitative synthesis goes beyond the aggregation of research findings. It enables the contextualization of findings, by considering the contexts and processes that shaped them. This aids in interpreting the findings and determining directions for future research. A systematic search of six databases yielded eight studies with an average sample age of 80+. Data regarding study contexts, theoretical frameworks, and methodologies were extracted. Findings related to caregivers' experiences were analyzed thematically.

**Results:** The thematic analysis revealed numerous experiences that were consistent across contexts, guiding theories, and methods, suggesting that these experiences are not highly individual or shaped by the study processes. Caregivers were found to provide intensive care at home, for as long as their health permitted, and were reluctant to ask for support. Caregivers also utilized many positive coping strategies (e.g., positive reframing), and reported finding meaning in the caregiving role.

**Implications:** This meta-study addresses the potential implications of the reported experiences in late-life (e.g., on the ability to experience active/healthy aging), and suggest.
Poster 14:

Advancing Strengths-Based Approaches to Rehabilitation through Indigenous Collage

Lisa Boivin, Rehabilitation Sciences Institute, University of Toronto.

Field of Research: Arts-based Indigenous Health Research, Rehabilitation Health Services Studies

Funding: CIHR Doctoral Scholarship

Background/Purpose: This Indigenous, arts-based research uses collage to explore how rehabilitation concepts may be connected to Indigenous animal teachings to suggest a strengths-based approach to clinical care.

Methods: My approach has been informed by Lianne Charlie, a descendant of the Tagї Cho Hudї (Big River People), Northern Tutchone speaking people of the Yukon, who describes collage as an Indigenous research methodology because it pieces together compatible and incompatible fragments of Indigenous identity. She explains: “Collage accounts for and accommodates the chaotic, contained and often contradictory life-worlds that have been left in the wake of continued settler colonialism by creating a space for Indigenous Peoples to navigate them in creative and empowered ways” (Charlie, 2018). My collages centre on animals, because stories about animals are a fundamental part of Dene life. Animals were necessary for subsistence; meeting the needs of nourishment, clothing and tools for living. They also played roles in teaching about complex concepts such as healthy relationships, wellbeing, and justice.

Results: I have used Indigenous collage methodology to create a series of digital images that present strengths-based approaches to rehabilitation care. In my collages, the viewer often sees an animal in an unnatural (colonial) setting, which is also my setting as an urban Indigenous person being raised away from my culture. The collages are accompanying by text rooted in Indigenous stories that create effective teaching tools.

Summary/Implications: This research is a response to Recommendation 24 from the Truth and Reconciliation Commission of Canada, which calls on healthcare programs to “require all students to take a course dealing with Aboriginal health issues, including the history and legacy of residential schools the United Nations Declaration on the Rights of Indigenous Peoples, Treaties and Aboriginal rights, and Indigenous teachings and practices. This will require skills-based training in intercultural competency, conflict resolution, human rights and anti-racism.” (TRC, 2015, p.3). While some progress has been made in medicine and nursing, my work offers Indigenous strength-based approaches to rehabilitation that respond to the gap in rehabilitation.
Poster 15:

Investigating whether the Social Determinants of Health predict Engagement in Exercise in People Living with HIV

Nivetha Chandran, Rehabilitation Science Institute, University of Toronto; Sergio Rueda, Institute for Mental Health Policy Research, Centre for Addiction and Mental Health (CAMH); Andrew Pinto, Li Ka Shing Knowledge Institute, St. Michael’s Hospital, Toronto; Kelly O’Brien, Department of Physical Therapy, University of Toronto.

Field of Research: Rehabilitation Health Services Studies

Funding: Early Researcher Award (Dr. Sergio Rueda), Ontario Ministry of Research and Innovation; University of Toronto Fellowship.

Background: In Canada, HIV is considered a chronic condition.1 More individuals are living longer and now aging with the physical, mental, and social health-related consequences of HIV and other concurrent health conditions, known as disability.2-4 Physical Activity can mitigate disability and improve health outcomes for people living with HIV.5-6 The social determinants of health (SDOH) includes environmental and personal factors which may influence health status and engagement in physical activity.7-8 However, it is unclear how SDOH may influence engagement in exercise among people living with HIV.

Purpose/Objectives: The purpose of this study is to examine the nature and extent of engagement in exercise among people living with HIV. Specific objectives are to: 1) to describe the nature and extent of engagement in exercise among those enrolled in a 25-week community-based exercise (CBE) intervention; and 2) to examine whether SDOH predict engagement in exercise among people living with HIV.

Methods: We will conduct a quantitative longitudinal study using data collected with adults living with HIV who participated in a 25-week community-based exercise (CBE) intervention at YMCA Toronto as part of a larger 'CBE Intervention Study'. Participants included those who enrolled in the CBE intervention. Participants were asked to engage in a combination of aerobic, resistive, balance and flexibility exercise, 3X/week, 90 min each for 25 weeks, supervised weekly by a fitness instructor. We will measure the 14 SDOH from the Raphael Framework, using variables captured in questionnaires administered at baseline, before and during the intervention phase. For objective 1 we will descriptively analyze the following variables: nature (type: aerobic, resistive, balance, flexibility) and extent (frequency, intensity, progression) of exercise as measured by the weekly coaching and exercise logs and YMCA usage. Categorical variables will be described using frequency and percent and continuous variables using median, 25th and 75th percentile. For objective 2, ‘engagement in exercise’ will be defined as attending ≥ 75% (19/25) weekly sessions. We will conduct univariate analyses (chi-square & t-tests) between engagement in exercise and each determinant followed by a logistic regression with significant determinants to determine predictors of engagement in exercise.

Implications: Results will help establish better understanding of the role of SDOH on engagement in exercise among people living with HIV and inform future directions.
Poster 16:

**Visual analytic tools and techniques in population health and health services research:**

**A scoping review**

**Jawad Chishtie**, Rehabilitation Sciences Institute, University of Toronto; Jean-Sebastien Marchand, Universite de Sherbrooke; Luke A Turcotte, University of Waterloo, Iwona A Bielska, McMaster University; Jessica Babineau, University Health Network; Monica Cepoiu-Martin, University of Calgary; Michael Irvine, Department of Mathematics, University of British Columbia; Sarah Munce, Toronto Rehabilitation Institute-University Health Network; Tara Jeji, Ontario Neurotrauma Foundation; Susan Jaglal, Department of Physical Therapy, University of Toronto.

**Field of Research:** Rehabilitation Health Services Studies

**Background/purpose:** Learning health system approaches are being used to leverage diverse big healthcare data sources using advanced analytic and visualization methods. Visual analytics (VA) provides insights into large complex data using a combination of advanced analytic and interactive visual presentations. This systematic scoping review presents the state of science on VA tools, techniques and frameworks applied in areas of population health and health services research.

**Methods:** Using Tricco et al’s 2018 PRISMA-ScR guidelines, our scoping review focused on peer reviewed sources including journal articles and conference papers published between 2005 and March 2019. Using the Covidence platform, two independent researchers were involved at all stages including title, abstract and full text screening and data abstraction. Another independent researcher served as the arbitrator in case of disagreement during screening, and for validation of abstracted data. A comprehensive abstraction platform was built to capture the data from diverse bodies of literature primarily from computer science and health, while findings were thematized for reporting.

**Results:** After screening 11,310 articles, findings from 55 articles were synthesized under 10 major headings: visual and analytic engines, visual presentation characteristics, tools used and their capabilities, application to the healthcare areas, data types and sources, VA frameworks, frameworks used for VA applications, availability and innovation, and knowledge translation.

**Summary/Implications:** We found a wide application of VA methods used in areas of epidemiology, surveillance and modelling, health services access, utilization, and cost analyses. All articles included a distinct analytic and visualization engine, with varying levels of detail on each. There were seven articles presenting analytic frameworks. Related to knowledge translation, 7 articles targeted policy and decision makers. Most articles included tools that were prototypes, with 5 in use at publication time. With the development of learning health system approaches, VA provides a powerful solution to derive meaningful insights from complex health care data for knowledge discovery and hypotheses generation. This is the first review addressing a critical gap in the literature on VA methods in population health and health services research.
Poster 17:

Medical communication beyond medical education:
A critical scoping review of physician-patient communication

Jacquelin Forsey, Rehabilitation Sciences Institute, University of Toronto; Nikki Woods, The Wilson Centre, UHN, University of Toronto; Paula Rowland, The Wilson Centre, UHN, University of Toronto, Risa Freeman, University of Toronto; Connie Li, McGill University; Stella Ng, Centre for Faculty Development, St. Michael’s Hospital, Toronto.

Field of Research: Rehabilitation Health Services Studies

Background/Purpose: Research has demonstrated that effective verbal communication [VC] between patients and physicians is essential for diagnosis, treatment adherence, and navigation of the healthcare system. Medical schools must prepare learners to enact effect VC practices in complex and dynamic work environments. The challenge in developing targeted training for VC is not a lack of research, but a lack of theory and conceptual clarity underpinning the extant literature. The social science disciplines of linguistics, psychology, and communications offer rich theoretical and empirical support to provide this conceptual clarity and a solid foundation from which to build future communications research and pedagogy.

Methods: We are conducting a critical scoping review to address the question: What does the literature in linguistics, psychology and communications tell us about verbal communication in physician-patient interactions? This review draws from both the scoping methodology of Arksey and O’Malley and critical narrative methodologies to go beyond descriptive synthesis into critical analysis and conceptual innovation. The search strategy, validated and conducted in collaboration with a health science librarian, was executed in MEDLINE, PsycINFO, and Linguistics and Language Behaviour Abstracts. Two team members are independently screening at the title/abstract and full text level. Included studies are limited to those exploring authentic, English language interactions between physicians and patients. Data extracted will by analysed thematically to link individual studies across disciplines into larger theoretical constructs and illuminate significant conceptual contributions to the field.

Results: The initial search returned 15,851 studies. Approximately 1500 full texts will be screened, and it is expected that approximately 400 studies will be included in the review. Key themes emerging from preliminary analysis include: dyad discordance, patient-centred language, facilitating shared-decision making, and the role of language in power dynamics.

Summary/Implications: This review will synthesize and interpret conceptual knowledge from social science disciplines to create a theoretical framework that will contextualize and clarify extant literature and act as a foundation for future research and pedagogy in this field. This work is not designed to provide definitive answers, but to act as a jumping off point to ask better questions and find better answers.
Poster 18:

Social support factors and discharge disposition of older adults with hip-fracture:
A retrospective cohort study

Alexandra Krassikova, Rehabilitation Sciences Institute, University of Toronto; Kathy McGilton, KITE - Toronto Rehab - University Health Network; Aileen Davis, Krembil Research Institute, University Health Network; Jennifer Bethel, KITE - Toronto Rehab - University Health Network; Steven Stewart, KITE - Toronto Rehab - University Health Network.

Field of Research: Rehabilitation Health Services Studies

Background: For older adults sustaining a hip-fracture event is a life-changing experience potentially negatively affecting all domains of life. Although, social support is a known strong determinant of health outcomes, the relationship between social support and discharge disposition of older adults with hip fracture remains under researched. For this study social support is operationalized using the Finfgeld-Connett framework, where social support is composed of emotional and instrumental domains. The purpose of this study is to examine the relationship between emotional and instrumental domains of social support and 1) discharge disposition after in-patient rehabilitation stay and 2) remaining at home 3- and 6-months post discharge in a population of older adults with hip fractures.

Methods: This is a retrospective cohort study on prospectively collected data. One hundred and fifty community dwelling patients 65 years or older admitted to in-patient rehabilitation directly from acute care were included. Data was collected at baseline, discharge, 3- and 6- months post-discharge. Evaluations include demographic characteristics, frequency of interaction over the phone, in-person, and involvement in community based social activities prior to hip fracture, external support received related to activities of daily living (ADL) and instrumental activities of daily living (IADL). The outcome of interest is discharge disposition, dichotomized as return to community setting or institutionalization. A multiple logistic regression analysis will be performed to answer the research question. Cognitive status will be examined as an effect modifier.

Implications: By understanding the interplay between social support and discharge disposition the rehabilitation potential of patients with hip-fractures can be maximized.
Poster 19:

Abnormal-becoming-human?

Portrayals of disability in children's rehabilitation textbooks and practices

Donya Mosleh, Rehabilitation Sciences Institute, University of Toronto; Bloorview Research Institute; Bhavnita Mistry, Bloorview Research Institute; Barbara Gibson, Department of Physical Therapy, University of Toronto.

Field of Research: Rehabilitation Health Services Studies

Funding: Holland Bloorview Kids Rehabilitation Hospital, Rehabilitation Sciences Institute, University of Toronto.

Background: Exploring how disability is understood and addressed in children’s rehabilitation is crucial to designing and enhancing policies, programs and services that best serve the needs of children with disabilities. Currently, no studies have critically examined how disabled childhood is conceptualized within children’s rehabilitation education, or how these ideas mediate the practices of health professionals. This is problematic because exploring the relations between discourse and practice is important to identifying how rehabilitation risks perpetuating negative understandings and the potential harms this causes disabled children. This project aimed to understand how childhood disability is understood and addressed in children’s rehabilitation textbooks, and in rehabilitation practices for children with Duchenne muscular dystrophy (DMD).

Methods: We conducted a discourse analysis of eight children’s rehabilitation textbooks and observational data from a recent study of two Canadian children’s rehabilitation clinics. Discourse analysis involves analyzing and interpreting language to highlight hidden meanings and taken-for-granted assumptions. The observational data was collected over a 4-year period, in two neuromuscular outpatient clinics at two different hospitals. The children and youth in this study had DMD. A total of 44 observations were collected across both hospitals.

Results: Our analysis highlights how the textbooks were oriented to understanding disability through the discourse of normal development, and thus portrayed children with disabilities as abnormal-becoming-normal. By contrast, analysis of the observational data demonstrated how clinicians, children and their families creatively navigated complex issues which disrupted and challenged the simplistic representation of disability, normality, and what it means to live a ‘good’ life advanced by the textbooks.

Implications: Our research renders visible the taken for granted assumption that pursuing normality necessarily translates to living a better life, which in turn, restricts other ways of doing and being in the world. In order to continue to enhance children’s rehab, we argue that there is a need to critically explore the bad effects of good intentions. Addressing this risk requires rehab professionals to consider how to acknowledge and appreciate diversity of children’s bodies and abilities, and to challenge rehabilitation’s embedded normalization goals.
Poster 20:

**Digital Technology to Support Informal Caregivers:**

**Matching the Tools to the Needs from a Sex and Gender Perspective**

Chen Xiong, Rehabilitation Sciences Institute, University of Toronto; Arlene Astell, Rehabilitation Sciences Institute, University of Toronto; Jill I Cameron, Department of Occupational Science and Occupational Therapy, University of Toronto; Alex Mihailidis, Department of Occupational Science and Occupational Therapy, University of Toronto; Emily Nalder, Department of Occupational Science and Occupational Therapy, University of Toronto; Angela Colantonio, Rehabilitation Sciences Institute, University of Toronto.

**Field of Research:** Rehabilitation Health Services Studies, Rehabilitation Technology Science

**Funding:** Canadian Institutes of Health Research, Health Canada

**Background/Purpose:** Caregiving is highly stressful and associated with poor mental and physical health. Technologies, including mobile and e-health applications, have been developed to address caregiver needs. Yet, sex and gender considerations have not been considered systematically in the design and evaluation of these technologies. Our research aims to gather key sex and gender considerations in the development of technologies for informal caregivers, and to develop a sex- and gender-sensitive technology evaluation tool.

**Methods:** Tool development was informed by (1) a systematic review of sex and gender differences in caregiving experiences and (2) retrospective analysis of a cross-sectional survey on technology perceptions among informal caregivers. The tool development process involved (3) semi-structured interviews with 16 informal caregivers and 8 technology researchers. Transcripts were analyzed using thematic analysis.

**Results:** Analysis of the cross-sectional survey revealed key differences between male and female caregivers with respect to caregiving experiences, willingness to pay and general perceived usefulness of technology. Findings from interviews also highlighted the influence of a range of diverse caregiver characteristics on technology preferences, which, together with findings from the first two studies, lead to the creation of the CareDATA (Caregiving Diversity and Technology Assessment) tool. It provides key considerations for incorporating sex, gender and diversity throughout the technology development process. Questions within the tool are spread across four components (identifying technology needs, meeting caregiver preferences, breaking down technology barriers, and enhancing technology uptake) with one crosscutting theme (incorporating sex, gender and diversity).

**Summary/Implications:** Through the development of CareDATA, we highlighted the complexities of sex and gender and diversity to advance knowledge across a wide range of settings, including research, policymaking and technology development. By bringing sex, gender and diversity to the forefront of the technology development process, our research is a robust step towards the realization of more tailored technologies to support informal caregivers.
Poster 21:

The Landscape and Perspectives of Prehabilitation – Analysis of Clinical Trial Registries

Clement T. Chow, Rehabilitation Sciences Institute, University of Toronto; Alexandra Krassikova, Rehabilitation Sciences Institute, University of Toronto; Paul Oh, KITE – Toronto Rehabilitation – University Health Network; Dina Brooks, School of Rehabilitation Science, McMaster University; Tracey J. F. Colella, KITE – Toronto Rehabilitation Institute – University Health Network

Field of Research: Rehabilitation Technology Science, Rehabilitation Health Services Studies

Background/Purpose: Prehabilitation (PREHAB) is an emerging intervention that focuses on enhancing the functional capacity of patients prior to surgical procedures. Potential benefits include: 1) improved preoperative conditioning, 2) fewer postoperative complications and 3) reduced hospital length of stay. This narrative review evaluated the state of PREHAB clinical studies by classifying intervention designs, characteristics and analysis of commonalities in ongoing and completed trials.

Methods: A comprehensive review of electronic registries was conducted from inception to January 22, 2020 including: ClinicalTrials.gov, ICTRP, and ANZCT. ClinicalTrials.gov was initially used to construct the search strategy with terms related to “prehabilitation” or “preoperative exercise” then refined to searches in the other registries. Two reviewers (CTC and AK) independently screened registry entries and extracted data using a form created by the authors. 483 entries were screened for eligibility, with 226 included. Statistical analyses were conducted using R (v. 3.6.1).

Results: Majority of PREHAB trials (n=81; 36%) were conducted in North America, followed by the United Kingdom (n=30; 13%), Spain (n=15; 7%), and Australia (n=13; 6%). Specialties included gastrointestinal (n=80; 35%), orthopedic (n=36; 16%), urogynecology (n=22; 10%) and cardiac (n=21; 9%) procedures. Overall, 25% (n=57) implemented home-based exercises while 14% (n=31) of trials used wearable technology to monitor biometrics and 23% (n=52) used telemedicine platforms for intervention delivery. PREHAB trials for oncology patients (n=110) implemented multimodal interventions including dietary supplementation (p=0.0009), psychosocial therapies (p=0.028), or both (p=0.0072). Since 2016, 52 trials have completed recruitment, but are ongoing due to a large volume of sessions (mean 14.7±13 over 5.5±4.5 weeks) or lengthy follow-up (mean 7.1±14 months), which may contribute to attrition. A challenge cited by 3.4% of trials included lack of recruitment; on average, trials required 33.9±18.5 months to attain 86.1±89.6 participants.

Summary/Implications: PREHAB is following the paradigm shift to home-based telemicine and empowering patients to be more independent in performing unsupervised exercises after guidance. Globally, PREHAB is a promising intervention for preparing patients awaiting procedures across all surgical specialties, however intervention designs vary substantially, and the completion of active trials is needed to confirm long-term effectiveness.
Poster 22:

Can motion-based technology impact balance, movement confidence, and cognitive function among people with dementia or mild cognitive impairment?

Erica Dove, Rehabilitation Sciences Institute, University of Toronto; Karl Zabjek, Department of Physical Therapy, University of Toronto; Rosalie Wang, Department of Occupational Science and Occupational Therapy, University of Toronto; Arlene Astell, Department of Psychiatry, University of Toronto.

Field of Research: Rehabilitation Technology Science, Occupational Science

Funding: AGE-WELL NCE

Background: Balance, movement confidence, and cognitive function are associated with falls risk among people with cognitive impairment (PwCI; e.g. dementia). Exercise can benefit PwCI with regards to balance, movement confidence, and cognitive function. However, adherence to exercise programs for PwCI is low given that many exercise programs are inaccessible and unengaging. While motion-based technologies (MBT; e.g. Xbox Kinect) are increasingly being explored to encourage exercise participation among PwCI, the impacts of MBTs for PwCI on variables such as balance, movement confidence, and cognitive function are underexplored. This study aims to examine the impacts of a group MBT intervention on balance, movement confidence, and cognitive function among PwCI.

Methods: Twenty-eight PwCI (53.6% female; mean age: 81.5 years) were recruited from four adult day programs and invited to play a group MBT intervention (Xbox Kinect bowling) twice weekly for ten weeks. Each participant completed the Mini Balance Evaluation Systems Test (Mini-BEST) and the Montreal Cognitive Assessment (MoCA) at pre- and post-intervention. Video recordings were captured during weeks one, five, and ten of the MBT intervention to examine indicators of movement confidence (e.g. fluency of motion).

Results: Due to a variety of unforeseen circumstances (e.g. COVID-19), only nine of 28 (32.1%) participants completed all stages of the study. Firstly, analysis will examine all 28 participants, to describe their balance, cognitive function, and movement confidence at baseline. Then, an analysis will be conducted on participants who completed all stages of the study (n=9), followed by a comparison with the participants who did not complete all stages of the study, for reasons unrelated to COVID-19 (e.g. moving to long-term care; n=8). Results will be available for May 2020.

Implications: Firstly, the results of this study highlight the prevalence of balance and mobility impairments among PwCI, suggesting a need for physical interventions that target this population. The results of this study could also inform the baseline characteristics of PwCI who are more likely to complete rehabilitation programs. Finally, this work can be used to inform the future development of rehabilitation focused MBTs and MBT interventions specifically targeted towards PwCI.
Poster 23:

The Relationship between Periarticular Muscle Properties and Subchondral Bone Quality in Non-overweight Postmenopausal Women with Knee Pain

Siwen Liu, Rehabilitation Sciences Institute, University of Toronto; Toronto General Hospital Research Institute; Andy Kin On Wong, Toronto General Hospital Research Institute.

Field of Research: Rehabilitation Technology Science

Funding: Canadian Institutes of Health Research, Health Canada

Background: Knee osteoarthritis (KOA) is a leading cause of disability in Canada that has been understudied in non-overweight postmenopausal women (non-OW PMW) (Public Health Agency of Canada, 2011). It is also unknown whether muscle mass closer to the insertion points around the knee joint (periarticular) better relate to KOA features in subchondral bone (bone layer beneath the cartilage), knee pain, and knee function. Subchondral bone damage is a hallmark of KOA and often involves bone marrow lesions (BMLs) and abnormal bone density (Felson et al., 2001; Nevitt et al., 2010). In addition to bone, periarticular muscles are prominent on images obtained from standard of care knee magnetic resonance imaging (MRI), yet their role in KOA is unclear. Because muscle imparts forces to keep bone strong, studying the site of muscle and bone interaction is important to understand their relationship in KOA (Frost, 2004).

Objective: To understand how periarticular muscle (distal end of the vastus medialis and proximal heads of the gastrocnemius) properties associate with KOA features of knee subchondral bone, knee pain, and knee function in non-OW PMW. Hypotheses: Non-OW PMW with lower periarticular muscle mass will be associated with H1) more diseased subchondral bone properties and H2) more knee pain and poorer knee function.

Methods: This cross-sectional study will recruit 80 participants from the community. Inclusion: Non-OW (Body mass index < 25.0 kg/m2) PMW between 50-85 years old with varying degrees of knee pain. Exclusion: Those with rheumatoid arthritis, existent joint replacements, or contraindications to MRI. Participants’ more painful knee will be scanned using MRI to examine BML volume and peripheral quantitative computed tomography (pQCT) to examine muscle mass and bone density. Three different pain questionnaires will be used to assess various pain types and a stair climb, walk, and chair stand test will reflect knee function. Multivariable linear regression models will relate muscle mass to A) subchondral bone properties and B) knee pain scores and functional test measures.

Summary/Implications: This study has the potential to pinpoint potential early KOA intervention targets for a high-risk population of women. Because this study opportunistically examines muscle from the same knee MR images obtained for standard of care, more value can be added to current clinical practice with minimal added cost, while potentially also leading a paradigm shift in the treatment of non-OW PMW with KOA.
Poster 24:

The Development of Playfulness amongst Youth with Disabilities in the HB FIRST® Robotics Program

Sunny Bui, Rehabilitation Sciences Institute, University of Toronto; Bloorview Research Institute; Sally Lindsay, Bloorview Research Institute, Toronto.

Field of Research: Social and Cognitive Rehabilitation, Occupational Science

Funding: BranchOUT Neurological Foundation

Background: Play amongst youth with disabilities and their peers are critical in the development of life skills (i.e. social, problem solving, attention). Among typically developing youth, robotics programs have the potential to improve STEM-related skills, teamwork, self-confidence and social and communication skills. Although there is growth in literature on the potential role of robotics programs, such as LEGO therapy, little is known about the impact of an adapted, group-based robotics program specifically for youth with disabilities. The objective of this study was to determine to what extent does the HB FIRST® Robotics Program impact the development of playfulness amongst youth with disabilities.

Methods: A total of 27 youth (aged 9-14) were recruited with varying disabilities (e.g. autism, cerebral palsy) and each youth was video recorded for six sessions (2 hours each) while enrolled in the program. The Test of Playfulness (ToP) was used to assess play in sessions one and six through observational coding. The first and last 10 minutes of the sessions underwent observational coding (four ToP scores) using the master coder method. ToP scores from session one and six were then averaged to have one score for each session.

Results: Interrater reliability was deemed moderate (k=0.6247) and internal consistency was high (α=0.89). Paired sample t-tests were performed to assess the difference between time 1 and time 2. Results were statistically significant using a significance level of 0.05.

Summary/Implications: These findings suggest that an adapted robotics program can be used to promote play and life skills development amongst youth with disabilities.
Poster 25:

Role of Aerobic Intensity in Combined Aerobic Exercise and Cognitive Enrichment Intervention

Nithin Jacob, Rehabilitation Sciences Institute, University of Toronto; Robin Green, KITE – Toronto Rehab – University Health Network.

Field of Research: Social and Cognitive Rehabilitation

Background: Aging-related brain atrophy – specifically of the hippocampi – can cause devastating memory decline and increased risk of Alzheimer’s Dementia. Delivering aerobic exercise (AE) and cognitive enrichment (CE; continuous, challenging, cognitive stimulation) together confers synergistic protection of the hippocampi and memory (Fabel et al., 2009). Combining high intensity AE with CE, compared to moderate intensity AE, may increase the synergistic benefits which are mediated by brain-derived neurotrophic factor (BDNF). The present randomized controlled trial will compare CE plus high intensity AE (Group 1) against CE plus moderate intensity AE (group 2).

Methods: Objective 1. Feasibility. To measure 1) recruitment, 2) retention, 3) adherence, 4) acceptability, and 5) outcome completion. Objective 2. Preliminary Efficacy. To measure pre- to post-intervention effect sizes in all groups for 1) memory, 2) hippocampal volume, and 3) serum BDNF levels. Hypothesis. Both groups will improve in efficacy outcomes, with significantly greater increases in Group 1 (high intensity AE).

N=24 community-based healthy adults (65-85 years) will be allocated 1:1, stratified by age, sex, and baseline fitness level. Both groups will engage in 30-minute sessions, 3x/week, for 12 weeks of CE using online Brain HQ Posit Science from home, and AE at Toronto Rehabilitation Institute. For AE sessions, Group 1 will cycle in intervals at 85-95% peak heart rate (HR peak), and Group 2 will cycle continuously at 65-75% HR peak.

Primary feasibility outcomes: 1) percentage of eligible individuals who enroll, 2) proportion retained until intervention completion, 3) average time spent daily and weekly on AE and CE sessions, 4) Questionnaires and semi-structured interviews to monitor aversive experiences and elucidate compliance facilitators and barriers, 5) proportion of completed outcome questionnaires.

Preliminary efficacy outcomes: 1) Mnemonic Similarity Task and Memory Image Completion Test scores, 2) hippocampal sub-structural volumes, and 3) 12-hour fasted blood samples of serum BDNF. Descriptive statistics will be used to characterize feasibility outcomes. A 2x2 (group x time) repeated measures ANOVA will be employed to measure effect sizes for objective 2.

Implications: Our proposed work will accelerate the development of stronger synergistic therapies aimed to offset ageing-related memory loss.
Poster 26:


Iulia Niculescu, Rehabilitation Sciences Institute, University of Toronto; KITE – Toronto Rehab – University Health Network; Hannah Quirt, KITE – Toronto Rehab – University Health Network; Twinkle Arora, KITE – Toronto Rehab – University Health Network; Terry Borsook, KITE – Toronto Rehab – University Health Network; Brett Ford, Department of Psychology, University of Toronto; Robin Green, KITE – Toronto Rehab – University Health Network; Department of Psychiatry University of Toronto; Andrea Iaboni, KITE – Toronto Rehab – University Health Network; Department of Psychiatry University of Toronto.

Field of Research: Social and Cognitive Rehabilitation, Rehabilitation Technology Science

Funding: Walter and Maria Schroeder Foundation

Background: Assessing depression in people with advanced dementia is challenging due to difficulties with self-report and retrospective ascertainment. Mobile Ecological Momentary Assessment (EMA) provides a novel approach in assessing depressive symptoms by collecting informant measures in intervals throughout the day, decreasing recall bias and increasing representativeness.

Objectives: To evaluate an observer-rated EMA tool’s feasibility and reliability in assessing depressive symptoms in people with dementia. Methods. Twelve participants with dementia were enrolled from the Specialized Dementia Unit at the Toronto Rehabilitation Institute. Patients were assessed for clinical outcomes of depression at admission and discharge. Observations were completed on phones with access to the EMA tool by research and nursing staff. Follow-up interviews were conducted to ascertain the nurse experience of using the tool and the Systems Usability Scale (SUS) was completed. Mean SUS scores and nurse completion rates were generated to demonstrate feasibility. Mixed-effects ordinal logistic regression models were fit for each EMA item and variances of the random effects were examined. Krippendorff’s alpha values and intra-class correlations were generated for inter-rater reliability.

Results. The mean SUS score was 80% and completion rate was 79% across nurses. Total variability of items was largely explained by variance related to the participants. With exception to negativity, all item models demonstrated participants significantly changing over time. All items showed moderate inter-rater reliability, with exception to lack of interest.

Summary/Implications. This research provides an innovative approach in assessing depression in dementia. Future analyses will explore the ability of the EMA data to predict clinical outcomes of depression.
Poster 27:

“Illustrating” the Role of the Expressive Arts among Children and Youth with Cystic Fibrosis: A Narrative Review

Stephanie Posa, Rehabilitation Sciences Institute, University of Toronto; Holland Bloorview Kids Rehabilitation Hospital; Fiona Moola, Dalla Lana School of Public Health, University of Toronto; Holland Bloorview Kids Rehabilitation Hospital, Ryerson University.

Primary Field of Research: Social and Cognitive Rehabilitation

Funding Source: VERTEX

Background/Purpose: Cystic fibrosis (CF) is a multi-system genetic disorder characterized by respiratory and digestive impairments. Of the studies conducted on CF, most adhere to the traditional biomedical model, which focus on the centrality of biological factors in determining the diagnosis and treatment of illness. To date, researchers have not explored the role of the expressive arts in the lives of CF patients in terms of the impact that it may have on their psychosocial health. We conducted a narrative review of the literature to examine current state of the evidence on the uses of the expressive arts in the lives of patients living with CF.

Methods: Cystic fibrosis, body image, self-esteem, art, drawing, creative writing, adolescents, and accompanying synonyms were the keywords used for our search. Five electronic databases were used to conduct our search: MEDLINE, PsycINFO, EMBASE, CINAHL, and Social Sciences Citation Index. Inclusion criteria was as follows: Full-text articles published in English, participants with CF aged 1-24 years, must contain psychosocial dimension of the self, must contain visual or textual arts.

Results: Most authors employed the arts as a way to explore the spectrum of psychosocial states among children with CF, while some indicated that the arts could be used to treat psychosocial morbidities. As well, the arts were used as a communicative device by patients to explore issues related to their social health, such as social and familial roles and feelings about clinical teams. Furthermore, the creative arts were employed as a coping strategy by CF patients, as well as a method to reveal their existing coping strategies. The creative arts were also used as a platform to facilitate a sense of normalcy among patients with CF.

Summary/Implications: The expressive arts might be a powerful tool to explore various facets of health in patients with CF and do not appear to be associated with any adverse effects. More research is needed to elucidate whether the arts can treat psychosocial morbidity in patients with CF. We encourage researchers, clinicians, patients, and families to further contemplate this under-investigated therapeutic practice in the lives of young people with CF.
Poster 29:

Predictors of Literacy Development in Canadian Children

Insiya Bhalloo, Rehabilitation Sciences Institute, University of Toronto; Department of Speech-Language Pathology, University of Toronto; Monika Molnar, Rehabilitation Sciences Institute, University of Toronto; Department of Speech-Language Pathology, University of Toronto.

Field of Research: Speech and Language Pathology

Funding: SSHRC Canada Graduate Scholarships - Master’s (CGS-M)

Background: Reading difficulties are common in young children, internationally and in Canada. Childhood literacy is a major contributor to future academic and socio-economic success; it is therefore crucial to provide early reading intervention. A major component of effective early intervention is literacy screening tools. Current standardized tools have been predominantly developed to identify and remediate early reading difficulties in at-risk monolingual English-speaking children. These English-specific tools are typically administered in-person — which limits speech-language accessibility for children from multilingual or remote communities. One screening tool for early detection and intervention of reading difficulties is assessing phonological awareness skills (i.e. awareness of language-specific sound structures), a cognitive-linguistic skill that predicts early reading abilities.

Objectives: My MSc thesis focuses on: (i) developing a novel Urdu phonological awareness test for Urdu-English bilingual children; and (ii) how to adapt literacy screening tools (including tools for English monolinguals as well) to online assessment settings.

Methods: A total of 150 typically-developing Canadian Urdu-English bilinguals, English-Other bilinguals and English monolinguals who are in Kindergarten - Grade 2 (i.e. between 4-8 years of age) will participate in 3 online English literacy tests — the Expressive Vocabulary Test (EVT-2), Comprehensive Test of Phonological Processing (CTOPP-2) and Woodcock Reading Mastery Test (WRMT-R). Additionally, the Urdu-English bilingual children will participate in 3 equivalent adapted Urdu online literacy tests (i.e. expressive vocabulary, phonological awareness and letter-word recognition).

Results: A hierarchical multiple regression analysis will be conducted to analyze the predictive relationship between the Urdu and English phonological awareness tests and child reading performance, while accounting for potential confounding variables such as language proficiency. Child performance on the 3 online English literacy tests will be compared to age-based (in-person) standardized norms for these tests.

Implications: The proposed study will enable speech-language pathologists and educators to provide language-specific early literacy services — such as screening and monitoring vulnerable children prior to the manifestation of reading difficulties — and better understand the relevance of speech-language tele-rehabilitation in Canadian communities.
Poster 30:


Carly Cermak, Rehabilitation Sciences Institute, University of Toronto; Shannon Scratch, Bloorview Research Institute; Deryk Beal, Bloorview Research Institute; Department of Speech-Language Pathology, University of Toronto.

Field of Research: Speech and Language Pathology

Background: Childhood traumatic brain injury (TBI) is a complex condition associated with impairments in cognition and language, consequently impacting performance in academic, employment and social settings long-term. Despite the importance of language skills for social communication, information literacy, critical thinking, and persuasive writing, little is known about the long-term language outcomes (i.e. > 2 years post injury) of early childhood TBI. To address this knowledge gap, we aimed to characterize language outcomes in children > 2 years post injury and examine the contributing demographic, pre-injury, and injury-related factors.

Methods: We completed a descriptive study on long-term language outcomes in children ages 6 to 16 who experienced a TBI between 2 to 6 years of age. The Wechsler Abbreviated Scale of Intelligence -II (WASI-II) was used to measure general intelligence and the Clinical Evaluation of Language Fundamentals-Fifth Edition (CELF-5) was used to measure receptive and expressive language in a case series of 4 children. Data analysis included descriptive statistics and correlation analysis.

Results: Preliminary findings revealed that participants with mild TBI (n = 2) performed within the average range on all language subtests of the CELF-5 and on both subtests (Vocabulary, Matrix Reasoning) of the WASI-II. A relative weakness was observed on CELF-5 subtests that required formulation of sentences when compared to other CELF-5 subtest scores. Participants with moderate TBI (n = 1) and severe TBI (n = 1) performed below average on half of the CELF-5 subtests, with few similarities identified between individual language profiles. Similarities were observed however, on WASI-II scores with both participants scoring below average on the Vocabulary subtest.

Summary: Language tasks requiring formulation of sentences appeared to be the most challenging tasks for children with mild TBI. For children with moderate to severe TBI, language profiles were generally low as reflected in CELF-5 subtest scores and WASI-II Vocabulary scores. Factors associated with lower CELF-5 and WASI-II scores included greater TBI severity and lower socio-economic status.
Effectiveness of Interventions for Dysphagia in Parkinson’s Disease:
A Systematic Review

Pooja Gandhi, Swallowing Rehabilitation Research Laboratory, KITE - Toronto Rehab - University Health Network; Catriona Steele, Swallowing Rehabilitation Research Laboratory, KITE - Toronto Rehab - University Health Network.

Field of Research: Speech and Language Pathology

Purpose: Dysphagia is a common sequelae of Parkinson Disease (PD), and is significantly associated with malnutrition, aspiration pneumonia and mortality. While multiple therapeutic strategies are used to treat dysphagia in people with PD, there is limited evidence regarding the comparative effectiveness of these interventions. The objective of this systematic review is to summarize and critically appraise literature regarding the effectiveness of interventions for dysphagia in PD.

Methods: A literature search was conducted according to PRISMA guidelines in OVID MEDLINE(R), Embase, Cochrane Central Register for Controlled Trials, CINAHL and Speechbite using keywords and MeSH terms for PD and deglutition/dysphagia. Of 2015 articles identified, 25 met our criteria for full text review: a) interventional trials, prospective or retrospective cohort studies, or pre-post studies; b) included adults with PD and dysphagia; and c) measured swallowing outcomes via videofluoroscopy (VFSS), endoscopy (FEES) or electromyography (EMG). Risk of bias and study quality were evaluated using the validated Evidence Project tool and criteria capturing the rigor of instrumental measures. Screening, data extraction and evaluation were completed independently by two reviewers, with discrepancies resolved by consensus.

Results: Interventions fell into 3 categories: pharmacological (n = 10), neurostimulation (n = 8) and behavioral (n = 7). A large variety of primary outcome measures were reported, including swallowing timing/latency, safety, efficiency/residue, and bolus spillage. VFSS was used in 17 studies, FEES in 6 and EMG in 4. The majority of studies failed to adequately report details about contrast media, signal acquisition settings and blinding of raters to time-point. Meta-analysis was not possible due to differences in methods, and limitations in study quality. Overall, studies with lower risk of bias and greater experimental rigor pointed to positive outcomes in swallowing efficiency/residue but not safety. Mild baseline impairment was a common limitation, which may have obscured results.

Summary/Implications: Low-quality evidence suggests that dysphagia interventions in PD primarily impact swallowing efficiency. Future research using rigorous standardized instrumental measures to objectively investigate changes in swallowing along with patient-important outcomes is warranted.
Poster 32:

Investigating Implicit and Explicit Motor Learning in Adults Who Stutter

Fiona Höbler, Rehabilitation Sciences Institute, University of Toronto; Tali Bitan, Department of Psychology and IIPDM, University of Haifa; Luc Tremblay, Faculty of Kinesiology and Physical Education, University of Toronto; Luc De Nil, Department of Speech-Language Pathology, University of Toronto.

Field of Research: Speech and Language Pathology

Funding: Hayden HANTHO Award; Natural Sciences & Engineering Research Council (NSERC - Dr. Luc De Nil)

Background: Fluent speech production is a highly complex human behaviour, requiring the smooth and efficient coordination, integration, and automaticity of physiological and neurological processes. Speech and language development can be seen as an adaptation to our linguistic environment through implicit learning, before we develop a greater reliance on explicit learning processes in adulthood. In persons who stutter, research has revealed impaired motor planning, coordination and acquisition on both speech-related (Walsh et al. 2015) and non-speech tasks (Smits-Bandstra et al. 2006), indicating deficiencies in modality-independent mechanisms of motor learning. This study sought to answer the fundamental questions concerning the nature of motor learning and its hypothesized impairment in persons who stutter. Using non-verbal experimental paradigms under implicit and explicit conditions, we investigated the domain-general and modality-independent processes that motor skill relies upon, in adults who do (AWS) and do not stutter (ANS).

Methods: 18 AWS and 14 ANS completed an explicit Finger-to-thumb Opposition Sequencing task (FOS). 16 AWS and 15 ANS completed a computer-based, implicit Alternating Serial Reaction Time task (ASRT). Both explicit and implicit tasks were completed across 20 blocks of practice, with their consolidation tested across 5 blocks the next day. Variables of speed and accuracy were analysed using repeated measures MANOVA. Participants’ working memory and attention were also tested.

Results: On the FOS, significant within-session performance gains were found across groups (p<0.01). No significant between-session improvements or differences between AWS and ANS were found. On the ASRT, significant sequence-specific learning was found across groups (p<0.01), as well as significant differences between AWS and ANS on measures of speed (p<0.01).

Implications: These results highlight the importance of considering performance differences in adults who stutter based on the nature of the learning task. Differences in implicit motor learning, especially if confirmed in children, may point to the role of specific motor learning deficiencies during speech development. As many treatment approaches are based on a combination of both implicit and explicit learning strategies, their differential influence on treatment outcomes needs to be considered, so that therapy and assessment can be individualized to better support recovery and address issues of relapse in the management of stuttering.
Poster 33:

The Effect of Bilingual Exposure on the Linguistic and Cognitive Recovery of Children Following Pediatric Stroke

Kai Ian Leung, Department of Speech-Language Pathology, University of Toronto; Noma Dlamini, Division of Neurology, The Hospital for Sick Children, Toronto; Robyn Westmacott, Department of Psychology, The Hospital for Sick Children, Toronto; Monika Molnar, Department of Speech-Language Pathology, University of Toronto.

Field of Research: Speech and Language Pathology, Social and Cognitive Rehabilitation

Funding: Natural Sciences & Engineering Research Council Discovery Grant (NSERC - Monika Molnar)

Background: Pediatric stroke occurs during a sensitive period in development and often affects higher-level cognitive and linguistic processes. In typically developing bilingual children, certain theories of linguistic and cognitive advantages have been confirmed in behavioural studies. Protective effects of bilingualism has also been demonstrated in bilingual Alzheimer’s Disease patients. Atypically developing bilingual children may be able to benefit similarly.

Purpose: The current project evaluates effect of bilingual language exposure, prior and poststroke, on the performance in cognitive and linguistic measures in pediatric stroke patients. We hypothesise that bilingual children will benefit from protective factors, thanks to their bilingual environment.

Methods: Potential interactions between the patient (e.g., age, sex, socio-economic status), linguistic (e.g., language exposure), and neural (e.g., stroke characteristics) variables that affect children’s cognitive and linguistic processing after stroke will be evaluated. The Canadian Pediatric Ischemic Stroke Registry and medical charts will be used to gather all variable and performance data, with neurocognitive measures evaluated at 6 months and 1-year post-stroke. A total of 650 arterial ischemic stroke patients aged 0-17 years will be sampled based on database query and multivariate statistical analyses needed. Children with presumed/recurrent stroke, fetal stroke, pre-term birth, prenatal exposure to drugs/alcohol, a history of epilepsy and/or prior developmental/congenital diseases are excluded to avoid confounding variables.

Results: Regression analyses will be conducted to account for the independent variables mentioned above, with dependent variable being scores on neurocognitive assessments and predictors being various linguistic and stroke characteristic variables. Further, considerations for a slope of recovery and possible interacting effects with bilingual exposure will be explored.

Summary/Implications: This project will test the applicability of current theoretical frameworks, based on typically developing bilinguals, to atypical populations. Future research on bilingual neural and cognitive development informed by our results on cognitive-language areas that are affected/enhanced, may also be developed. Gaining a better understanding bilingual neural and cognitive processing and brain-behaviour relationships in children is crucial, as about half of children around the globe are bilinguals.
Poster 34:

Incidence of Feeding and Swallowing Impairment in Children after Stroke

Victoria Sherman, Rehabilitation Sciences Institute, University of Toronto; Mahendra Moharir, Division of Neurology, Sickkids; Ishvinder Bhathal, Division of Neurology, Sickkids; Kevin Thorpe, Dalla Lana School of Public Health, University of Toronto; Rosemary Martino, Department of Speech-Language Pathology, University of Toronto.

Field of Research: Speech and Language Pathology

Funding: Sickkids Clinician Scientist Training Program

Purpose: Stroke occurs across the lifespan and is becoming increasingly recognized in childhood. Dysphagia is common after stroke in adults; however, few studies have explored dysphagia in children post stroke. This study assessed incidence and predictors of feeding and swallowing impairments in children post stroke.

Methods: The Canadian Pediatric Ischemic Stroke Registry (CPISR) for a single tertiary care hospital was used to identify consecutive patients aged 1mo - 18yrs, admitted with arterial ischemic stroke (AIS) or cerebral sinovenous thrombosis (CSVT) over five years (Jan 2013 - Nov 2018), and included demographic and stroke details. Using a priori operational definitions, the medical chart for each patient was reviewed by two independent raters to capture in-hospital dysphagia incidence. Dysphagia was defined to include both feeding and swallowing impairment. Univariate description of the total sample used means (SD) and medians (IQR) and bivariate analysis derived incidence of each impairment with respect to select variables: type, severity and sidedness of stroke.

Results: There were 106 children: 73(68.9%) with AIS, 35(33.0%) with CSVT; 58(54.7%) male; and, median age 5.7 years (1.4-11.2). Majority (72, 75.8%) had stroke symptoms that lasted >24 hours. There were 26(24.5%) with severe neurological deficit at stroke presentation, and 12(11.3%) at discharge. Hemiparesis was present in 52(48.6%), of which 26(50.0%) left sided. Multiple infarcts were present in 41/69 (59.4%) AIS cases. Across the entire sample, the incidence of feeding impairment was 19(17.9%), and swallowing impairment was 37(34.6%). Of those with feeding and swallowing impairment, the majority were AIS (16, 88.9% and 34, 91.9% respectively). The majority had a right sided or bilateral neurological deficit, 24(64.9) of those with swallowing impairment and 12(63.2) of those with feeding impairment. Of those with swallowing impairment, 11(29.7%) had severe neurological deficit at presentation. There were 14(13.2%) children who had both feeding and swallowing impairments.

Implications: These findings suggest that dysphagia is also a consequence of stroke in children. Due to study design limitations, these estimates are likely conservative leaving the true incidence unknown. Prospective work is needed to better understand the incidence and characteristics of dysphagia in this unique population.
Poster 35:

Measures of Hyoid Movement in Healthy Swallowing:
How Stable Are They across Liquid Consistencies?

Sana Smaoui, Rehabilitation Sciences Institute, University of Toronto; KITE - Toronto Rehab - University Health Network; Melanie Peladeau-Pigeon, KITE - Toronto Rehab - University Health Network; Catriona Steele, Rehabilitation Sciences Institute, University of Toronto; KITE - Toronto Rehab - University Health Network.

Field of Research: Speech and Language Pathology

Funding: National Institute of Health – USA

Background/Purpose: Judgments of hyoid movement are frequently included in evaluations of swallowing. The current literature lacks information regarding expected values for measures of hyoid peak position, timing and kinematics in healthy swallowing. This study explores hyoid movement across the continuum from thin to extremely thick liquids.

Methods: Participants were 39 healthy adults under 60 years old (19 male) who underwent a videofluoroscopic swallowing study (30 images/second). Participants each swallowed 27 boluses of 20%w/v barium: 3 thin and 6 each thickened to slightly, mildly, moderately, and extremely thick consistencies according to the International Dysphagia Diet Standardisation Initiative (IDDSI) framework. Half of the thickened stimuli were prepared using xanthan gum and half with a starch-based thickener. Sip volume was derived from preand post-sip cup weights. Trained raters tracked hyoid position frame-by-frame relative to C4, with position along the x, y, and xy hypotenuse axes expressed in units normalized to a C2-C4 scalar. Descriptive statistics and linear mixed effects model analyses were completed for hyoid peak position, timing (time-to-peak-position, time-to-peak-velocity, time-to-peak-speed) and kinematics (speed, velocity, peak speed, peak velocity). Models explored the effects of IDDSI level, sip volume, thickener, and task repetition on the dependent variables.

Results: The dataset comprised 975 swallows with available hyoid tracking data. Median sip volumes were 8.9 ml for thin to mildly thick and 4.7 ml for moderately and extremely thick liquids. Peak superior hyoid position was significantly higher for mildly and moderately thick gum-thickened liquids. Otherwise, the analyses found no significant differences in any hyoid parameter across IDDSI levels or thickener. Weak positive correlations were found between sip volume and peak xy hyoid position (r = .15, p<.01), and speed of hyoid movement along the xy axis (r =0.131, p<.01).

Summary/Implications: The data suggest that hyoid peak position, timing and kinematic measures remain stable across the range from thin to extremely thick liquids in healthy adults, regardless of thickener type. No pattern of increasing hyoid position, timing or kinematics was seen with increasing liquid thickness. Slightly higher superior peak positions and faster speeds of hyoid movement may be expected with larger bolus sizes. We present healthy normal reference values to be used in comparison to determine impairment in disordered populations.