Rehabilitation Sciences Institute
UNIVERSITY OF TORONTO

presents the

Annual Research Day Showcase

Abstract Book

Tuesday May 10, 2016

McLeod Auditorium and Stone Lobby
Medical Sciences Building
1 King's College Circle
Toronto

Table of Contents

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Welcome

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

It is truly an honour to extend a warm welcome to all at our annual Rehabilitation Sciences Institute (RSI) Research Day, where we celebrate the academic and leadership talent of our exceptional graduate students who represent the future in rehabilitation research. The broad range of research that characterizes our interdisciplinary training environment is inspiring. I especially wish to recognize that this year our students have worked hard to introduce a number of new initiatives, such as student awards, 3-minute presentations, a magazine (rehabINK), greater involvement of our alumni, and an overall amazing annual research day schedule. We are so proud of you! I wish to express my sincere gratitude to the many people who have made this day possible: the RSI Research Day planning committee, our dedicated faculty, staff, and our outstanding hospital/community partners. Our research would also not be possible without the support of our university, funders, sponsors and friends. My hope is that we all emerge from this day renewed in our common mission to improve health and wellbeing through interdisciplinary rehabilitation research and knowledge exchange.

A message from the Graduate Coordinator of RSI, Dr. Dina Brooks

We are very pleased to welcome you to the RSI Research Showcase. Our mission is to prepare students to be leaders in the rehabilitation sciences. As you will see today, our students strive for research excellence. Research Day represents a unique forum through which key research findings can be showcased to our community to advance science and practice. As rehabilitation is a multidisciplinary enterprise, the research presented by our outstanding students will capture the depth and breadth of the field.

As Graduate Coordinator, one of the most rewarding parts of the position has been interacting with our talented students. Their passion and commitment to learning is truly inspiring and today you will have the opportunity to experience it at the poster and oral presentations.

Enjoy the day!

A message from the Rehabilitation Sciences Graduate Students' Union

The RSI Research Showcase 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 Rehabilitation Sciences Graduate Students Union (RSGSU), are excited to take part in highlighting all of our hard work and the diversity of our research. The RSI Research Day is a unique event as it is organized *for* the students, *by* the students. This event is a great environment to support our students, meet new people, and learn something new.

RSGSU

Take charge of today!
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

in partnership with

Rehabilitation Sciences Institute
UNIVERSITY OF TORONTO

2016 Research Day Committee

Roni Propp
MSc Student

Dr. Dina Brooks
Graduate Coordinator

Teenu Sanjeevan
PhD Candidate

Dr. Rena Park Helms
Associate Professor

Gillian de Boer
PhD Candidate

Diane Wiltshire
Business Officer

Roshanth Rajachandrakumar
MSc Student

Chen Xiong
MSc Student

Alana Tibbles
MSc Student

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

Loida Ares
Administrative Coordinator

Jessica Boafo
Administrative Assistant

Rob Page
Manager of Information Technology

Schedule of the Day

Tuesday, May 10th, 2016
8:30 a.m. – 5:00 p.m.
McLeod Auditorium and Stone Lobby
Medical Sciences Bldg. 1 King's College Circle

MORNING SESSION	
8:30 – 9:00	**Registration & Faculty Networking Breakfast** *MacLeod Auditorium* **Poster Set-up** *Stone Lobby*
9:00 – 10:30	**Faculty Assembly** *MacLeod Auditorium* ❖ **Guest Speaker – Heather McGhee Peggs** Manager, Conflict Resolution Centre (CRC) for Graduate Students *"Common Sources of Student/Supervisor Conflict and what you can do to manage them"* **Student Assembly** *MSB 2173* ❖ *"A Talk with Fellow Students: Mentorship101"*
10:30 – 10:45	**Refreshment Break** *MacLeod Auditorium*
10:45 – 11:15	**Opening Remarks** *MacLeod Auditorium* ❖ **Dean Trevor Young**, MD, PhD, FRCPC, FCAHS ❖ **Dr. Angela Colantonio**, PhD
11:15 – 12:30	**Student Presentations: 3 Minute Presentation Competition** *MacLeod Auditorium* ❖ *"Reduced tongue strength does not affect sensory tests of tactile or viscosity discrimination"* **Carly Barbon, PhD Student** ❖ *"How typically developing students perceive social inclusion of children with disabilities in mainstream schools: A scoping review"* **Brydne Edwards, PhD Candidate** ❖ *"Interventions that optimize everyday outcomes for people with brain injury related impaired self-awareness are complex"* **Lisa Engel, PhD Candidate** ❖ *"Energy conservation treatment in adults with fatigue: A scoping review"* **Janine Farragher, PhD Student**

	❖ *"A preliminary mixed-methods cross-cultural investigation of conversational turn taking in families of children with hearing loss"* **Hillary Ganek, PhD Candidate** ❖ *"Dysphagia intervention for patients with head and neck cancer treated with radiotherapy with or without chemotherapy: A systematic review"* **Elissa Greco, MSc Student** ❖ *"Exploring intraindividual variability during a working memory task after sports-related concussion in youth"* **Stephanie Green, PhD Candidate** ❖ *"Temporal and spectral analysis of centre of pressure: Indicators of recovery after traumatic brain injury"* **Olinda Habib Perez, PhD Candidate** ❖ *"Cortical activity during lower limb movements in children with hemiplegic cerebral palsy: An fMRI study"* **Alicia Hilderley, PhD Candidate** ❖ *"Age, sex and baseline concussion symptoms in youth athletes: An exploration of heart rate variability"* **Melissa Paniccia, PhD Student** ❖ *"Investigating symptoms of depression and concussion in adolescent athletes devoid of concussive injury"* **Tian Renton, MSc Student** ❖ *"The concept of normal: A history, the perpetuation and the consequences of normality"* **Natalie Rose, PhD Student** ❖ *"The feasibility of using shear wave ultrasound to measure stiffness of the swallowing muscles in normal healthy subjects"* **Stephanie Shaw, PhD Candidate** ❖ *"Autism Inside Out: Perspectives from three autobiographies written by youth"* **Christie Welch, PhD Student** ❖ *"Needs and preferences of technology among Chinese family caregivers of persons with dementia"* **Chen Xiong, MSc Student**
AFTERNOON SESSION	
12:30 – 1:45	**Lunch and Networking** *MacLeod Auditorium*
1:00 – 1:45	**Poster Judging** *Stone Lobby*

1:45 – 2:45	**Keynote Speaker** *MacLeod Auditorium* ❖ **Ms. Joanne Goldberg** *Assistant Director of Institute of Aging – CIHR* *"The World is Aging – New Challenges and Opportunities for Rehabilitation Research"*  Joanne Goldberg is the Assistant Director of the Institute of Aging of the Canadian Institutes of Health Research. She holds a Master's of Science degree in Biomedical Sciences (Rehabilitation) from the Université de Montreal and a Bachelor of Science degree in Physiotherapy. Ms Goldberg joined the Institute of Aging in November 2011 and brings with her over 20 years of research planning and research management experience. Ms. Goldberg was previously the Assistant Director for Scientific Affairs/Program Development the Fonds de la recherche du Québec-Santé where she was responsible for the development and implementation of numerous partnerships with the public and the charity/non-profit sector organizations, as well as with the private sector, both at the national and international levels. She was responsible for all agency matters related to clinical research, including the implementation of the Quebec Biopharmaceutical Strategy. Ms. Goldberg is a licensed health professional (Physiotherapist) and is certified as a Clinical Research Professional (CCRP). She served as President of the Society of Clinical Research Professionals (SoCRA) in 2008-2009 and is a member of the Society's International Certification Committee.
2:45 – 2:50	**Fitness Recharge** *MacLeod Auditorium*
2:50 – 3:30	**Student Presentations: 10 Minute Presentations** *MacLeod Auditorium* ❖ *"Mapping paediatric rehabilitation across Canada – challenges and complexities of funding of services"* **Sonia Pagura, PhD Candidate** ❖ *"Movers and thinkers: Exploring the relationship between motor and cognitive brain networks in upper limb recovery post-stroke"* **Timothy Lam, MSc Candidate** ❖ *"The correlation between substance abuse and cognitive recovery after traumatic brain injury"* **Alana Tibbles, MSc Student**
3:30 – 4:00	**Awards Ceremony, rehabINK & Wrap-up** *MacLeod Auditorium*
4:00 – 5:00	**Networking with Wine & Cheese** *Stone Lobby*

Sponsorships

Thank you to our valued sponsors!

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Silver Level

UHN Toronto Rehabilitation Institute

CIHR IRSC Canadian Institutes of Health Research / Instituts de recherche en santé du Canada

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UNIVERSITY OF TORONTO | International Centre for Disability and Rehabilitation

Dr. Norah Cullen

Keynote Speaker: Joanne Goldberg

Title: The World is Aging – New Challenges and Opportunities for Rehabilitation Research

Biography

Joanne Goldberg is the Assistant Director of the Institute of Aging of the Canadian Institutes of Health Research. She holds a Master's of Science degree in Biomedical Sciences (Rehabilitation) from the Université de Montreal and a Bachelor of Science degree in Physiotherapy. Ms Goldberg joined the Institute of Aging in November 2011 and brings with her over 20 years of research planning and research management experience.

Ms. Goldberg was previously the Assistant Director for Scientific Affairs/Program Development the *Fonds de la recherche du Québec-Santé* where she was responsible for the development and implementation of numerous partnerships with the public and the charity/non-profit sector organizations, as well as with the private sector, both at the national and international levels. She was responsible for all agency matters related to clinical research, including the implementation of the Quebec Biopharmaceutical Strategy.

Ms. Goldberg is a licensed health professional (Physiotherapist) and is certified as a Clinical Research Professional (CCRP). She served as President of the Society of Clinical Research Professionals (SoCRA) in 2008-2009 and is a member of the Society's International Certification Committee.

Student Oral Presenters

Three Minute Presenters

Carly Barbon
PhD Student

Brydne Edwards
PhD Candidate

Lisa Engel
PhD Candidate

Janine Farragher
PhD Student

Hillary Ganek
PhD Candidate

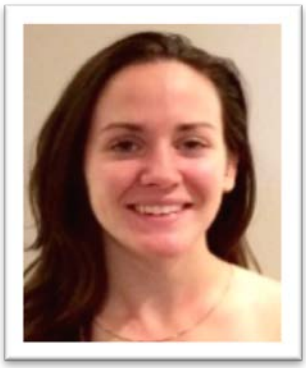
Elissa Greco
MSc Candidate

Stephanie Green
PhD Candidate

Olinda Habib Perez
PhD Candidate

Alicia Hilderley
PhD Candidate

Melissa Paniccia
PhD Student



Tian Renton
MSc Student

Natalie Rose
PhD Student

Stephanie Shaw
PhD Candidate

Christie Welch
PhD Student

Chen Xiong
MSc Student

Ten Minute Presenters

Timothy Lam
PhD Candidate

Sonia Pagura
MSc Candidate

Alana Tibbles
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 travel award.
Submit your ballot by 1:00pm! The winners will be announced at the Wine & Cheese at 4:00pm!

Poster Competition

We have 4 student travel awards up for grabs:

- Best Poster – MSc
- Best Poster – PhD
- Best Poster – People's Choice
- Best Poster – CIHR Gender, Work and Health award

Submit your ballot by 1:45pm! The winners will be announced at the Wine & Cheese at 4:00pm!

Social Media Contests

What better way to kick off **RSI Research Day 2016** than with a giveaway! Here how's to win:

Step 1: Like us on Facebook (Rehabilitation Sciences Institute) **OR** follow us on Twitter (@RSIUofT) to enter.
Step 2:

- If you entered through Facebook, LIKE our #RSIResearchDay post on May 10th!
- If you entered through Twitter, all you have to do is RETWEET the #RSIResearchDay #Giveaway post!

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

The **deadline** to enter is **Tuesday, May 10th, 2016** at **3:00pm**!

All contest winners will be announced at the Wine & Cheese event starting at 4:00pm in the Stone Lobby.

Make sure to also join the conversation by using the hashtag **#RSIResearchDay**

Good luck!

Student Abstracts

in alphabetical order by last name

Poster #1

Investigating balance, plantar pressure, and foot sensitivity in individuals with diabetes during stair gait

Patrick Antonio, Rehabilitation Sciences Institute, University of Toronto; Stephen Perry, University of Toronto, Wilfrid Laurier University

Funding: James F. Crothers Family Fellowship in Peripheral Nerve Damage, Toronto Rehabilitation Institute Student Scholarship

Field: Movement Science, Rehabilitation Technology Science

Background: Diabetic peripheral neuropathy is a dysfunction of the peripheral nerves that restricts sensation from the limbs, constrains one's mobility and quality of life. Furthermore, the impaired peripheral nerves affect foot sensitivity compromising an individual`s balance. To compensate, individuals generate greater foot pressures while walking - often leading to tissue ulcerations, or possibly lower-extremity amputations if left untreated. As well, foot pressures during stair gait are greater than level walking. Currently, there are off-the-shelf diabetic insole devices that claim to offload foot pressures and limit ulcer formation; however these devices fail to address concurrent issues of balance and fall risks. This first phase of the study investigates the foot pressure offloading capacity of the off-the-shelf diabetic insoles during stair gait, and how an individual with diabetic peripheral neuropathy's balance is affected.

Methods: Diabetic individuals (n=2) with impaired foot sensitivity were outfitted with (3) off-the-shelf diabetic insoles (and 1 normal insole), and instructed to traverse the 'Stair Lab' at the Toronto Rehabilitation Institute. Mobility was recorded using reflective markers placed on the body via motion capture cameras. Balance, specifically the center of mass-base of support (COM-BOS) was calculated using the body markers. Foot pressures were also recorded using pressure sensor insoles placed inside standardized and size-matched footwear for each participant during stair gait.

Preliminary Results: The 3 diabetic insoles displayed high peak foot pressure in the metatarsal head region, but lower peak pressures in the heel region, vs. the normal insoles without support. Also, diabetic insoles showed more stability during stair gait vs. normal insoles.

Implications: Increased foot pressures in the metatarsal heads indicate that perhaps the designs of diabetic insoles are not optimal to wear for stair gait, specifically. Yet, balance may be positively influenced by the diabetic insoles during stair gait. This is preliminary data, further collection and analysis will provide further insight into this question.

Poster #2 and Three Minute Presentation

Reduced tongue strength does not affect sensory tests of tactile or viscosity discrimination

Carly E. A. Barbon, Rehabilitation Sciences Institute, University of Toronto; Toronto Rehabilitation Institute; Teresa J. Valenzano, Toronto Rehabilitation Institute; Melanie Peladeau-Pigeon, Toronto Rehabilitation Institute; Catriona M. Steele, Toronto Rehabilitation Institute

Funding: National Institutes of Health

Field: Speech-Language Pathology

Background/Purpose: It is plausible to assume that sensory information obtained during bolus compression by the tongue enables tailoring of propulsion forces to bolus viscosity. We explored whether reduced tongue strength leads to higher sensory discrimination thresholds in healthy adults and adults with dysphagia.

Methods: Two experiments were conducted. Experiment 1 involved 340 healthy individuals aged 12-86. Experiment 2 involved adults with neurogenic dysphagia. Maximum isometric tongue pressures were measured and participants also completed a Tactile Discrimination Acuity Test and a triangle test viscosity discrimination task. Paired t-tests were used to compare individuals with dysphagia to their decade and sex group from Experiment 1.

Results: Tongue strength declined in healthy individuals >70, and in participants with dysphagia. Tactile discrimination was worse for healthy individuals aged ≥70 but did not differ in those with dysphagia. Viscosity discrimination did not differ as a function of age or dysphagia.

Summary/Implications: Adults ≥70 and patients with dysphagia have decreased tongue strength. Tactile discrimination also declines with age. Despite these changes, individuals with dysphagia do not have greater difficulty discriminating viscosity with thickened liquids. This suggests that individuals with reduced tongue strength should be able to detect and respond to differences in bolus viscosity.

Poster #3

Using Twitter to recruit participants for health research: An example from a caregiving study

Marina Bastawrous, Rehabilitation Sciences Institute, University of Toronto; Jennifer Stinson, Sick Kids Hospital; Fiona Webster, University of Toronto; Jill Cameron, University of Toronto

Funding: CIHR STIHR Fellowship in Healthcare, Technology & Place, UHN Toronto Rehab Scholarship

Field: Rehabilitation Health Services Studies, Rehabilitation Technology Science

Background: Social media can optimize the various stages of the research process. The present study focuses on the implementation phase—specifically the use of social media for participant recruitment. When using convenience sampling, Twitter is especially useful as the 'retweeting' function facilitates the process of 'snowball sampling'. While Facebook has been widely used and reported on in the literature, we have little insight into how Twitter can be used to recruit participants and whether samples recruited in this way are representative enough to render study findings generalizable.

Objectives: In the context of a study on caregiving peer support, we aimed to: (1) Investigate whether a representative sample can be recruited through Twitter (2) Describe the nature and extent of study-related tweets posted; and (3) Describe the extent to which these tweets were shared by others.

Methods: Tweets were posted (Feb 1-Oct 1, 2014) asking potential participants to access and retweet the study survey link. A series of Mann-Whitney and chi-square tests were conducted to compare caregivers recruited via Twitter vs. other means on demographic variables and internet proficiency. Z-scores were also calculated to provide an indication of effect size. Third party apps were used to aggregate and analyze the study-related tweets and to calculate the reach of the top 10 most retweeted tweets. Results: Twenty-seven out of 71 caregivers were recruited through Twitter. There were no statistically or practically significant differences between groups. Tweets posted included general recruitment tweets (n= 124), mention tweets (n= 1275), and engagement tweets (n= 285). The general recruitment tweets were most-shared by users (67.2% were retweeted). The top 10 most retweeted tweets indicated that tweet reach can range from 5,273 to 62,144 users.

Implications: Twitter samples can be considered representative and findings are potentially generalizable. Researchers can optimize Twitter recruitment by considering how this strategy will aid them in reaching their particular population of interest. Time must also be invested into building fellowship and rapport on Twitter and post-recruitment analysis of process and output should be considered.

Poster #4

Sex-specific predictors of inpatient rehabilitation outcomes after traumatic brain injury

Vincy Chan, Rehabilitation Sciences Institute, University of Toronto; Tatyana Mollayeva, Toronto Rehabilitation Institute, University Health Network; Kenneth J. Ottenbacher, University of Texas Medical Branch; Angela Colantonio, University of Toronto

Funding: Eunice Kennedy Shriver National Institute of Child Health & Human Development of the National Institutes of Health (R24HD065702), Canadian Institutes of Health Information, Pediatric Oncology Group of Ontario, Brain Canada, Ontario Neurotrauma Foundation

Field: Rehabilitation Health Services Studies

Purpose: To identify sex-specific predictors of inpatient rehabilitation outcomes among patients with a traumatic brain injury (TBI) from a population based perspective.

Methods: Retrospective cohort study using population based healthcare administrative data in Ontario, Canada. Patients in inpatient rehabilitation for a TBI within one year of acute care discharge between 2008/09 and 2011/12 were identified using specified International Classification of Diseases Version 10 codes.

Results: Sex, as a covariate in multivariable linear regression models, was not a significant predictor of rehabilitation outcomes. While many of the predictors examined were similar across males and females, sex-specific multivariable models identified some predictors of rehabilitation outcomes that are specific for males and females; mechanism of injury ($p<.0001$) was a significant predictor of functional outcome among females while comorbidities ($p<.0001$) was a significant predictor for males only.

Summary: Predictors of outcomes after inpatient rehabilitation differed by sex, providing evidence for a sex-specific approach in planning and resource allocation for inpatient rehabilitation services for patients with TBI.

Poster #5

Identifying sub-clinical differences in gait characteristics associated with fatigue during rollator use among persons with multiple sclerosis

Justin Chee, Rehabilitation Sciences Institute, University of Toronto; Kara Patterson, University of Toronto; Alex Mihailidis, University of Toronto

Funding: Multiple Sclerosis Society of Canada Doctoral Studentship

Field: Movement Science, Rehabilitation Technology Science

Background/Purpose: Persons with multiple sclerosis (MS) who use rollators (i.e. four-wheeled walkers) continue to experience falls and have difficulties with self-efficacy associated with activities of daily living. Self-management interventions and biofeedback training techniques have been shown, in previous work, to help them overcome challenges posed by fatigue and gait impairments respectively. In the present study, we seek to determine which gait characteristics, associated with fatigue, are most sensitive at detecting sub-clinical changes in gait performance among rollator users with MS.

Methods: A cross-sectional observational design will be employed to examine how gait characteristics associated with fatigue and the energetic cost of walking are affected by a fatiguing walking task (e.g. a 6-Minute Walk Test). All participants must possess a clinical diagnosis of MS and belong to one of four clinical categories (according to EDSS score) from fully ambulatory to requiring bilateral assistance. They will perform three bouts of normal walking (10-m), and a 6-Minute Walk Test (6-MWT). Gait characteristics associated with fatigue (e.g. double support time) and outcome measures associated with the energetic cost of walking that may be affected by fatigue (e.g. postural sway) will be recorded using an instrumented rollator and wearable ambulatory monitoring sensors.

Expected Results: We expect to observe a significant difference in the gait characteristics exhibited by rollator users in different clinical categories of disability. We also anticipate that outcome measures associated with energetic cost of gait will be more sensitive at detecting sub-clinical changes than fatigue-associated gait characteristics.

Summary/Implications: This work will improve the detection of functional, mobility-changes to aid in tracking the trajectory of disease progression among MS patients. It also sets the stage for the development of a novel assistive mobility device that enhances MS patient outcomes using an on-board biofeedback training intervention.

Poster #6

Inhibition of primary cilia resorption reduces retinal ganglion cell degeneration after axotomy

Brian Choi, Rehabilitation Sciences Institute, University of Toronto; Alireza Shabanzadeh, Toronto Western Hospital; Philippe D'Onofrio, Rehabilitation Sciences Institute; Paulo Koeberle, University of Toronto

Funding: CIHR

Field: Movement Science, Social and Cognitive Rehabilitation

Purpose: It is unknown whether the primary cilia of RGCs (retinal ganglion cells) regulate cell cycle re-entry that is exhibited during apoptosis. Aurora A kinase and HDAC6 (histone deacetylase 6) are involved in cilia resorption and are highly expressed in rapidly dividing cells. This study investigates the hypothesis that inhibiting pathways that control cilia resorption can prevent apoptotic cell cycle re-entry in RGCs after optic nerve transection.

Methods: Adult Sprague-Dawley rats received intraorbital optic nerve transections. At 3 and 8 days postaxotomy, animals received intraocular injections of an Aurora A kinase inhibitor (N=6) or Tubastatin A (TBA; N=4), an inhibitor of HDAC6, delivered at 10mM or 20 mM concentrations respectively. At 14 days postaxotomy RGCs were imaged by immunofluorescence directed against RBPMS (RNA Binding Protein with Multiple Splicing) and survival was quantified from fixed, flat-mounted retinas. Data was analyzed using a one-way ANOVA followed by Tukey's post-hoc test in order to identify statistically significant differences between control and experimental groups. To examine the effects of cilia disruption in RGCs, Ift88 (intraflagellar transport) siRNAs were injected into the vitreous chamber or into the transected optic nerve stump. After 4 days of siRNA treatment, cell cycle entry in RGCs was assayed in fixed retinas using a Ki67 antibody.

Results: At 14 days postaxotomy, retinas treated with Aurora A kinase inhibitor or TBA had a significantly higher RGC density compared to controls ($p<0.001$). Ift88 siRNA treated RGCs showed nuclear expression of Ki67 whereas normal (untreated) or control retinas, treated with a scrambled siRNA sequence did not.

Conclusions: Our findings suggest that the primary cilia may play a role in keeping RGCs in a post mitotic state. Blocking Aurora A and HDAC6 activity appears to halt the signalling cascades that lead to apoptotic cell cycle re-entry, via cilia resorption. These findings support a novel role of the primary cilium in regulating the survival of RGCs after injury.

Poster #7

Postcolonial encounters with disability: Exploring disability and ways forward together with persons with disabilities in Western Zambia

Shaun Cleaver, Rehabilitation Sciences Institute, University of Toronto; Stephanie Nixon, Physical Therapy, University of Toronto; Helene Polatajko, Occupational Science and Occupational Therapy, University of Toronto; Lilian Magalhaes, Occupational Therapy Department, Federal University of Sao Carlos; Virginia Bond , LSHTM, UK and Zambart, University of Zambia School of Medicine

Funding: Canadian Institutes of Health Research Fellowship, W. Garfield Weston Fellowship

Field: Rehabilitation Health Services Studies

Background: Many disability strategies in the global South are premised upon dominant ideas about disability and rehabilitation from the global North. Imported strategies that intend to improve the situation of persons with disabilities in the global South need to more closely consider culture and context. In an effort to challenge the indiscriminate flow of ideas about disability from global North to global South, we co-construct ways of thinking about disability, and what to do about it, arising from a study of disability groups in Western Zambia.

Methods: We used a constructivist qualitative design with critical and participatory elements. The participants were two groups of persons with disabilities in Western Zambia. We generated data through 8 focus group discussions and 39 individual interviews. An iterative qualitative content analysis process was applied. The project was further reviewed to create insights according to global health research principles, and using a reflective analytic process.

Results: The participants' perspectives on disability and ways to improve their situation were different than dominant Western notions. Participants presented their greatest concern as poverty and their vision of a way forward as the provision of help (i.e., material resources) from wealthier parties. The reflective analysis allowed us to identify contradictions within this project. Despite our challenge to global hegemony, this project was markedly influenced by the structural power dynamics of doctoral education and socioeconomic worldviews prevalent in the global North.

Implications: This study offers contextually-grounded perspectives on disability. The most immediate implications are to propose practical strategies to help persons with disabilities address poverty in Western Zambia. Broader implications include: 1) a refutation of globally dominant perspectives of disability and rehabilitation, and 2) new perspectives regarding the ways in which global Northerners can collaborate with persons with disabilities in the global South.

Poster #8

Right on the nose: Quantitative assessment of oral-nasal balance in speech

Gillian de Boer, Rehabilitation Sciences Institute, University of Toronto; Tim Bressmann, University of Toronto

Funding: Canadian Institutes of Health Research (grant fund number 485680)

Field: Speech-Language Pathology

Purpose: Most acoustic studies of oral-nasal balance disorders (resonance disorders) have focused on hypernasality. However, disorders of oral-nasal balance are often complex. Hypernasal resonance in combination with compromised nasal patency is common among patients with bilateral and unilateral complete cleft lip and palate (Fukushiro & Trindale, 2005; Coston et al., 2009). The study investigated whether a linear predictive analysis based on Long Term Averaged Spectra of both oral and nasal stimuli would arrive at a comprehensive classification of the speaker's oral-nasal balance.

Methods: Eleven normal female speakers were taught to simulate hypernasality, hyponasality and mixed nasality. Hyponasality was simulated by blocking one nostril. For hypernasality, the participants were trained to voluntarily lower the velum for all speech sounds. Mixed nasality was simulated by blocking one nostril and lowering the velum. The participants were recorded with a Zoom Q3 audio recorder as they read oral and nasal stimuli. The speaking conditions were normal voice and the simulations of hypernasality, hyponasality and mixed nasality. The hyponasality and mixed nasality simulations were repeated with the alternate nostril occluded. The recordings were analysed with Long Term Averaged Spectra (LTAS).

Results: The LTAS amplitude values (in decibels) were extracted in 100 Hz intervals over a range of 4 kHz. To normalise across participants and speaking conditions, the decibels were converted to z-scores. A repeated measures Analysis of Variance of the normalized amplitudes revealed a resonance condition - frequency band amplitude interaction effect ($p < .001$). A linear discriminant analysis of the participants' LTAS led to a set of formulas correctly classifying 80.7% of the oral-nasal balance conditions.

Summary: The simulations produced distinctive spectra enabling the creation of formulas that predicted the oral-nasal balance above chance level. Future research with speakers with oral-nasal balance disorders will be needed to investigate the potential of this approach for the clinical diagnosis of disorders of oral-nasal balance.

Poster #9

ERK1/2 contributes to necroptosis in neurons after optic nerve transection

Philippe D'Onofrio, Rehabilitation Sciences Institute, University of Toronto; Brian Choi, Rehabilitation Sciences Institute; Alireza Shabanzadeh, Toronto Western Hospital; Paulo Koeberle, Rehabilitation Sciences Institute/Department of Surgery

Funding: NSERC

Field: Movement Science

Background/Purpose: Neuron degeneration is involved in neurological diseases such as Alzheimer's disease and Parkinson's disease, as well as in ophthalmological diseases such as glaucoma, retinal detachment, age-related macular degeneration, retinitis pigmentosa, and ischemia-reperfusion injury. At a cellular level, many processes lead to neuron loss, and of these apoptosis is the most studied. However, recent evidence indicates that the mechanism known as necroptosis may also play an important part. Necroptosis appears to rely on RIP kinases, however there is evidence to suggest that ERK1/2 may also play a role. ERK1/2 is expressed to some degree in every human tissue, particularly in the brain, skeletal muscle, thymus and heart: it has been described as a key member of essential signaling cascades within neurons. Recently, ERK1/2 activity has been found to contribute to cell death following ischemic reperfusion injury in the retina, however the mechanisms of this action remain unclear. ERK1/2 interacts with survival, apoptotic, and necroptotic pathways, meaning that its overall action is very unclear. The present work examines the activation patterns and targets of ERK1/2 following optic nerve axotomy in order to elucidate its functions after injury. It also examines the potential for ERK1/2 inhibition to increase the survival of retinal ganglion cells after injury.

Methods: Retinal ganglion cell damage is induced by optic nerve transection. Levels of ERK1/2 as well as protein interactions are elucidated with western blots and co-immunoprecipitations. Retinal ganglion cell survival is quantified with confocal microscopy.

Results: ERK1/2 becomes most active 1 day following axotomy, and inhibition of its binding at this time reduced the level of active ERK1/2 as well as it's the activation level of RIP3. This results in greater levels of retinal ganglion cell survival.

Summary/Implications: This work demonstrates that necroptosis is an important mechanism in neuron degeneration after optic nerve transection. As such, it forms a potential avenue for treatments to prevent retinal, and possibly neuronal, degeneration following damage.

Poster #10

Using music and movement to support school readiness skills in preschool children with hearing loss

Glynnis DuBois, Rehabilitation Sciences Institute, University of Toronto; Sandra Trehub, University of Toronto; Glenn Schellenberg, University of Toronto; Michael Thaut, University of Toronto; Alice Eriks-Brophy, University of Toronto

Field: Speech-Language Pathology

Background: Researchers and therapists have long been intrigued by the potential of musical activities in childhood to facilitate the development of literacy skills. Theorists have speculated that language, reading, and music overlap in meaningful structural and functional ways that extend well beyond a simple association with audition (Patel, 2014; Tierney & Kraus, 2014) and suggest that these abilities may be scaffolded by the skills acquired through sharing or making music. There have been some investigations of those aspects of childhood music and movement exposure that may help to scaffold development in the areas of phonological awareness (Kraus & Chandrasekaran, 2010; Moritz, et al, 2013), vocabulary, and social skills (Gerry, Unrau & Trainor, 2012). There is, unfortunately, a paucity of research on the potential benefits of music activities for children with hearing loss (HL). Since recent advances in hearing technology for this population now provides them with access to both spoken language and music, the potential benefits of the use of music is now becoming an innovative and exciting focus for research. The goal of this quasi-randomized experimental intervention study proposal is to examine the impact of the addition of music and movement to traditional listening and spoken language therapy for preschool children with HL.

Methods: Participants will be matched and placed into a music and movement group, a craft-based group, or a control group. Pre- and post-intervention assessments focusing on outcomes in the areas of speech, language, pre-literacy, audition, and social skills will be completed.

Implications: With evidence to support the benefits of music and movement, it is hoped that practitioners will be encouraged to incorporate these elements into best practices for children with HL. Such evidence would also contribute to the development of resources guiding practice in how to best prepare this population for success in integrated classroom settings.

Poster #11

The impact of threatening content on arousal systems

Nicole Durham, Rehabilitation Sciences Institute, University of Toronto; Bethany Young, University of Toronto; Pascal van Lieshout, University of Toronto

Field: Social and Cognitive Rehabilitation

Background: Traumatic brain injury (TBI) is the leading cause of death and disability (Werner & Engelhard, 2007). The vast physical, social and cognitive deficits post injury affect individuals from returning to work and daily activities thereby reducing their quality of life (Zupan, Neumann, Babbage and Willer, 2009). Aside from the array of deficits, emotion-processing difficulties (especially to negative stimuli) are common post TBI (Rushby, Fisher, McDonald, Murphy & Finnigan, 2013). This includes abnormalities in autonomic arousal, which manifests both behaviourally and physiologically. The current study examines whether threat-related effects in TBI are manifested at the physiological level and impact linguistic processing. If so, it could be a possible source for difficulties in processing information in spoken language. Thus, our study can provide an objective way to demonstrate that emotional content is registered in the brain and leads to predictable autonomous nervous system and behavioural responses.

Method: We use the Linguistic Acoustic ThreaT Effect (L.A.T.T.E.), to examine the extent to which threatening content impacts phoneme monitoring ability. Accuracy and reaction times (ms) are measured in response to target-present and absent trials for negative and neutral stimuli. Skin conductance responses are measured simultaneously.

Expected Results: Behaviourally, it is expected that slower reaction times in the presence of negative stimuli may indicate a failure to operate efficiently under the emotional strain invoked by the content of the spoken threat word. Physiologically, we expect to see an increase in autonomic arousal in response to negative content, thus providing a neural basis for the impact on linguistic processing.

Summary/Implications: These results would provide further empirical support to the theoretical framework on the impact of threat words on cognitive processing using objective measures. We expect that it can provide support for future clinical research to remediate potential problems in handling negative emotions in spoken language as found in patients with TBI.

Poster #12 and Three Minute Presentation

How typically developing students perceive social inclusion of children with disabilities in mainstream schools: A scoping review

Brydne Edwards, Rehabilitation Sciences Institute, University of Toronto; Bloorview Research Institute; Gillian King, Bloorview Research Institute; Debra Cameron, University of Toronto; Amy McPherson, Bloorview Research Institute

Funding: Bloorview Research Institute's Graduate Student Scholarship

Field: Social and Cognitive Rehabilitation

Background/Purpose: Research exploring whether inclusive education enhances social inclusion has yielded inconsistent results (Bates McCafferty, Quayle & McKenzie, 2015). Despite the importance of typically developing students' perspectives in promoting successful social inclusion strategies in the classroom, their perspectives are not well represented in the literature (e.g., Adderley et al., 2015; Beckett, 2009). The purpose of this review was to summarize typically developing students' perspectives of social inclusion in mainstream classrooms. Secondary objectives included investigating tools used to measure different aspects of social inclusion, and identifying factors influencing typically developing students' perspectives on social inclusion.

Methods: This study focused on perspectives toward students with physical disabilities and followed Arksey and O'Malley's (2005) methodology. Five databases were searched and 5643 articles were screened for eligibility. 5449 articles were excluded following title review, and another 200 were excluded based on abstract review.

Results: 11 articles were included in this review. Results were categorized using Koster et al.'s (2009) framework of peer-related social inclusion components: interaction, acceptance and friendship. Typically developing students reported reduced interaction, lower acceptance and less willingness to befriend a child with a physical disability. Main factors impacting these perspectives included similarity in interests/hobbies, social pressure, knowledge of disability, and task demands.

Summary/Implications: The findings show that each social inclusion component is being evaluated separately. In addition, the same components are evaluated using different outcome measures, leading to inconsistencies in research results. Together, this contributes to social inclusion's conceptual ambiguity. To gain conceptual clarity, there should be one measure used consistently to evaluate specific components. Researchers also need to consider the factors identified in the present review when evaluating social inclusion, such as knowledge of disability, as these factors could confound results.

Poster #13

Kinematic analysis of upper extremity movement after botulinum toxin combined with upper limb rehabilitation post stroke: A case study

Parvin Eftekhar, Rehabilitation Sciences Institute, University of Toronto; Tilak Dutta, Toronto Rehabilitation Institute; Dina Brooks, Rehabilitation Sciences Institute; George Mochizuki, Heart & Stroke Foundation Canadian Partnership for Stroke Recovery

Funding: Heart & Stroke Foundation Focus on Stroke Doctoral Research Award

Field: Rehabilitation Health Services Studies, Rehabilitation Technology Science

Background: Kinematic analysis of movement allows for sensitive, quantitative measures of movement patterns in individuals with spasticity after stroke. Objective: To examine the impact of botulinum toxin (BoNTA) combined with upper limb (UL) rehabilitation compared to UL rehabilitation alone in one individual post stroke using kinematic analysis.

Methods: The participant received three months of UL rehabilitation (2x/week, 1hr/session) followed by BoNTA injections in his wrist flexors. UL rehabilitation continued, as prior to injection, for three more months.

Outcome measurements: Assessments were conducted at 5 time-points: M0 - baseline prior to any intervention; M1 - after 1 month of UL Rehabilitation only; M3 - 3 months of UL Rehabilitation only; M4- 1-month post injection; and M6 - 3-months post injection. Kinematic variables included: movement time (MT), smoothness (jerk), velocity, and active range of motion (AROM). The average of 5 repetitions for each variable was calculated from three tasks: 1) wrist extension/flexion, 2) elbow flexion/extension, 3) shoulder flexion, horizontal abduction/adduction. Clinical measures were: Modified Ashworth Scale (MAS) and Chedoke McMaster Stroke Assessment (CMSA).

Results: The subject was a 48-year old male, three years post-hemorrhagic stroke resulting in left hemiplegia. Spasticity at the wrist was graded MAS=2 for all three time points prior to BoNTA injection, but improved to MAS=0 after injection. CMSA hand and arm scores remained at 3 throughout the study. Improvements in MT (12.0(6.0)s at M3 to 9.0(0.1)s at M6), smoothness (133.0(21.0)°/s3 at M3 to 82.0(1.5))°/s3 at M6), and velocity (45.0(30.0)m/s at M3 to 56.0(13.0)m/s at M6) were observed on the affected side after BoNTA plus UL rehabilitation.

Conclusion: In this individual, the combination of BoNTA and UL rehabilitation resulted in improved movement time, velocity, smoothness and clinical measure of spasticity, but had no effect on active range of motion. These findings will be confirmed in a larger sample.

Poster #14 and Three Minute Presentation

Interventions that optimize everyday outcomes for people with brain injury related impaired self-awareness are complex

Lisa Engel, Rehabilitation Sciences Institute, University of Toronto; Adora Chui, Baycrest; Yael Goverover, New York University; Deirdre Dawson, University of Toronto

Funding: Canadian Institutes for Health Research; Ontario Neurotrauma Foundation; Canadian Partnership for Stroke Recovery

Field: Social and Cognitive Rehabilitation

Background/Purpose: Adults with acquired brain injury related impaired self-awareness (ABI-ISA) may have difficulties engaging in rehabilitation and often show poorer activity and participation (everyday living) outcomes when compared to ABI-survivors without ISA. However, we hypothesize that with the appropriate interventions, outcomes for people with ABI-ISA can be enhanced. As of yet the evidence for activity and participation level outcomes for ABI-ISA populations has not been reviewed. The purpose of this study is to critically examine the non-pharmacological intervention literature and identify active elements that optimize everyday living outcomes in this sub-population.

Methods: We completed a systematic review for interventions that address activity and participation outcomes for adults with ABI-ISA using the Assessing the Quality and Applicability of Systematic Reviews (AQASR) and Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines (i.e., used a review protocol, in-depth search, five databases, and two reviewers). Reviewers graded studies using the Oxford Centre for Evidence Based Medicine's (OCEBM) levels of evidence, and assessed randomized control trial (RCT) quality using the Physiotherapy Evidence Database (PEDro) scale.

Results: 15 unique studies were found. All studies found improvements on measures of everyday activities, but there was variability on community participation outcomes. All utilized complex interventions with multiple elements: 15 studies used external feedback (e.g., Socratic guided discussions), 12 used experiential activities, and 10 used metacognitive strategy training. Only two were RCTs and four were single-case experimental designs. The RCT PEDro ratings were 6/10 and 8/10, suggesting valid results. Only one study examined differences between participants with low versus high self-awareness.

Summary/Implications: Current evidence supports using complex intervention programs. Limited evidence shows everyday living level outcomes benefit from interventions in individuals with ABI-ISA, however, their outcomes may be less optimal than ABI-survivors without ISA. More research is needed to verify this and to elucidate effective intervention elements.

Poster #15 and Three Minute Presentation

Energy conservation treatment in adults with fatigue: A scoping review

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Funding: Vanier Canada Graduate Scholarship, Kidney Research Scientist Core Education and National Training program

Field: Occupational Science

Background/Purpose: Fatigue is one of the most common symptoms of illness, and is often persistent and disabling among individuals with chronic diseases. Energy conservation treatment (ECT) is an approach to fatigue management, which teaches energy-saving strategies to be used during everyday activity to minimize fatigue and improve quality of life. No review to date has examined the full body of evidence on ECT.

Objective: To investigate what is known about the effects of ECT in adults with fatigue.

Methods: A scoping review was conducted in accordance with Arksey and O'Malley's guidelines. Seven electronic databases were systematically searched for relevant studies using search terms pertaining to ECT. Reference lists of seminal articles were also hand-searched. Articles were examined for eligibility, and data were extracted about study methodologies and main findings. Results were grouped thematically, and synthesized descriptively.

Results & Implications: Thirty-two studies were identified. The literature primarily examined a protocolized, six-week group ECT program in the MS population. Multiple studies have shown this program to reduce the impact of fatigue in clients with MS, and evidence also suggests it positively affects self-efficacy, goal attainment and is well-received by participants. Remaining literature has examined different ECT programs in different populations, and is more limited and unclear. Preliminary evidence on ECT is generally positive in rheumatoid arthritis and post-polio syndrome populations; however, randomized controlled trials in the cancer and CFS populations have failed to find positive effects associated with ECT. These disparities may be related to aspects of intervention or study design. More robust studies in populations outside of MS are needed, as are investigations of which aspects of ECT yield positive results with which client populations. Studies of ECT in other populations prone to fatigue such as chronic obstructive pulmonary disease, heart disease, kidney disease, and post-cerebrovascular accident, are also warranted.

Poster #16 and Three Minute Presentation

A preliminary mixed-methods cross-cultural investigation of conversational turn taking in families of children with hearing loss

Hillary Ganek, Rehabilitation Sciences Institute, University of Toronto; Stephanie Nixon, Univeristy of Toronto; Ron Smyth, University of Toronto Scarborough; Alice Eriks-Brophy, University of Toronto

Funding: Connaught International Scholarship, Ontario Graduate Scholarship, Lupina Senior Doctoral Fellowship, Mitacs Globalink, ASHA Grant Program for Projects on Multicultural Activities

Field: Speech-Language Pathology

Background: Many organizations from the west have begun international training programs to increase the expertise of professionals working with children with hearing loss in the developing world (Wylie, McAllister, Davidson, & Marshall, 2013). Unfortunately, the strategies being taught may conflict with local language socialization practices, the processes by which children learn appropriate ways to interact with and through language (Crago, 1992; Schieffelin & Ochs, 1986). This study will compare families with and without hearing loss in Vietnam to those in Canada as an example of how language socialization practices impact parent-child communication so that speech-language pathologists may create more culturally appropriate intervention techniques.

Methods: Data was collected from children between 18 and 48 months old with and without hearing loss in Canada and Vietnam. The LENA System automatically analyzed full day audio recordings to calculate an average conversational turn count as a measure of parent-child vocal interaction. Qualitative interviews regarding language socialization were conducted with the children's parents. Results were compared across cultural groups.

Results: Preliminary data indicates a statistically significant difference between the conversational turn counts of Canadian and Vietnamese children without hearing loss ($U=135$, $p<.001$). There was no difference between the two Vietnamese cohorts ($U=181$, $p=.21$). We expect further data collection will show similar results and that Canadian children with hearing loss, for whom data remains to be collected, will participate in a similar number of turns as their typically developing Canadian peers. Themes that emerge from the qualitative analysis will be shared and quotes will be used to illustrate why there may be differences in amount of parent-child talk.

Summary: When speech-language pathology ignores cultural differences between families, a child's language learning process can be disrupted. Findings from this project will highlight the importance of considering language socialization practices in intervention for children with hearing loss.

Poster #17 and Three Minute Presentation

Dysphagia intervention for patients with head and neck cancer treated with radiotherapy with or without chemotherapy: A systematic review

Elissa Greco, Rehabilitation Sciences Institute, University of Toronto; Tijana Simic, Rehabilitation Sciences Institute, University of Toronto; Jolie Ringash, University Health Network, Princess Margaret Cancer Centre; George Tomlinson, Toronto General Hospital, Department of Medicine; Rosemary Martino, University of Toronto, Department of Speech Language Pathology

Field: Speech-Language Pathology

Background: Patients undergoing radiotherapy/chemoradiotherapy (RT/CRT) for head and neck cancer (HNC) often develop dysphagia. Interventions from speech-language pathology may maintain or improve swallow physiology; however, it is unclear which have the greatest benefit.

Methods: A systematic literature review was conducted to assess the efficacy of exercise, regardless of timing, for these patients. Targeted outcomes were physiology, function and quality of life (QoL). Seven electronic databases were searched to April 2015 for all primary studies, of any language or design. Using a priori criteria, two blinded raters judged abstracts and full articles. Data of accepted articles were extracted. Critical appraisal was completed according to Cochrane's Risk of Bias tool. Discrepancies were resolved by consensus.

Results: From 1199 unique abstracts retrieved, 12 studies were accepted. Of these, 7 were randomized controlled trials (RCTs). Across studies, treatments varied in design and when they started (7 before and 5 after RT/CRT). Also, studies provided insufficient details about treatments (n=6) and did not control for clinician-participant interaction time (n=7). Overall findings of efficacy were inconsistent with only QoL shown to improve in three studies.

Summary/Implications: To date, there is limited high-level evidence that exercise therapy benefits swallow physiology or function in HNC patients with dysphagia due to RT/CRT. Limited evidence does suggest benefit to QoL. Future high quality RCTs are needed to identify efficacious dysphagia intervention for these patients.

Poster #18 and Three Minute Presentation

Exploring intraindividual variability during a working memory task after sports-related concussion in youth

Steph Green, Rehabilitation Sciences Institute, University of Toronto; Talia Dick, Holland Bloorview Kids Rehab; Nick Reed, Holland Bloorview Kids Rehab; Michelle Keightley, Holland Bloorview Kids Rehab; Alex Mihailidis, University of Toronto

Funding: CIHR; Ontario Neurotrauma Foundation

Field: Social and Cognitive Rehabilitation

Background/Purpose: The majority of concussion research is on adults, but given brain changes occurring during development, youth-specific research is warranted. To date, there is little evidence exploring working memory (WM) in youth post-concussion, and overall findings are inconclusive. Variability between subjects may drive non-findings of traditional accuracy and reaction time (RT) measures. Brain injury and adult concussion literature have explored intra-individual variability (IIV) as a measure of change post-injury, with evidence to suggest increased IIV post-injury. No studies of youth post-concussion were found.

Methods & Analyses: Verbal and nonverbal WM tasks were used to compare pre- and post-concussion IIV in 21 youth. IIV was measured via the Coefficient of Variation (CV). A Wilcoxon signed-rank test compared pre- and post-concussion scores. Pearson correlations explored relationships between days post-concussion, symptom score, and age with change in IIV.

Results: Findings showed no change in mean RT or CV post-concussion using a Wilcoxon signed rank test and Bonferroni correction ($p>0.006$). No relationships were found between mean RT or CV and age, symptom score and days post-concussion at post-test. Summary/Implications: This study suggests that youth recruited from the community do not exhibit slowed performance speed or greater IIV following concussion. However current study limitations (low n, high variance in CV and RT) suggest further study of IIV in youth following concussion utilizing study designs with greater power to detect change, might be worthwhile.

Poster #19 and Three Minute Presentation

Temporal and spectral analysis of centre of pressure: Indicators of recovery after traumatic brain injury

Olinda Habib Perez, Rehabilitation Sciences Institute, University of Toronto; Toronto Rehabilitation Institute; Robin E. Green, Toronto Rehabilitation Institute; George Mochizuki, Sunnybrook Research Institute

Funding: ONF-REPAR, OSOTF TRI Student Scholarship, RSI DCA

Field: Movement Science

Background: Balance control is impaired after traumatic brain injury (TBI). Centre-of-pressure (COP) displacements in the time domain have been used as an overall descriptor of balance control. However, analysis of the COP in the frequency domain has demonstrated specific balance impairments in neurologic populations. Such analyses may be useful in characterizing recovery in balance impairment following TBI.

Methods: Standing balance was collected from 35 individuals with TBI (2, 5, 12 months after injury) and from 22 healthy controls (HC). Participants stood on two adjacent force plates (50 seconds) in two conditions: eyes open (EO) and eyes closed (EC). Root mean square (RMS) measures of standing balance and power spectral analysis of COP in the AP and ML direction were calculated.

Results: AP RMS was reduced (i.e. improved) in early recovery ($p<0.05$) in individuals with TBI during EC, and approached significance ($p\geq0.064$) during EO and EC for ML RMS. Furthermore, RMS was significantly higher in TBI patients across recovery than HC in both the AP and ML direction ($p<0.05$). Individuals with TBI also produced higher power at both low and high frequencies of COP across recovery than HC.

Discussion: Though individuals with TBI initially demonstrate improvements within the first 5 months post injury, the recovery of standing balance diminishes by 12 months and is consistently at a lower level than that of HC. The time during early recovery may reflect the time at which individuals with TBI receive physical rehabilitation. The increased amplitude of COP frequencies in individuals with TBI highlights that there is impaired online (low frequency) and reactive (high frequency) balance control across recovery. These results indicate that despite some recovery in balance control in individuals with TBI, it continues to be disrupted a year after injury.

Poster #20 and Three Minute Presentation

Neural activation associated with lower limb movements in children with hemiplegic cerebral palsy

Alicia Hilderley, Rehabilitation Sciences Institute, University of Toronto; Ben R Morgan, SickKids; Wayne Lee, SickKids; Darcy Fehlings, Holland Bloorview Kids Rehabilitation Hospital; Margot Taylor, SickKids; Virginia Wright, Holland Bloorview Kids Rehabilitation Hospital

Funding: CIBC Children's Foundation, Bloorview Children's Hospital Foundation Chair in Paediatric Rehabilitation

Field: Movement Science

Background: Physical interventions that target improvement of walking for children with hemiplegic cerebral palsy (HCP) result in functional gains that are readily assessed using established measures. However, the underlying neural mechanisms of change have been underexplored due to challenges with imaging the small lower limb representations in the motor cortex of the brain. Our group has optimized methods for a task-based functional magnetic resonance imaging (fMRI) ankle dorsiflexor paradigm. The objective of this study was to establish whether these methods produce viable images to identify areas of lower limb neural activity and change in children with HCP.

Methods: Three independently ambulatory children with HCP (ages 8-10 years) were recruited. Children were positioned with one ankle in a purpose-built apparatus while supine, and were required to dorsiflex 5 degrees once every 16-18 seconds for a period of 4 minutes during the fMRI scan. This was repeated twice per leg. Resultant images were analyzed using a standard preprocessing protocol. Task parameters were extracted and statistical parametric maps were produced to identify areas of activation. The hemispheric contribution to movement of each leg was evaluated using the laterality index (LI) with the following formula: LI = ([contralateral – ipsilateral]/[contralateral + ipsilateral]).

Results: Clear and measurable images were obtained for each participant using this protocol. Bilateral areas of activation were observed for lower limb movements. Laterality indices indicated greater contralateral activation during dominant leg movements and greater ipsilateral activation during non-dominant movements.

Summary/Implications: Neural activation areas differed for dominant and non-dominant leg movements. Establishment of this fMRI paradigm will allow us to identify associations between lower limb control strategies and motor performance, and to investigate underlying neural mechanisms of skill improvement following walking-based interventions for children with hemiplegic CP.

Poster #21

Developing a conceptual framework to construct a decision aid for youth with obstetrical brachial plexus palsy

Emily S. Ho, Rehabilitation Sciences Institute, University of Toronto; Janet Parsons, Li Ka Shing Knowledge Institute; Margaret Lawson, Children's Hospital of Eastern Ontario Research Institute; Gregory H. Borschel, SickKids Research Institute; F. Virginia Wright, Bloorview Research Institute

Funding: SickKids Perioperative Services Innovation Fund

Field: Practice Science

Background: Between five and nineteen percent of children with obstetrical brachial plexus palsy (OBPP) do not attain full recovery in their upper extremity. These children may become future candidates for rehabilitation and surgical interventions to optimize upper limb function. The decision to pursue treatment is 'preference-sensitive' because the rationale for treatment is strongly dependent on the child's and family's unique values regarding functional and aesthetic goals. Decision Aids are evidence-based tools that contain information on the treatment options as well as a Values Clarification Method to guide the individual towards the option that best fits their life situation.

Purpose: The purpose of this poster is to describe the development of a conceptual framework that will be used to construct a Decision Aid for youth with OBPP. Methods: A review of paediatric Decision Aids registered in the Ottawa Hospital Research Institute (OHRI) Decision Aid Inventory was conducted. The quality of the evidence-based information and development process was evaluated using the International Patient Decision Aid Standards (IPDAS) Checklist. The updated IPDAS instrument (IPDASi v4.0) was used to determine and evaluate the methodological gaps in current Decision Aid development processes.

Results: Sixty-nine paediatric Decision Aids were registered in the OHRI Inventory (Total: n=646) that were developed by 14 unique health care professionals or agencies. One Decision Aid per individual or agency (n=14) was randomly selected for the review. Nine (64.3%) Decision Aids had references for the scientific evidence presented in the tool. The mean rating on the IPDAS Development Checklist was 64.2% + 29.6 (Range: 0 – 100%). Rehabilitation, decision-making and measurement theories were applied to the IPDASi v4.0 dimensions to operationalize key concepts that apply to Decision Aid development. Scoping review, qualitative and consensus research methodologies were used to add scientific rigor to the steps of the development process.

Summary: A conceptual framework was developed using pragmatic application of theory and research methods to the IPDASi v4.0 that will be used in the development of a Decision Aid for youth with OBPP. It has potential to offer researchers and clinicians practical guidance on the development and evaluation of Decision Aids for preference-sensitive decisions.

Poster #22

The Cognitive Orientation to daily Occupational Performance approach supports transfer: A review of the evidence

Adina Houldin, Rehabilitation Sciences Institute, University of Toronto; Sara McEwen, St. John's Rehab - Sunnybrook Hospital; MacKenzie Howell; Helene Polatajko, OS/OT and Rehabilitation Sciences Institute

Funding: St. John's Rehab Research Program, Sunnybrook Research Institute

Field: Occupational Science, Movement Science

Background: The term 'transfer' refers to the ability to apply learning from therapy to everyday life, and is notoriously difficult to achieve. However, a cognitive-based, client-centred, and task-specific therapy called Cognitive Orientation to daily Occupational Performance (CO-OPApproachTM) has reported transfer in a variety of settings, age groups and populations.

Purpose: The purpose of this study was to review the evidence of transfer following CO-OP training.

Methods: Utilizing relevant on-line search engines, 40 CO-OP studies were identified and reviewed for evaluation of transfer and categorized with an inter-rater agreement of 80 percent. The articles were sorted into the following categories: 1. Primary transfer, reported as transfer of learning from trained skills to untrained skills, 2. Secondary transfer, reported as learning transfer to a variety of skills evaluated with standardized assessments and, 3. Unreported transfer, either primary or secondary transfer indicated, without labeling it as such.

Results: 24 out of the 40 articles evaluated transfer. Sixteen evaluated transfer by either primary or secondary methods. The remaining eight articles fell into the unreported transfer category. Each of the 24 articles provided evidence of positive transfer following CO-OP intervention, with a near equal separation between those that tested either adult or child populations. Several studies reported clinically significant improvements in primary transfer using the Canadian Occupational Performance Measure or the Performance Quality Rating Scale. Statistically significant changes were found on a number of indicators of secondary and unreported transfer (e.g., Vineland Adaptive Behaviour Scale, Dysexecutive Questionnaire) including motor, communication and daily living domains.

Implications: Evidence suggests the CO-OPApproachTM is associated with positive transfer in various populations across the lifespan. The use of a problem-solving based therapy for the improvement of transfer to real world skills is an important advancement in the rehabilitation sciences.

Poster #23

Speech movements and intelligibility in Parkinson's disease

Elaine Kearney, Rehabilitation Sciences Institute, University of Toronto; Renuka Giles, University of Toronto; Michael Brandon Haworth, York University; Petros Faloutsos, York University; Melanie Baljko, York University; Yana Yunusova, University of Toronto

Funding: NSERC

Field: Speech-Language Pathology

Background: This study examines the effect of varying speaking conditions on articulatory movements (jaw, tongue tip, tongue dorsum) and intelligibility in Parkinson's disease (PD). PD is a progressive neurodegenerative disease that affects speech movements, leading to reduced intelligibility (Schulz & Grant, 2000). The association between changes in speech movements and intelligibility loss, however, is not well understood. We hypothesize that speakers with PD will show different movement characteristics during sentence production relative to healthy speakers, and that these changes will be associated with changes in intelligibility.

Methods: Speakers 22 individuals with PD and 20 healthy older adults read three sentences in normal, loud and clear speaking conditions. Jaw and tongue (tip, dorsum) movements were recorded using a 3D electromagnetic tracking system, the Wave Speech Research System (NDI, Canada). Movement measures included movement size, speed and duration. Listeners 40 young adults rated speech intelligibility of the recorded sentences using direct magnitude estimation, relative to a modulus (Weismer et al., 2002). The geometric mean across five listeners was calculated as the intelligibility score for each sentence.

Results: Preliminary analyses of the normal speaking condition revealed smaller jaw and tongue dorsum movement size in PD, while tongue tip movements were larger and faster. Overall, sentence durations were shorter, and intelligibility was reduced in PD. Across speaking conditions, loud speech was characterized by larger movements and faster speed, while clear speech resulted in larger movements and slower speed. Clear speech resulted in an increase in intelligibility for a subgroup of PD speakers with a deficit in intelligibility, and was positively associated with increased movement size.

Discussion: This study establishes important links between speech movement impairment and the functional impact of speech disorder at the level of speech intelligibility. Increased understanding of the movement-intelligibility relationship will inform future work in the development of movement-based interventions in this population.

Poster #24

Parent-reported effectiveness of AAC interventions for youth: A systematic review of outcome measures

Amie Kron, Rehabilitation Sciences Institute, University of Toronto; Holland Bloorview Kids Rehabilitation Hospital & Bloorview Research Institute; Steve Ryan, Rehabilitation Sciences Institute, University of Toronto; Holland Bloorview Kids Rehabilitation Hospital & Bloorview Research Institute

Funding: Canadian Institutes of Health Research (Partnerships for Health System Improvement Program)

Field: Rehabilitation Health Services Studies

Background/Purpose: The aim of this review was to: (i) identify parent-report measurement tools used to assess the functional outcomes of AAC interventions in youth (<18 years); (ii) assess the psychometric properties of these measures; and (iii) describe the functional and contextual categories of the measures as informed by the International Classification of Functioning, Disability, and Health for Children and Youth (ICF-CY).

Methods: An electronic database search for English, peer-reviewed articles published after 2001 was conducted using MEDLINE, PsycINFO, and CINAHL. Each source was reviewed for relevancy based on inclusion criteria: (i) children <18 yrs who needed or used aided AAC devices or systems; (ii) measurement tools assessed functional outcomes from the perspective of the caregiver; and (iii) sufficient information was provided to understand tool subject matter. Data regarding study source, measurement properties, and type of AAC intervention were extracted using a common table.

Results: Eleven articles met inclusion criteria after screening 2,918 articles. Participants' diagnoses, methodological design, and AAC interventions varied across studies. Tools meeting inclusion criteria included 3 standardized assessments, and 3 non-standardized questionnaires and interviews. The standardized questionnaires measured Body Functions, Activities and Participation, and/or Contextual components of the ICF-CY.

Summary/Implications: This review revealed candidate parent-report questionnaires that may be used to measure functional outcomes of AAC interventions for younger children. Further evidence is needed regarding their responsiveness to important change and clinical utility before recommended for routine use in AAC clinical practice. The development of sound measures for older children and youth is indicated.

Ten Minute Presentation

Movers and thinkers: exploring the relationship between motor and cognitive brain networks in upper limb recovery post-stroke

Timothy K. Lam, Rehabilitation Sciences Institute, University of Toronto; Sunnybrook Research Institute; Deirdre R. Dawson, Baycrest; Jean J. Chen, Baycrest; Brain Levine, Baycrest; Joyce L. Chen, Sunnybrook Research Institute

Funding: Ontario Graduate Scholarship, Canadian Partnership for Stroke Recovery Start-up Funds

Field: Movement Science, Social and Cognitive Rehabilitation

Background: Imagine working at McDonald's. You switch between flipping burgers and chopping lettuce. As you switch between tasks, you require cognition (specifically task switching) to prevent jumbling your motor actions by chopping burgers and flipping lettuce. Prior research suggests better cognitive function correlates with better arm recovery after stroke. However, the neural basis that underlies this relationship is not well-known. Therefore, the aim of our study is to better understand how brain networks involved in motor and cognitive functions relate to motor recovery post-stroke.

Methods: Twenty-seven chronic stroke participants underwent magnetic resonance imaging (MRI) to obtain structural and resting state functional MRI (rs-fMRI) scans. Rs-fMRI allows us to examine brain networks which are composed of brain regions whose blood-oxygen-level-dependent (BOLD) response (proxy for neural activity) is temporally coupled or "connected". We assessed motor impairment (Chedoke-McMaster Stroke Assessment Stage of Arm and Hand), motor function (Action Research Arm Test), and task switching ability (Trail Making Test). We used a seed-based connectivity approach by defining a region-of-interest (seed) for each network using FSL software. The motor seed was left primary motor cortex (M1) and the cognitive/frontoparietal seed was left dorsolateral prefrontal cortex (DLFPC). Intra-network connectivity within networks and inter-network connectivity between networks were correlated with assessment scores using Spearman's correlation.

Results: Intra-network connectivity: participants with higher connectivity between M1 and supplementary motor area within motor network have less hand impairment and better motor function. Participants with higher connectivity between DLPFC and pars triangularis within frontoparietal network have less hand impairment. Inter-network connectivity: participants with higher connectivity between motor and frontoparietal networks have better motor function.

Summary: We replicate prior findings showing the degree of motor network connectivity correlates with degree of motor recovery. Our novel inter-network finding suggests greater coupling between motor and cognitive networks could be related to better motor recovery.

Poster #25

Exploring cognitive integration of basic science and its effect on diagnostic reasoning in novices

Kristina Lisk, Rehabilitation Sciences Institute, University of Toronto; Anne MR Agur, University of Toronto; Nicole N Woods, University of Toronto

Funding: Humber College Staff Initiated Research Grant

Field: Movement Science

Purpose: Integration of basic and clinical science knowledge is increasingly being recognized as important for practice in the health professions. The concept of 'cognitive integration' places emphasis on role of basic science in providing critical connections to clinical signs and symptoms while accounting for the fact that clinicians may not explicitly articulate their use of basic science knowledge in clinical reasoning. In this study we used a diagnostic justification test to explore the impact of integrated basic science instruction on novices' diagnostic reasoning process.

Methods: Participants (N = 43) were allocated to an integrated basic science or clinical science training group. The integrated basic science group was taught the clinical features along with the underlying causal mechanisms of 4 musculoskeletal pathologies while the clinical science group was taught only the clinical features. Participants completed a diagnostic accuracy test immediately after learning and 1-week later. The diagnostic justification test was completed 1-week after initial learning. A 2 x 2 repeated measures ANOVA was used to analyze the diagnostic test data. A 7-point Likert scale was used to score participants' justification responses. Two raters scored all responses and cumulative scores were subject to a t-test.

Results: The results showed that novices who learned the integrated causal mechanisms had superior diagnostic accuracy ($p<0.01$) and a better understanding of the relative importance of key clinical features ($p=0.01$). While participants from both groups identified correct features on the justification test, those who received integrated basic science instruction identified key diagnostic features rather than features that were common across disease categories.

Summary: These findings further our understanding of cognitive integration by providing evidence of the specific changes in clinical reasoning when basic and clinical sciences are integrated during learning.

Poster #26

The role of telomere-associated proteins in retinal ganglion cell apoptosis after axotomy

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Funding: CIHR, NSERC

Field: Movement Science

Purpose: Telomeres are DNA-protein complexes that cap the ends of eukaryotic chromosomes. They have a dynamic secondary structure that binds and interacts with a large network of telomere-associated proteins that protect the genomic integrity and maintain the proliferative success of cells. When telomeres are destabilized, chromosome ends are misrecognized as DNA double stranded breaks, eliciting DNA damage responses that lead to cellular apoptosis. There is sparse evidence that telomere destabilization plays a role in the pathology of CNS diseases. In the present study we examined whether telomere dynamics play a role in retinal ganglion cell (RGC) degeneration after axotomy.

Methods: In order to evaluate the role of the Telomerase enzyme in RGC apoptosis after axotomy, rats received intraocular (IO)(4µL) or optic nerve (ON)(10µL) injections of either Trichostatin A (TERT up-regulator and Telomerase activator, 3 & 8 days post-axotomy), TAG-6, PIPER, or MST-312 (Telomerase Inhibitors III, IV, or IX, respectively), or a short hairpin RNA (shRNA) plasmid directed against TERT (catalytic subunit of Telomerase). In order to further examine the role of telomere-associated proteins in RGC apoptosis after axotomy, animals received ON injections (10µL) of Dicer short interfering RNAs (DsiRNAs) directed against TRF1, TRF2, TCAB1, DNA PKcs, Ku70, and EST1A. RGC survival was quantified in fixed flat-mounted retinas at 7 or 14 days post-axotomy.

Results: IO delivery of TSA increased RGC survival by fourfold ($p<0.001$) at 14 days, while ON delivery of a TERT shRNA plasmid decreased RGC survival ($p<0.001$) at 7 days. However, ON delivery of Telomerase Inhibitors III, IV, and IX had no effect on RGC survival at 7 days. Furthermore, in vivo transfection of axotomized RGCs with TRF1 ($p<0.01$), TCAB1 ($p<0.001$), Ku70 ($p<0.001$), and EST1A ($p<0.001$) DsiRNAs decreased RGC survival at 7 days, while TRF2 or DNA PKcs DsiRNAs had no effect on RGC survival at 7 days.

Conclusions: Our results show that TERT gene expression promotes RGC survival while Telomerase enzymatic activity has no role in RGC survival after axotomy. Additionally, the TRF1, TCAB1, Ku70, and EST1A telomere-associated proteins play an important role in RGC survival after axotomy, while the TRF2 and DNA PKcs proteins do not.

Poster #27

Conceptualizing concussion: Exploring key stakeholder reactions to youth-produced drawings of concussion

Katie Mah, Rehabilitation Sciences Institute, University of Toronto; Laura R. Hartman, Bloorview Research Institute, Holland Bloorview Kids Rehabilitation Hospital; Nick Reed, Bloorview Research Institute, Holland Bloorview Kids Rehabilitation Hospital

Funding: Bloorview Research Institute Fellowship

Field: Occupational Science

Background: To date, quantitative data and scientist perspectives have dominated the field of youth concussion. As a result, the youth perspective is largely absent from the literature. Specifically, youth conceptualizations of concussion are unexplored, leaving those who interact with youth to rely on speculation to understand how youth think and feel about this common health phenomenon. With the intent of informing the direction of education, treatment, and research, this arts-based study translated youth conceptualizations of concussion, as expressed through drawing, to key stakeholders in the area of youth concussion. The purpose is to explore stakeholder reactions to youth-produced drawings of concussion.

Methods: Drawings were produced by youth (5-19 years of age) in a related study exploring how youth think and feel about concussion. Drawings were then displayed in an art installation viewed by an international audience of stakeholders in the area of youth concussion (e.g., clinicians, researchers, teachers, policy-makers). Data was collected via audio recording and drawing. First, each stakeholder audio recorded his or her reaction to the art installation. Then, each stakeholder produced his or her own drawing of youth concussion. Lastly, each stakeholder audio recorded the meaning of the drawing and if he or she envisioned a change in practice or research as a result of viewing the installation. Data will be analyzed using an adapted visual methodology and thematic analysis.

Results: It is expected that youth conceptualizations of concussion will be integrated into stakeholders' existing ways of conceptualizing youth concussion. These varied ways of understanding will be reflected in preliminary themes.

Implications: This study is the first of its kind to present the youth perspective to stakeholders in decision-making positions. Data collection methods required stakeholders to actively reflect on the youth perspective thereby creating the potential to influence the direction of youth concussion research and practice.

Poster #28

Limited functional reserve is not a characteristic of neurogenic dysphagia

Ashwini M. Namasivayam, Rehabilitation Sciences Institute, University of Toronto; Carly E.A. Barbon, University of Toronto; Melanie Peladeau-Pigeon, University Health Network; Shauna Stokely, Trillium Health Partners; Catriona M. Steele, University Health Network

Funding: Heart and Stroke Foundation of Canada (grant NA7337), National Institute of Deafness and Other Communication Disorders (grant 5R01DC011020-03)

Field: Speech-Language Pathology

Introduction: Tongue-palate pressure is a parameter of great interest in the field of dysphagia. Maximum isometric tongue-palate pressures (MIPs) decline in healthy aging. Functional reserve (FR) is the difference between MIPs and swallowing pressures, and is also thought to decline in healthy aging. In this study, we explored whether MIPs and functional reserve are reduced in individuals with dysphagia, compared to healthy age-matched controls.

Materials & Methods: We studied a retrospective clinical sample of 43 adults with dysphagia secondary to stroke, acquired brain injury, brain tumor, neurodegenerative disease or age-related frailty (26 male; mean age: 60, age range: 26-93). Peak anterior MIPs and regular effort saliva swallow (RESS) pressures were collected with the Iowa Oral Performance Instrument and FR was calculated. Paired t-tests were used to compare measures for these individuals with dysphagia to decade-based means from a sample of 340 healthy controls aged 12-86 (162 male).

Results: The 95% confidence intervals for individuals with dysphagia were MIPs of 33-43 kPa (mean = 38) and RESS pressures of 17-26 kPa (mean = 22). Both MIPs and RESS pressures were significantly lower than values seen for age-matched controls ($p < 0.001$). Confidence intervals for the healthy controls were MIPs of 43-47 kPa (mean = 45) and RESS of 29-30 kPa (mean = 30). Functional reserve averaged 15 kPa in both groups. Confidence intervals for FR were wider in the individuals with dysphagia (10-19 kPa) than in the controls (14-17 kPa), but this difference was not statistically significant.

Conclusions: In contrast to older healthy controls, who only show a reduction in MIPs, individuals with dysphagia also demonstrate a significant reduction in swallowing pressures. The impact of this reduction is to preserve an average gap of 15 kPa between MIPs and swallowing pressures. Thus, limited FR is not a characteristic of neurogenic dysphagia.

Poster #29

Utilization of an endogenous stem cell based therapeutic mechanism to promote cognitive recovery following stroke in mice

Labeeba Nusrat, Rehabilitation Sciences Institute, University of Toronto; Vaakiny Raguthevan, University of Toronto; Ilan Vonderwalde, University of Toronto; Dale Corbett, University of Ottawa; Cindi M. Morshead, University of Toronto

Funding: Heart and Stroke Foundation

Field: Rehabilitation Technology Science

Background: Direct activation of adult neural stem and progenitor cells [together called precursors (NPCs)] using small molecules in the adult mammalian brain may provide a novel self-repair avenue for treating stroke. Our group has previously shown that Cyclosporine A (CsA) has direct pro-survival effects on NPCs in vivo, resulting in NPC pool expansion. Systemic CsA administration post-stroke, promotes NPCs migration to the injury site, tissue regeneration and functional recovery in sensorimotor models of stroke.

Objective: We investigated the efficacy of this endogenous cell-based therapy to promote recovery of post- stroke cognitive impairments, particularly executive dysfunctions, which heavily impact rehabilitation outcome and quality of life.

Methods: Mice received focal, bilateral endothelin-1 induced ischemia in the medial prefrontal cortex (mPFC) for the cognitive stroke model. The effect of mPFC stroke on NPCs and cognitive recovery, with or without CsA, was investigated using in vitro, in vivo and behavioural assays.

Results: Expansion of NPC population was observed at 4 and 7 days after stroke, similar to observations following sensorimotor stroke. mPFC lesions produced measurable cognitive deficits which persisted up to 45 days after stroke.

Summary: We predict that success with CsA will help us develop a novel endogenous stem cell based therapy that will contribute towards cognitive recovery following stroke.

Ten Minute Presentation

Mapping paediatric rehabilitation across Canada – challenges and complexities of funding of services

Sonia Pagura, Rehabilitation Sciences Institute, University of Toronto; Susan Jaglal, University of Toronto; Karen Hurtubise, Université de Sherbrooke; Val Guiltner, Glenrose Rehabilitation Hospital; Shawna Wade, Holland Bloorview Kids Rehabilitation Hospital

Funding: Holland Bloorview Kids Rehabilitation Hospital Foundation

Field: Practice Science

Purpose: This study aims to identify services location, system gaps and required policy change necessary to better outcomes for children with disabilities.

Methods: A parallel two-phase mixed methods explanatory design with a complementarity approach to further explaining the original quantitative results was used. Survey questions were developed in alignment with governmental strategies. The survey was dispersed to all CNCYR membership (93 unique facilities) with additional snowball sampling. Using a semi-structure telephone interview guide, survey participants (administrators) were contacted to supply additional information. The interviews were taped and transcribed and analyzed using an interpretive descriptive approach.

Results: Seventy-eight unique facilities across Canada responded achieving an 83.8% response rate. Survey responses included representation from all provinces and territories. Forty-two participants agreed to be contacted and 19 semi-structured interviews were completed. Respondents on average had 14 years of administrative experience (Std ±10.6). Figure 1 represents the geographic distribution of the facilities who responded to the survey/interviews and their locations that provide paediatric rehabilitation in Canada. Survey analysis suggested that facilities specific government ministry funding varies greatly depending on the type of facility and from province to province. Additionally, there is an increased reliance on private and fund-raising efforts to deliver programming for paediatric rehabilitation. Qualitative analysis revealed the following themes: 1. Core paediatric rehabilitation services are not what administrators indicated that families voiced as rehabilitation 'need'; 2. Complex ministerial funding policies, shrinking overall funding, powerful advocacy groups, and recruitment and retention issues created service gaps; 3. Transitions to adult care is challenging with specific populations.

Discussion: This initiative, the first to map pediatric rehabilitation in Canada, begins to shed a national perspective on providing pediatric rehabilitation in Canada. Findings suggest that although many differences can be highlighted, national commonalities do exist. A mismatch between funding and service demand is evident. An unwarranted fragmentation of pediatric rehabilitation services renders its navigation challenging creating gaps and challenges for families. An increase in inter-sectorial (health, education, social services) and community collaborations is burgeoning in some provincial policy, however without cross-provincial strategy barriers will continue. A growing need for advocacy for pediatric rehabilitation is apparent.

Poster #30 and Three Minute Presentation

Age, sex and baseline concussion symptoms in youth athletes: An exploration of heart rate variability

Melissa Paniccia, Rehabilitation Sciences Institute, University of Toronto; Lee Verweel, Bloorview Research Institute, Holland Bloorview Kids Rehabilitation Hospital; Dr. Tim Taha, Faculty of Physical Education and Kinesiology, University of Toronto; Dr. Scott Thomas, Faculty of Physical Education and Kinesiology, University of Toronto; Dr. Nick Reed, Concussion Centre, Bloorview Research Institute, Holland Bloorview Kids Rehabilitation Hospital

Funding: Canadian Institutes of Health Research, Ontario Neurotrauma Foundation

Field: Social and Cognitive Rehabilitation

Background/Purpose: Concussion is a common injury amongst Canadian youth. The implications of concussion in youth are unique as the developing brain is more vulnerable to concussive injury. Heart rate variability (HRV) is a non-invasive, neurophysiological marker emerging in the field of concussion research as a way to objectively monitor change in autonomic nervous system functioning along the recovery trajectory. The objectives of this study were to: (1) explore the influence of age, sex on HRV in healthy youth athletes between 13-18 years old; and (2) examine the relationship between baseline/pre-injury concussion symptom domains (physical, cognitive, emotional, fatigue) and HRV.

Methods: This prospective, repeated measures study examined pre-injury data obtained from youth athletes between 13-18 years of age (N=295) across various sports in the Greater Toronto Area. Baseline/pre-injury concussion symptoms, and heart rate variability (over a 24-hour period) were collected. Linear models were used to examine the aforementioned objectives.

Results: Age effects revealed that older participants displayed higher HRV compared to younger athletes in time domain measures. Males also displayed a higher HRV compared to females in both time and frequency domain measures. Cognitive and fatigue symptoms in healthy youth athletes significantly predicted HRV in both time and frequency domain measures.

Implications: This study acts an initial step in understanding the baseline/pre-injury neurophysiological profile of youth athletes while considering age and sex. This study highlights the potential value of a novel, non-invasive neurophysiological indicator used in conjunction with traditional self-report of symptoms for clinical management. Prospective longitudinal research is needed to further explore potential changes in autonomic functioning and the multi-faceted contextual influences of a youth athlete's environment.

Poster #31

Exploring the experiences of youth and young adults with ABI as they transition towards work-related roles

Alicia Paniccia, Rehabilitation Sciences Institute, University of Toronto; Mary Stergiou-Kita , Department of Occupational Science and Occupational Therapy, University of Toronto; Bonnie Kirsh, Department of Occupational Science and Occupational Therapy, University of Toronto; Sally Lindsay (Senior), Department of Occupational Science and Occupational Therapy

Funding: Ontario Ministry of Research and Innovation, Ontario Graduate Scholarship

Field: Rehabilitation Health Services Studies

Background: Current research on employment of individuals with an acquired brain injury (ABI) is heavily focused on adults and their return-to-work capabilities. Employment research that focuses on youth and young adults with ABI is limited. Understanding the experiences of youth and young adults as they transition towards work-related roles can inform occupational rehabilitation research and practice by providing a more descriptive trajectory of their transition and may promote successful transitioning of these individuals into such roles. Purpose: The purpose of this study is to explore the experiences of youth and young adults with ABI as they transition towards work-related roles.

Methods: This study uses a descriptive qualitative design, drawing on rich, in-depth semi-structured interviews of 8 participants (3 male, 5 female). Interviews were transcribed verbatim and thematic analysis was utilized to analyze the data. NVivo software was used to manage data. Bandura's (1986) Social Cognitive Career Theory (SCCT) informed the interview guide and analysis of data.

Findings: Data analysis is currently underway. Emerging findings focus on issues relating to the experience of transitioning towards work-related roles (both paid and unpaid), including barriers and facilitators of acquiring and/or maintaining these roles, and the extent to which self-efficacy, personal goals and expected outcomes inform the transition to work.

Summary: Youth and young adults with ABI often encounter barriers when transitioning towards work-related roles. Some participants were able to employ coping strategies to acquire and/or maintain work-related roles, while others felt limited by their condition. These results highlight that while challenges exist in searching or securing work-related roles, there are a variety of facilitators that youth and young adults with ABI can draw on to make their transition a more successful one.

Poster #32

Measuring meaningful outcomes in Duchenne muscular dystrophy: The protocol and initial evidence

Roni Propp, Rehabilitation Sciences Institute, University of Toronto; The Hospital for Sick Children; Sarah Buttle, University of Ottawa; Shannon Weir, The Hospital for Sick Children; Clarissa Encisa, The Hospital for Sick Children; Aileen Davis, Krembil Research Institute, University Health Network; Laura McAdam, Holland Bloorview Kids Rehabilitation Hospital, Bloorview Research Institute, Department of Pediatrics, University of Toronto; Nancy Salbach, Department of Physical Therapy, University of Toronto; Unni Narayanan, The Hospital for Sick Children

Funding: Bloorview Research Institute Fellowships

Field: Rehabilitation Health Services Studies

Background: Duchenne muscular dystrophy (DMD) is the most common and severe of all neuromuscular disorders. As there is no cure, it is imperative to measure whether the interventions address the goals of the children and their parents. Health related quality of life (HRQOL) is an important measure of the impact of chronic disease on the individual, encompassing social, physical, and psychological domains. The Caregiver Priorities and Child Health Index of Life with Disabilities (CPCHILD) questionnaire is a HRQOL measure that was developed specifically for children with severe disabilities.

Objective: To evaluate the suitability of the CPCHILD as an outcome measure for children with DMD and to validate the CPCHILD or an adapted version in this population.

Methodology: A purposive sample of children with DMD and their parents will be interviewed to evaluate the suitability of the CPCHILD. A multidisciplinary group of health care professionals with expertise in the management of this population will be e-surveyed to further evaluate the suitability of the CPCHILD. The interviews will inform the retention, modification, elimination or addition of questionnaire items. The resulting outcome measure will be administered to a larger sample of children and their parents to analyze the psychometric properties of the questionnaire, including test-retest reliability, construct validity, and differences between the child and parent scores.

Significance: A condition-specific outcome measure for the DMD population will serve as a much needed tool to assist in medical decision-making and to evaluate the effectiveness of interventions in relation to the priorities and goals of children with DMD and their parents.

Poster #33

Exploring variability and 'error' in balance control

Roshanth Rajachandrakumar, Rehabilitation Sciences Institute, University of Toronto; Toronto Rehabilitation Institute, UHN; Shajicaa Sivakumaran, Toronto Rehabilitation Institute, UHN; Department of Kinesiology; University of Waterloo;; Alison Schinkel-Ivy, 2Toronto Rehabilitation Institute, UHN; Avril Mansfield, Rehabilitation Sciences Institute, University of Toronto; Toronto Rehabilitation Institute, UHN

Funding: Natural Sciences and Engineering Research Council of Canada

Field: Movement Science

Background: Numerous studies have found a relationship between the variability of balance measures, and an increased risk of falls in an older adult population. Variability of the centre of pressure (COP) position while standing and variability of spatio-temporal characteristics of walking have both been linked to an increased risk of falls. The specific nature of this relationship is currently unknown. It can be postulated that the variability of these balance measures reflect the variability of the centre of mass (COM) movement. Since balance control involves manipulation of the COM, variability of the COM could be seen as an error in balance control. Accordingly, a large error could lead to a higher risk of poor balance control (e.g. falling) compared to a small error. We hyothesize that high variability of the COM movement (position and speed) when standing will lead to poor balance responses to moving platform postural perturbations. We will compare trials where participants did not take a step (best response) to trials where they took a single step (poor response).

Methods: Data for three healthy young adults (20-35 yrs) have been collected to date, with an aim to collect a total of 16 participants. Participants experienced a total of 100 discrete perturbations, randomly assigned in the anterior-posterior and mediolateral directions. Kinematic data was collected using a 13-camera Vicon motion capture system and a 56-marker full-body layout. The standard deviation of the COM position and speed for 10 secs prior to perturbation onset was calculated to determine COM variability in standing.

Results and Future Directions: Preliminary data from the first three participants suggest no major differences in COM variability prior to ‘no step’ trials and single step trials. Questionnaires are also being administered to measure anxiety and physical activity, both of which could possibly affect COM variability when standing.

Poster #34 and Three Minute Presentation

Investigating symptoms of depression and concussion in adolescent athletes devoid of concussive injury

Tian Renton, Rehabilitation Sciences Institute, University of Toronto; St. Michael's Hospital; Dr. Angela Colantonio, Toronto Rehabilitation Institute; Dr. Nick Reed, Holland Bloorview; Dr. Jane Topolovec-Vranic, St. Michael's Hospital

Funding: St. Michael's Hospital Graduate Student Scholarship, OSOTF Unilever/Lipton Neurosciences Fellowship (UHN), OSOTF Dalton Whitebread Scholarship (Faculty of Medicine)

Field: Social and Cognitive Rehabilitation

Objectives: i) to investigate the prevalence and describe the relationship between self-reported symptoms of depression and concussion among adolescent athletes (in the absence of concussion injury), ii) to investigate the relationship between participant sex and self-reported symptoms of concussion and depression (in the absence of concussion injury) and iii) investigate the relationship between participant medical history (i.e. history of concussion, depression, anxiety or learning disability) and self-reported symptoms of concussion and depression (in the absence of concussion injury).

Method: Athletes enrolled within various community level sport organizations across the Greater Toronto Area were invited to take part in this investigation. Athletes participating in mandated baseline testing conducted by community-based concussion management clinics in Toronto were also invited to participate. Approximately 155 adolescent athletes (males and females between 13-18 years old) participating in various sports (lacrosse, soccer, hockey, rugby and cheerleading) and levels of competition (house and competitive leagues) were included. Primary outcome measures included The Post-Concussion Scale (PCS) and The Mood and Feelings Questionnaire (MFQ). The PCS was used to document the presence of concussion-like symptoms (in absence of a concussive injury). Symptoms of depression were documented via the MFQ. Demographic and medical histories were also collected. Surveys were administered once at various points throughout an athlete's competitive season.

Results: Depression and concussion symptom scores are described relative to participant age, sex and medical history (i.e. prior history of depression, history of concussion). Results delineate concussion and depression symptom differences between males and females, and describe athletes involved in various sport disciplines a priori, devoid of concussive injury.

Conclusions: Findings describe adolescent athlete mental health status and concussion symptoms prior to injury. Findings will be utilized to provide rationale for secondary research, investigating concussive injury incidence and the effect of proactive mental healthcare interventions specific to this population.

Poster #35 and Three Minute Presentation

The concept of normal: A history, the perpetuation and the consequences of normality

Natalie Rose, Rehabilitation Sciences Institute, University of Toronto

Field: Social and Cognitive Rehabilitation

Purpose: Normality is a permeating and valued concept in our society, but its existence and the value we place on it has significant consequences for many individuals. The purpose of this poster is to demonstrate that normality, rather than a reality that can be strived towards, is a social construct, the definition of which is always in flux. Additionally this poster explores how normality is perpetuated in society, the consequences of the overvaluation of a normal body and the ways that normality might be resisted.

Method: A comprehensive literature search was undertaken through electronic databases, hand journal searches, consultation with experts, and citation searching, resulting in the identification of 32 texts used to support this poster.

Results: From the literature five main ideas emerged related to normality, its perpetuation in society and its consequences. History: The history of the concept of normal is only approximately 200 years old and stemmed predominantly from early interest in statistical and eugenic movements. Rehabilitation: Rehabilitation is one of many systems that is predicated on and reproduces the value of normality in society. Consequences: Disabled people experience significant consequences from the value placed on having a “normal” body, including a history of sterilization, constant pressure to pursue normality at all costs, and internalized-abelism that stems from societal messages that non-normality is a less valuable way of being. Definition: The definition of normality is not constant and changes between cultures and throughout history. Resistance: Normality as a concept could be resisted if we deny the value of normality over non-normality and instead focus on the value of diversity within and between bodies.

Implications: It is crucial that we begin to point to normal as a damaging, rather than helpful, concept when applied to human bodies and begin recognizing the value in differences and variations among us.

Poster #36

Deciding to participate in arts-based health research: A qualitative study of participants' perspectives

Hyun Ryu, Rehabilitation Sciences Institute, University of Toronto; Bonnie Kirsh, University of Toronto; Janet Parsons, St. Michael's Hospital; Alison Thompson, University of Toronto; Flora Matheson, St. Michael's Hospital

Field: Social and Cognitive Rehabilitation

Background: Arts-based health research (ABHR) is a novel approach in qualitative inquiry that uses different forms of art within any part of the health research process to generate, analyze, and/or communicate scientific knowledge. The use of arts-based methods in health research encompasses numerous forms of art, such as photography, videography, drawing, poetry, theatre, and dance. While qualitative studies using arts-based methods have rapidly grown since the mid 2000s, ethical consideration for the use of arts-based methods in health research has been significantly lacking. More importantly, no effort has been made to understand how participants perceive and understand ethical issues in ABHR.

Objective: From an interpretivist point of view, the objective of this study is to understand the major factors incorporated in participants' decision-making in ABHR.

Methods: Purposive and theoretical sampling will be used to select participants from an urban arts charity organization called Urban Non-Violent Initiative Through Youth (UNITY). By using a modest approach to constructivist grounded theory, 15-20 postgraduates/alumni of UNITY's arts program will be recruited for semi-structured in-depth interviews.

Implications: Findings of this study will contribute importantly to our knowledge in the ethics of ABHR from the perspectives of potential participants. Moreover, participants' perspectives, understandings, and factors involved in their decision-making will inform researchers, REBs, and guideline development of ABHR, which should result in a better protection of participants in all areas of this emerging approach. A better understanding of ethics in ABHR that attends to the concerns of participants as they articulate them, will contribute to the researchers' and ethics boards' confidence in the conduct of ABHR.

Poster #37

Exploring performance validity testing within occupational therapy practice

Reema Shafi, Rehabilitation Sciences Institute, University of Toronto; Angela Colantonio, University of Toronto

Funding: CIHR

Field: Occupational Science, Social and Cognitive Rehabilitation

Background: Occupational therapists (OTs) are considered experts in the assessment of functional cognition following injury. Unfortunately, to date, most standardized measures used by OTs to assess cognition, 1) are not meant to assess the construct of functional cognition and/or 2) rely on the assumption that the subjective account of impairments is accurate. The College of Occupational Therapists of Ontario (COTO) regulates practice and establishes the minimum standards for the profession. We question whether, as clinicians working in the community, OTs are meeting the minimum criteria as established by COTO. There is a growing body of literature that indicates a near 40% exaggeration rate with respect to subjective complaints of cognitive impairment. We explore whether OTs are consistently relying on an objective measure that validates functional impairments within the context of performance in activities of daily living.

Methods: To gain a comprehensive and holistic perspective of the identified practice gap in occupational therapy practice, an exploratory tri-phase sequential mixed methods study is being proposed. In phase I, focus groups will engage in open unbiased discussions to facilitate information gathering & sharing diverse sets of perspectives. During phase II, an online survey will be developed and administered to registered OTs practicing in Ontario to gain a broader perspective regarding the views & beliefs of OT practitioners & suggested resolutions. Phase III will serves to further understand diverging perspectives through 'outlier detection' using focus groups.

Implications: The objectives of this study are to understand the perceptions of various stakeholders in Ontario with respect to approaches to functional validation & to identify the key constructs considered vital for functional independence. This study provides an opportunity for active participation and communication to address concerns & to steer solutions. The knowledge acquired will have direct applicability to practice within occupational therapy, and more globally, rehabilitation.

Poster #38 and Three Minute Presentation

The feasibility of using shear wave ultrasound to measure stiffness of the swallowing muscles in normal healthy subjects

Stephanie M. Shaw, Rehabilitation Sciences Institute, University of Toronto; Anand Rattansingh, Medical Imaging, Toronto General Hospital, University Health Network; Anne M. Agur, Department of Surgery, Division of Anatomy, University of Toronto; Sunita Mathur, Department of Physical Therapy, University of Toronto; Andrew Hope, Princess Margaret Cancer Centre, University Health Network

Funding: Canadian Institutes of Health Research (CIHR Operating Grant #93685), Canadian Cancer Society Research Institute (CCSRI Operating Grant #020190)

Field: Speech-Language Pathology

Background: Head and neck cancer patients treated with radiotherapy often develop chronic dysphagia. To date, little is known about the pathophysiology of this condition, impeding the development of targeted and effective interventions. Some researchers have suggested that fibrosis within the swallowing muscles causes stiffness and immobility in dysphagic individuals. However, no tools exist that can reliably measure fibrosis or stiffness within the swallowing muscles. The purpose of this study was to (1) determine the feasibility of using shear wave ultrasound to measure stiffness of the swallowing muscles in normal healthy subjects, and (2) to estimate the intra-rater reliability of these measurements.

Methods: Ten healthy subjects (5M, 5F; mean age: 34.7±12.8 yrs) were recruited. Stiffness of both left and right geniohyoid and genioglossus muscles was assessed at rest and during contraction using a Supersonic Imagine Aixplorer® with a SuperCurved SC6-1 transducer. Ten repeated measures were obtained for each side/condition and averaged. Participants were asked to rate clarity of instructions, comfort during testing, and testing duration, using a 5-point Likert scale (1=bad, 5=excellent). Shear wave image quality was rated by an experienced sonographer (1=unacceptable, 2=acceptable, 3=excellent). Testing was considered "feasible" if average participant ratings were ≥3 and if image quality was ≥2 for at least 50% of the obtained scans. Intra-rater reliability was estimated for left vs. right sides using intraclass correlation coefficient (ICC).

Results: Shear wave ultrasound was well-tolerated by participants (mean scores: clarity=4.8; comfort=4.1; duration=4.3). Image quality was acceptable for 6/13 conditions. Preliminary analyses demonstrate good intra-rater reliability (ICC: 0.64-0.89) for 5/6 of the acceptable conditions.

Conclusions: Shear wave ultrasound is a feasible technique for measuring stiffness of geniohyoid and genioglossus at rest and during certain swallowing exercises. Further investigation into the reliability and validity of this approach for measuring radiation-related fibrosis is warranted.

Poster #39

The neuropathological signature of bulbar-onset ALS: A systematic review

Sanjana Shellikeri, Rehabilitation Sciences Institute, University of Toronto; Vishwathsen Karthikeyan, Sunnybrook Research Institute; Rosemary Martino, University of Toronto; Julia Keith, Sunnybrook Research Institute; Yana Yunusova, University of Toronto

Funding: ALS Society of Canada Bernice Ramsay Discovery Grant, NIH-NIDCD #R01DC009890 & #R01R01DC013547

Field: Speech-Language Pathology, Movement Science

Background: ALS is primarily a motor neuron disease, but is also associated with extramotor (i.e., language and cognitive) impairments. The bulbar form of ALS affects speech and swallowing functions, and is characterized by a rapid progression, and a short survival. Some studies suggest that bulbar-onset ALS may be unique to other subtypes and is associated with extramotor impairments, however, other studies suggest that it is a more advanced stage of the same disease. Our understanding of the underlying neuropathology in bulbar ALS is extremely limited at present.

Methods: The purpose of this study was to conduct a Cochrane-based systematic review investigating what is known about the neuropathological abnormalities in bulbar-onset ALS (bALS), as compared to spinal-onset ALS (sALS), in the existing literature. After abstract and full text screening, a total of 17 studies were accepted into the study.

Results: Findings revealed that the existing literature is inconclusive in determining if the two subtypes are neuropathologically distinct, or lie within a spectrum of the same disease. However, some studies suggested that specific regions of interest within the cortex, particularly related to language and speech processing, may be independently involved in bulbar-onset ALS.

Implications: Future work needs to directly compare the neuropathology of the two subtypes, standardize histopathology protocols, provide thorough descriptions of pre-morbid behaviour profiles, and associate the observed pathology with relation to genetic makeup.

Poster #40

Gender differences within online gaming: A scoping review

Jing Shi, Rehabilitation Sciences Institute, University of Toronto; Bonnie Kirsh, University of Toronto

Funding: Queen Elizabeth II Patty Rigby and John Wedge Graduate Scholarships in Science and Technology

Field: Rehabilitation Health Services Studies, Occupational Science

This systematic scoping review identified, described, and categorized gender differences of online gamers in terms of gamer characteristics, online experiences and behaviours, and offline effects on the gamer. Five stages of the York framework were used to guide this review: identification of the research question; identification of relevant studies; study selection; charting of data; and collation, summarization, and reporting of the results. Themes within each of the three areas of interest are presented. The main themes found in gamer characteristics were related to demographics, time spent gaming, and motivations to play. The main themes found in the area of experiences in the online world were related to online identities, online relationships, negative online experiences, and in-game activities. Finally, the main themes found with respect to the offline world were related to health, relationships, and school.

Poster #41

Executive control ability as a predictor of language therapy outcomes: A systematic review

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Funding: Canadian Partnership for Stroke Recovery Trainee Award

Field: Speech-Language Pathology

Background/Purpose: Some evidence suggests that higher executive control (EC) ability is relates to better language recovery in people with aphasia, but this is based on a limited number of studies. The present study aimed to systematically review the literature examining whether cognitive abilities (i.e., EC) are predictive of language treatment gains.

Method: Electronic searches were conducted in CINAHL, Cochrane Trials, Embase, MEDLINE, MEDLINE-in-Process and PsycINFO. Accepted studies (reviewed by two independent raters) presented original, peer-reviewed research with N > 2; at least 90% of participants were adults with acquired post-stroke aphasia receiving language intervention and the studies correlated pre-treatment EC abilities with gains made following therapy.

Results: Initial search results yielded 2676 articles, however 13 studies were accepted overall. Critical appraisal of the studies revealed that the majority didn't report blinding of therapists or outcome assessors to treatment outcomes or patient characteristics nor reliability measures for the outcomes assessed. The treatment protocols mainly focused on improving naming, but also included treatments for sentence comprehension and functional communication. The EC measures used were highly variable. Generally, some relationship between cognitive ability and post-treatment language outcome was found in nine out of 13 studies: higher levels of EC were predictive of greater language improvements following therapy.

Summary/Implications: The findings confirm a relationship between EC and language treatment outcomes in post stroke aphasia but also highlight the need for standardized EC assessment batteries for individuals with aphasia. The variability of treatment types, language outcomes and EC measures across studies did not allow for a clear description of the exact nature of the relationship between language and EC abilities. This is the first systematic review to address the role of EC in language and aphasia recovery and may impact how individuals with aphasia are assessed and treated in the future.

Poster #42

Effect of rollator use on older adults' walking characteristics

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Funding: TRI-TD Scholarship for Graduate Students with Disability

Field: Movement Science, Occupational Science

Background: There is a dearth of studies that have investigated walker use among older adults and their characteristics. The aim of this study is to explore patterns of using walker among older adults' and its effect on their walking balance and mobility.

Methods: Retrospective review was conducted on 139 elderly (69-97 years old, 44 male, 95 female) residents in an assisted living facility in Ontario who could independently walk with or without the use of mobility assistive aids. Balance and mobility of all participants were evaluated based on Schlegel Functional Fitness Assessment. Participants were tested during quiet standing with eyes open and closed, sit-to-stand, 25-foot walk, 6-minute walk, and grip strength. Tri-axial accelerometers (Gulf Coast Data Concepts, Model X8M-3, Waveland MS) and two Nintendo® Wii balance boards were used to measure temporal gait characteristics. Statistical Analysis Software (SAS, Version 9.4) was used for data analysis. Descriptive statistics was used to describe participants' demographics. Means and standard deviations were used to describe balance and mobility outcomes.

Results: Preliminary analysis of the results indicates a greater number of female participants in both young to middle old (65-84 years old) and frail old group (85 years old and over). As well, there are more walker users among female participants than males. Male walker users are less likely to use the walker in any settings (short hall, long hall, room and outdoor walking) compared to female walker users. Ongoing analysis is aimed at quantifying spatiotemporal gait characteristics and determining effects of existing disease conditions on pattern of use. Summary/Significance of the Study Results of this study will help better understand walker user characteristics, including presence of existing disease conditions. Summary/Significance of the Study Results of this study will help better understand characteristics of walker users, including presence of existing disease conditions and gait patterns. As well, findings from this study could help demonstrate who are most likely to benefit from use of walkers.

Ten Minute Presentation

The correlation between substance abuse and cognitive recovery after traumatic brain injury

Alana Tibbles, Rehabilitation Sciences Institute, University of Toronto, TRI; Dr. Robin Green, TRI and University of Toronto; Dr. Angela Colantonio, TRI and University of Toronto; Dr. Robert Mann, CAMH

Field: Social and Cognitive Rehabilitation

Purpose: Clinicians often caution their patients against using drugs or alcohol while recovering from a traumatic brain injury (TBI) but little is known about how these substances actually affect the recovery process. The aim of this study is to better understand how substance abuse affects cognitive recovery after brain injury, with a specific focus on memory and attention.

Methods: Participant test scores were taken from the Recovery Study Database which consists of over 200 patients of at least 18 years of age with a TBI. Based on T-scores of ≥60 on measures of drug or alcohol problems on the Personality Assessment Inventory, a subset of participants made up the Substance Abuse Group (n=36). These participants were matched with participants from the same database that were not substance abusers. Scores were compared for each group on individual tests of Timed Attention, Untimed Attention and Memory. Aggregate scores, which were calculated using weighted averages of the scores in that domain, were also compared.

Results: Participants in the Substance Abuse Group had less improvement in their scores from 2-5 months post-injury than did the Controls. This was significant for several individual tests of timed attention: Trail Making Test A ($p<0.05$), Stroop Colour-Word ($p<0.05$), Stroop Word ($p<0.05$) and Verbal Fluency ($p<0.05$), as well as the aggregate for Timed Attention ($p<0.05$). Since the subgroup aggregate for manual motor tests was not significantly different between the groups, results cannot be solely attributed to differences in motor speed.

Implications: Substance abuse was found to impede recovery of attention and memory after TBI. The most pronounced differences between the Substance Abusers and the Controls were observed in timed tests of attention. These results should promote future investigation to determine whether differences can be better explained by behavioural factors associated with substance abuse or structural/anatomical changes resulting from substance abuse.

Poster #43

Development and testing of a measure of balance confidence for children and teens with physical disabilities

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Funding: Holland Bloorview Kids Rehabilitation Chair in Pediatric Rehabilitation, Rehabilitation Sciences Institute

Field: Practice Science

Background: Children and teens (hereafter called youth) with physical disabilities generally participate in physical activities less frequently and with less diversity than typically-developing youth. Balance deficits are common and well-documented in youth with lower extremity disabilities, however balance confidence (self-perception of one's ability to maintain balance during specific activities or certain situations) has received little attention. Balance confidence may be important to measure since, in adults, it better predicts activity, participation, and community integration than balance capabilities. Unfortunately, tools for measuring balance confidence in adults are not appropriate for children. Thus, it has not been possible to study the combined impact of balance confidence and balance capabilities on activity participation in paediatrics.

Purpose: The current study will examine connections among balance confidence, balance capabilities, and participation by: (1) developing a measure of balance confidence for ambulatory youth ages 9 to 18 years; (2) testing the measure with youth with physical disabilities and typically-developing youth; and (3) using the measure to explore relationships among balance confidence, balance capabilities, and participation in physical activities.

Methods: Youth will participate in creation of this measure through focus group discussions. The measure will be computer-based with a pictorial format to enhance youth engagement. Test-retest reliability and construct and predictive validity testing will be completed.

Relevance: These findings are expected to be very relevant to youth, parents, and clinicians in providing new insights into a potentially important and modifiable barrier to participation in physical activities that may be addressed by clinicians through well-targeted participation-centered goals.

Poster #44

System level factors and considerations for implementing caregiver programs in a regional stroke system

Victrine Tseung, Rehabilitation Sciences Institute, University of Toronto; Susan B. Jaglal, UHN-Toronto Rehabilitation Institute; Department of Physical Therapy, University of Toronto; Nancy M. Salbach, UHN-Toronto Rehabilitation Institute; Department of Physical Therapy, University of Toronto; Jill I. Cameron, UHN-Toronto Rehabilitation Institute; Department of Occupational Science & Occupational Therapy, University of Toronto

Funding: Ontario Ministry of Research and Innovation's Early Researcher Award [JIC], Canadian Institutes for Health Research's New Investigator Award [JIC, NMS], Knowledge Translation Canada Student Fellowship Award [VT].

Field: Rehabilitation Health Services Studies

Background/Purpose: Family caregivers are essential to ensuring a successful transition home for stroke survivors. However, caregivers are often unprepared to take on this important role. Despite literature showing that caregiver education and support programs help to improve caregiver skill and well-being, these programs have not been formally implemented in the Canadian healthcare system. This study aims to identify organizational/system level factors that influence the implementation of caregiver education and support programs in a regional stroke system in Ontario, Canada.

Methods: Focus groups were conducted with the following stakeholder groups: Regional/District Program Directors, Community and Long-Term Care Specialists, Regional Education Coordinators, and Regional Rehabilitation Specialists. Semi-structured interviews were conducted with Regional Medical Directors, health professionals providing stroke care in acute care, rehabilitation and community settings, health region executives, and health region primary care leaders. The main topic areas included: 1) factors influencing the implementation of caregiver programs; 2) perceptions regarding how the needs of caregivers could be met; and 3) perceptions regarding what changes could be made to the health care system to benefit family caregivers. Transcripts were coded, data were analyzed using categorical aggregation, identification of patterns and naturalization generalizations.

Results: Four focus groups (n = 19, 7, 7, 11) and twenty-nine interviews were conducted. Data analysis yielded four organization/system level themes: 1) Developing a shared understanding of the need for caregiver education and support programs to be implemented within an integrated health care system; 2) Adopting a journey of care perspective; 3) Delineating ownership and responsibility for implementation; and 4) Addressing regional variations related to access, availability and culture.

Summary/Implications: The results of this study can inform the development of strategies to implement caregiver programs across a regional stroke system.

Poster #45

Characterizing dysphagia and swallowing interventions in spinal cord injury: A systematic review

Teresa J. Valenzano, Rehabilitation Sciences Institute, University of Toronto; Ashley A. Waito, Rehabilitation Sciences Institute, University of Toronto; Catriona M. Steele, Toronto Rehabilitation Institute-University Health Network

Funding: Toronto Rehabilitation Institute

Field: Speech-Language Pathology

Purpose: Dysphagia is reported to be a common secondary complication for individuals with spinal cord injuries (SCI). Different etiologies of SCI may lead to different profiles of swallowing impairment. We conducted a systematic review to determine the characteristics of dysphagia after traumatic SCI and to describe interventions currently used to improve swallowing function in this population.

Methods: A comprehensive multi-engine literature search identified 137 articles of which 7 were judged to be relevant. These underwent review for study quality, rating for level of evidence, and data extraction.

Results: The literature describing dysphagia after SCI was comprised predominantly of low level evidence and single case reports. Aspiration, pharyngeal residue, and decreased/absent hyolaryngeal elevation were found to be common characteristics of dysphagia in this population. The most commonly used swallowing interventions included tube feeding, compensatory swallowing strategies, and steroids/antibiotics. Improvement in swallowing function following swallowing intervention was reported in all studies, however there was no control for spontaneous recovery.

Conclusions: The results demonstrate a need for high-quality research to profile the pathophysiology of dysphagia after traumatic SCI and controlled studies to demonstrate the efficacy of swallowing interventions in this population.

Poster #46 and Three Minute Presentation

Autism Inside Out: perspectives from three autobiographies written by youth

Christie Welch, Rehabilitation Sciences Institute, University of Toronto; Helene Polatajko, University of Toronto; Patty Rigby, University of Toronto; Margaret Fitch, University of Toronto

Funding: Canadian Occupational Therapy Foundation

Field: Occupational Science

Background: The prevalence of autism has sparked intense research efforts; the majority of which focuses on biomedical concerns. (Zwicker & Herbert Emery, 2014).People with autism report dissatisfaction with this focus and call for studies that increase understanding of autism and its daily challenges. (Pellicano, Dinsmore & Charman, 2014). Occupational therapists also report dissatisfaction with autism research outcomes; stating the literature is not helpful to their practice (Ashburner et al., 2014).

Purpose: By exploring perspectives of youth with autism, this project aims to develop an improved understanding of the lived experience of autism and create a starting point for dialogic research in future study phases. Methods: Three autobiographies by youth who identify as having autism were purposively sampled based on the degree to which they discuss their social and embodied experiences. This data set underwent inductive thematic analysis. Analytic methods followed structure provided by Braun & Clarke (2006): a recursive process of coding, collating, mapping, reviewing, creating clear themes and then reporting using compelling extracts.

Results: The autobiographers give descriptions of struggling to control their bodies; both to initiate desired movements and inhibit unwanted movements. It seems this may be a shared, but under studied component of the autism experience. These youth also discuss the social sequelae of these problems with insightful descriptions of their impact on others. Implications: The implications of under recognized motor control issues are vast because it calls in to question the practice of using outward behaviour to assess people with autism: their intentions, desires, intelligence and awareness. Accounts from these youth also challenge current assumptions in autism literature such as poor “theory of mind”. This project is aligned with client centred interests of occupational therapists as well as priorities identified by people with autism.

Poster #47

Peripheral muscle dysfunction in interstitial lung disease: a scoping study

Lisa Wickerson, Rehabilitation Sciences Institute, University of Toronto; Dina Brooks, University of Toronto; Sunita Mathur, University of Toronto,

Funding: Peterborough K. M Hunter Graduate Scholarship, Ontario Lung Association and Canadian Lung Association Fellowships

Field: Movement Science

Objective: To characterize and summarize the state of the evidence for peripheral muscle dysfunction in individuals with interstitial lung disease (ILD).

Methods: A scoping study was performed by searching multiple electronic databases for published papers and conference abstracts of any study design. All sub-types of ILD were included, and any study that included a measure of peripheral muscle dysfunction and/or structural and metabolic characteristics of muscle were eligible.

Results: Forty-five studies representing 2522 individuals with 34 sub-types of ILD were included in this study. Data was charted using descriptive numerical analysis of study characteristics. Peripheral muscle dysfunction was predominantly reflected by reduced volitional isometric strength (17 studies), whereas the evaluation of muscle endurance was rare (2 studies). Volitional muscle force or torque was measured in the quadriceps (14 studies) and handgrip (8 studies), with strength preferentially reduced in the lower limbs. Eight studies measured structural or metabolic characteristics and found evidence of reduced muscle size and oxidative stress. Findings of muscle injury and muscle inflammation (e.g. serum markers, electromyography and muscle biopsies) were reported primarily in individuals with idiopathic inflammatory myopathies and connective tissue diseases.

Conclusions: Reduced volitional muscle strength was the most common finding of peripheral muscle dysfunction in ILD. Further quantification of peripheral muscle dysfunction and identification of structural and metabolic characteristics are needed to target specific interventions and optimize muscle function.

Poster #48 and Three Minute Presentation

Needs and preferences of technology among Chinese family caregivers of persons with dementia: A pilot study

Chen Xiong, University of Toronto, Toronto Rehabilitation Institute; Arlene Astell, University of Toronto, University of Sheffield; Alex Mihailidis, University of Toronto, Toronto Rehabilitation Institute; Angela Colantonio, University of Toronto, Toronto Rehabilitation Institute

Funding: Canadian Consortium of Neurodegeneration in Aging, Canadian Institutes of Health Research, Canadian Association on Gerontology, Toronto Rehabilitation Institute, Harry C. Sharpe Fellowship, Alzheimer's Society of Canada

Field: Rehabilitation Technology Science, Rehabilitation Health Services Studies

Background: Dementia is a major public health concern that currently affects over 750,000 people in Canada. It is associated with significant caregiver demands and there are technologies available to assist caregiving. However, there is a paucity of information on caregiver needs and preferences of these technology that take into account ethnicity and sex/gender, especially among Chinese family caregivers of persons with dementia (PWD) in Canada.

Objective: The purpose of this study was to examine the technology needs and preferences of Chinese family caregivers of PWDs in Canada with a sex/gender lens.

Methods: A cross-sectional survey was conducted through the Yee Hong Centre of Geriatric Care in Ontario, Canada in both English and Mandarin. Respondents were given the option to complete the 78-item questionnaire over the phone, by mail or over the internet. Frequency distributions, Wilcoxon Signed Ranks Test and multiple regression analyses were performed.

Results: The majority of the 40 respondents to date did not demonstrate knowledge about technology to assist with caregiving. Ease of installation and reliability were identified as the most important features when installing and using technology respectively. Overall, respondents demonstrated a positive attitude towards the use technology in assisting with their care recipient's activities of daily living (ADLs) and delaying their transfer to a residential care facility. Controlling for age, female respondents were found to be significantly more receptive of technology compared to their male counterparts**.**

Conclusions: Our findings suggest a need to increase awareness of technology options to assist caregiving in this ethnic population. They provide insight for future development and marketing of technological innovations that will better align with the needs and preferences of caregivers. Further exploration of additional environmental and social influences on technology perception is warranted to further our understanding and tailor technology for this population.

Poster #49

Inpatient rehabilitation in patients with traumatic brain injury: Content of treatments and functional outcomes by age

Sareh Zarshenas, Rehabilitation Sciences Institute, University of Toronto; Angela Colantonio, Rehabilitation Sciences Institute, University of Toronto; Norah Cullen, Toronto Rehabilitation Institute

Funding: Ontario Neuro-Trauma Foundation, National Institutes of Health

Field: Rehabilitation Health Services Studies, Social and Cognitive Rehabilitation

Background/Purpose: Inpatient rehabilitation (IR) is one of the main elements in the continuum of care in patients with TBI. Occupational Therapy (OT), Physical Therapy (PT), and Speech Language Pathology (SLP) are the key professional disciplines in IR program for these patients. Although large numbers of epidemiological and population-based studies have been conducted on TBI patients, there is a paucity of evidence on the effect of age on clinical characteristics, components and outcomes of IR in patients who were treated in Canadian settings. This study sought to investigate the effect of age on: 1) Clinical characteristics 2) IR components 3) Functional outcomes in TBI patients who were treated at TRI-UHN.

Methods: Data on 150 TBI patients (≥18 years) that consecutively admitted to TRI-UHN between 2008 and 2011, were obtained from Practice-Based Evidence (PBE) project. Patients were stratified by their age into four sub-groups; (30≥, 30-45, 45-65, and ≥ 65 years). Points of care forms and Functional Independence Measurement were used to document content of interventions functional outcomes.

Results: Cause of injury, length of stay and time from injury to IR admission were significantly varied by age ($p \leq .05$). Pattern of receiving OT, PT and SLP did not show any significant differences by age. Therapeutic exercise, cognitive rehabilitation and education were the most frequent activities in PT, OT and SLP respectively. All groups showed significant higher FIM at discharge from IR program ($p \leq .05$).

Summary/Implications: Despite the differences in some clinical characteristics and content of treatments, both older and younger TBI patients showed significant improvement at discharge. This study offered new perspective on IR components of TBI patients by age groups. More analysis is warranted to examine the predictive value of therapeutic activities for better functional outcome based on age and based on severity of injury.

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Thank you for attending and participating in the 2016 Rehabilitation Sciences Institute Research Day Showcase.

See you next year!