

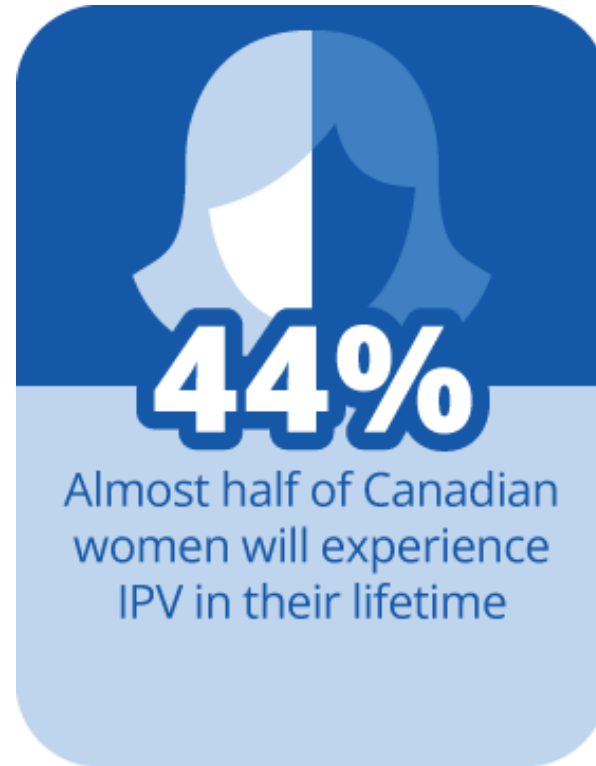
Characterizing The Chronic Effects of a Remote History of Brain Injury in Women Who Have Experienced Intimate Partner Violence

Paul van Donkelaar
School of Health and Exercise Sciences
University of British Columbia - Okanagan



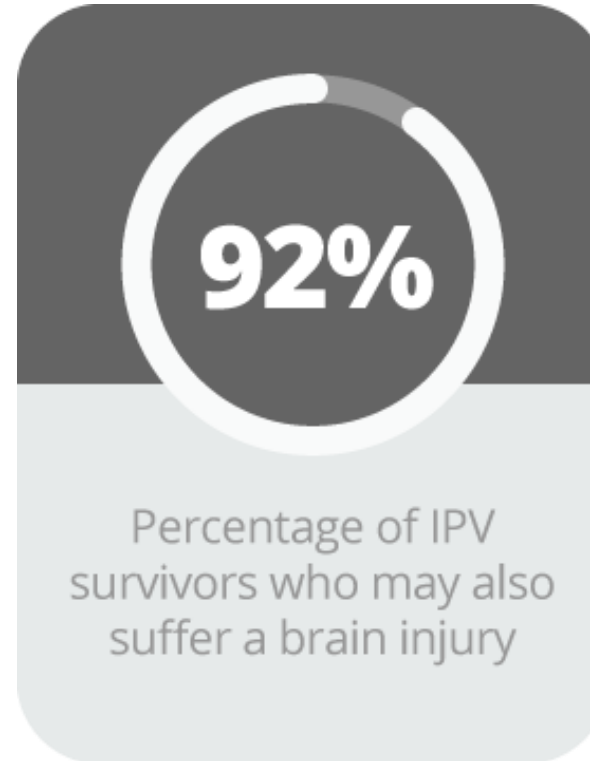
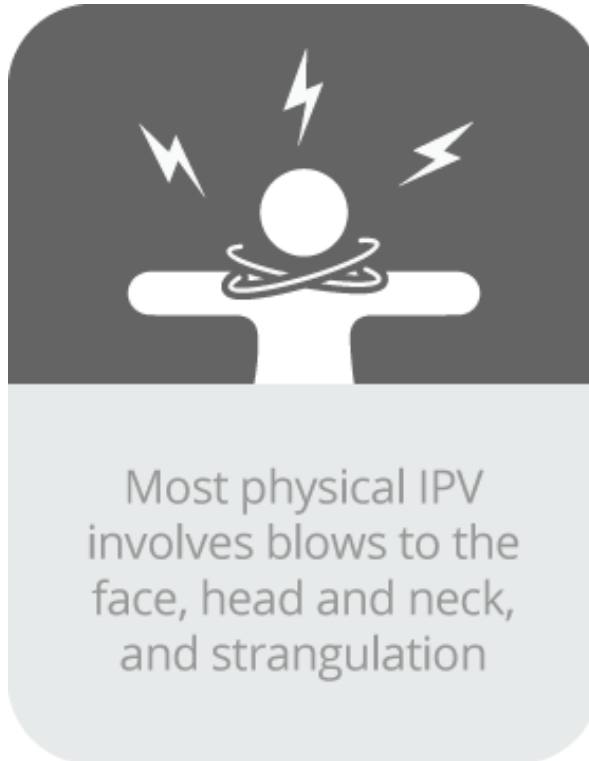
Background

- Intimate partner violence (IPV) is remarkably prevalent in Canada and worldwide.



Background

- The potential for brain injury (BI) occurs as a result of direct or indirect head impacts and/or non-fatal strangulation (NFS) and affects a large proportion of survivors of physical IPV.



Characterizing chronic/remote IPV-BI

- Recruit participants from women-serving community organization (e.g. women's shelters, transition houses).
- Assess psychopathological comorbid factors (e.g. PTSD, anxiety, depression, etc)
- Assess previous history of BI due to IPV via Brain Injury Severity Assessment (BISA):
 - Interview/questionnaire designed to assess exposure to potential BI from IPV (Valera & Berenbaum, 2003).
 - Includes questions about non-fatal strangulation (NFS) and BI from other injury mechanisms.
 - Subscores related to frequency, recency, and severity of IPV-BI resulting in a total score from 0 to 8.
 - BISA scores are associated with changes in neurocognitive function, brain activation, functional connectivity in the brain, and BI symptoms in chronic/remote IPV-BI survivors (e.g., Adhikari et al., 2024; Smirl et al., 2019; Valera & Kucyi, 2017; Valera et al., 2019).



BI symptoms in chronic/remote IPV-BI

BRAIN INJURY

<https://doi.org/10.1080/02699052.2019.1658129>



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Characterizing symptoms of traumatic brain injury in survivors of intimate partner violence

Jonathan D. Smirl^a, K. Elisabeth Jones^a, Paige Copeland^a, Omeet Khatra^b, Edward H. Taylor^c,
and Paul Van Donkelaar^a on behalf of the Canadian Traumatic brain injury Research Consortium (CTRC)



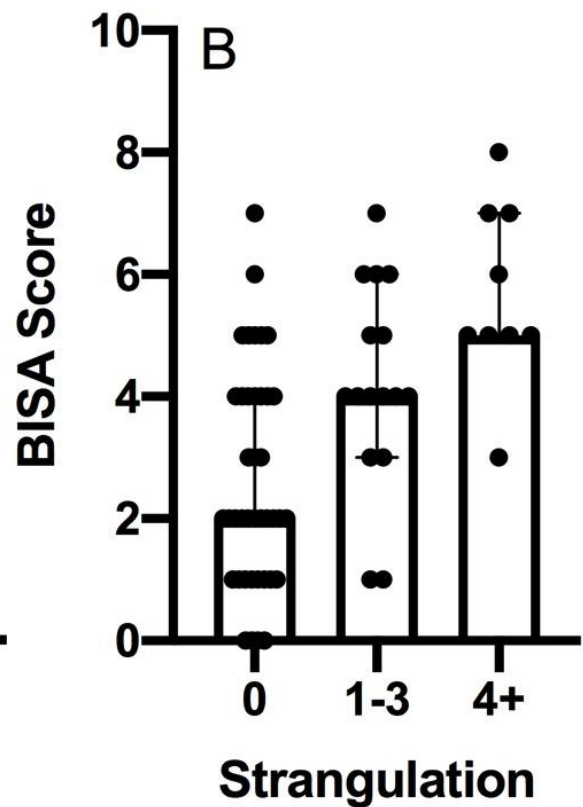
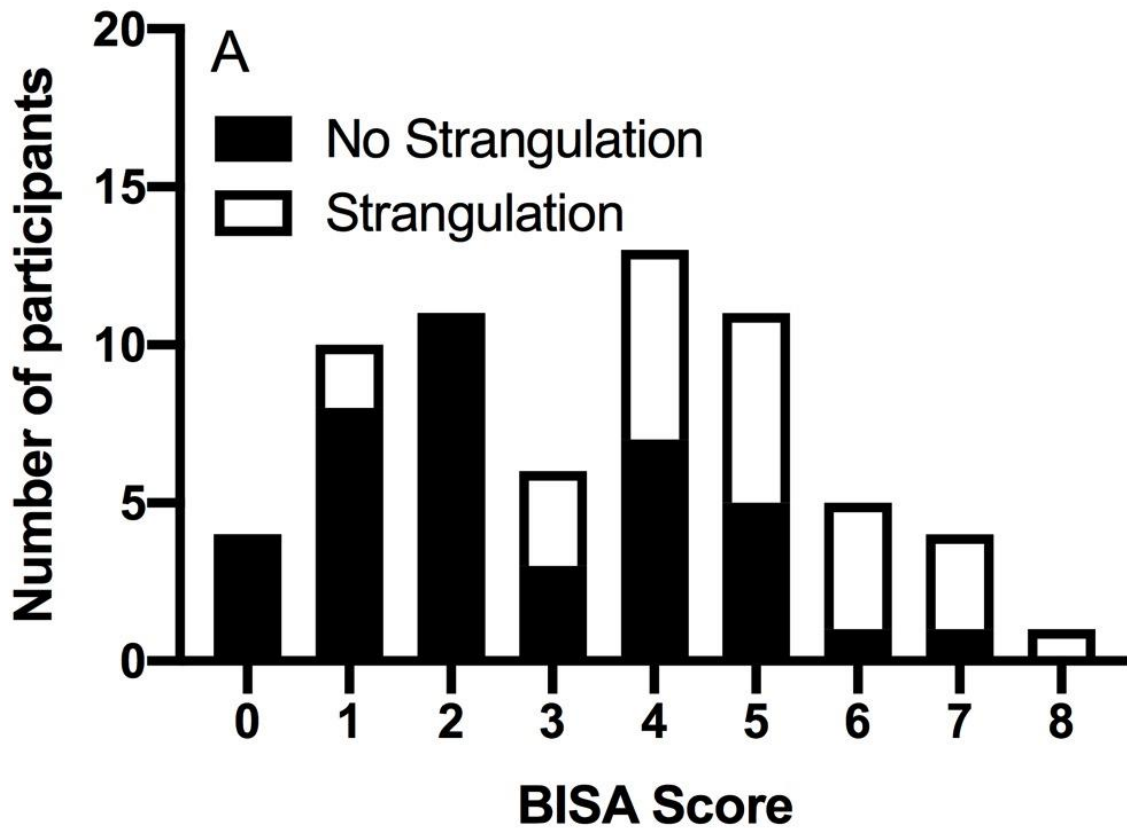
Dr. Jon Smirl

- Objective: Assess BI symptoms in women who have experienced chronic/remote BIs from IPV.
- Participants: 18 women recruited who had experienced IPV.
- Measures: BI symptoms assessed using BISA and SCAT5 for comparison to acute sport-related concussion.

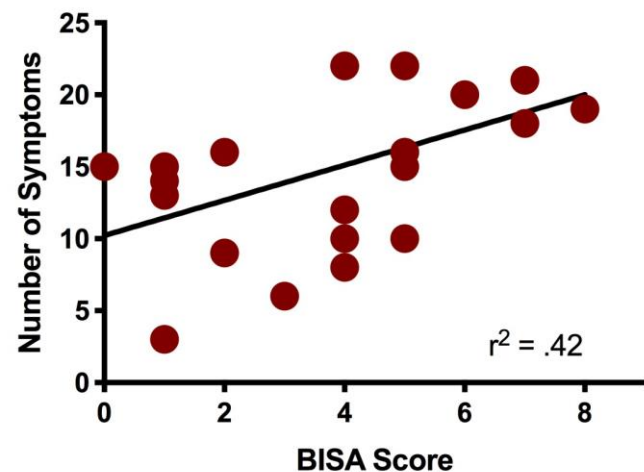
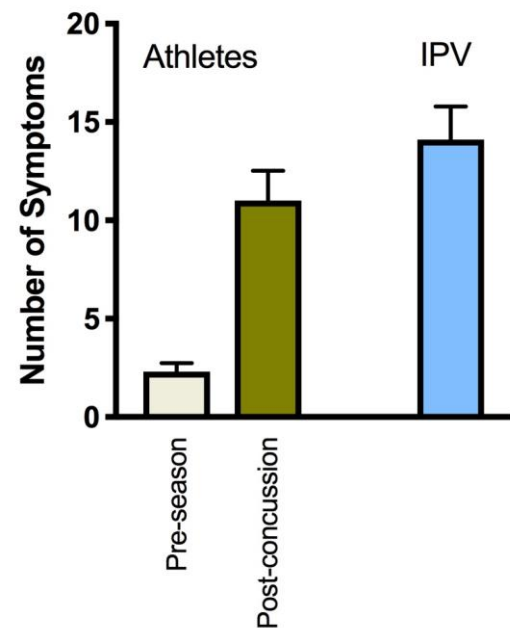


BI symptoms in chronic/remote IPV-BI

- The presence and extent of exposure to NFS associated with higher BISA scores.



BI symptoms in chronic/remote IPV-BI



- Number of BI symptoms similar to that observed in acute sport-related concussion and associated with BISA score.
- Significant associations between severity of multiple BI symptoms and BISA score.

SCAT5 Symptom	Correlation with BISA	p value
Fatigue or Low Energy	0.715	<0.001
Nervous or Anxious	0.649	0.002
Dizziness	0.608	0.004
Drowsiness	0.592	0.005
Difficulty Concentrating	0.584	0.005
Just Don't Feel Right	0.520	0.014
Difficulty Remembering	0.511	0.015
Sensitivity to Noise	0.499	0.017
Trouble Falling Asleep	0.490	0.020
Irritability	0.484	0.021
Blurred Vision	0.463	0.026
Sadness	0.451	0.030
Neck Pain	0.413	0.044
Balance Problems	0.359	0.072
Nausea or Vomiting	0.347	0.079
Sensitivity to Light	0.343	0.082
Feeling Slowed Down	0.283	0.128
Like You're in a Fog	0.236	0.172
Confusion	0.201	0.212
More Emotional	0.169	0.251
Pressure in the Head	0.144	0.284
Headache	-0.032	0.450



Cognitive-motor effects of chronic/remote IPV-BI

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Neurotrauma

ORIGINAL ARTICLE

CLINICAL STUDIES

Characterization of Cognitive-Motor Function in Women Who Have Experienced Intimate Partner Violence-Related Brain Injury

Naomi Maldonado-Rodriguez,^{1,*} Clara Val Crocker,^{1,*} Edward Taylor,² K. Elisabeth Jones,¹ Krystal Rothlander,¹ Jon Smirl,³ Colin Wallace,¹ and Paul van Donkelaar¹; on behalf of the Canadian Traumatic Brain Injury Research Consortium



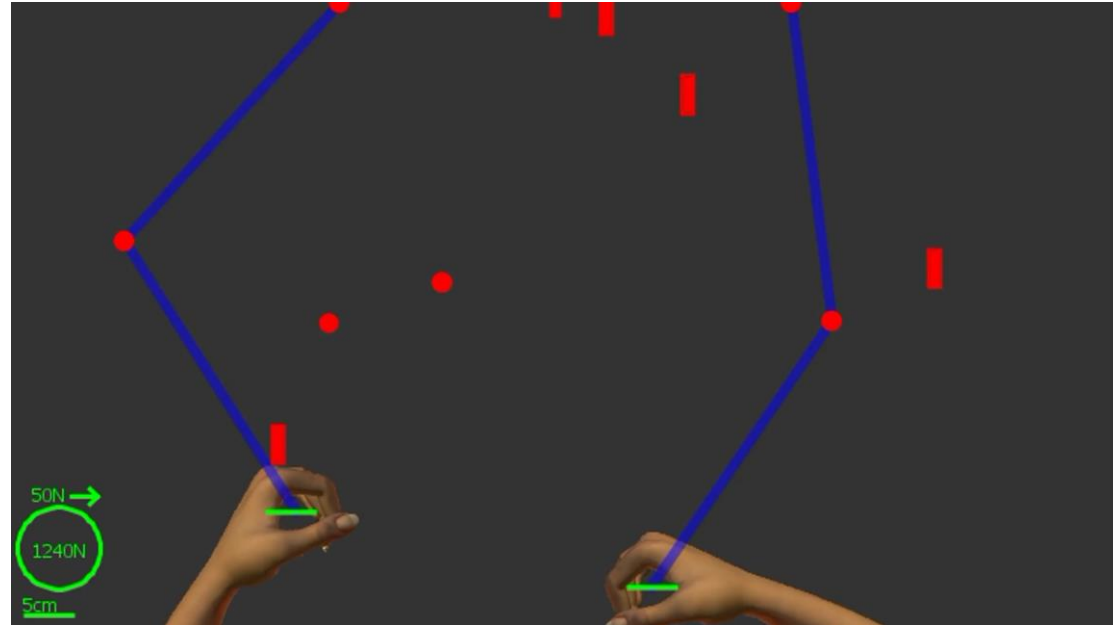
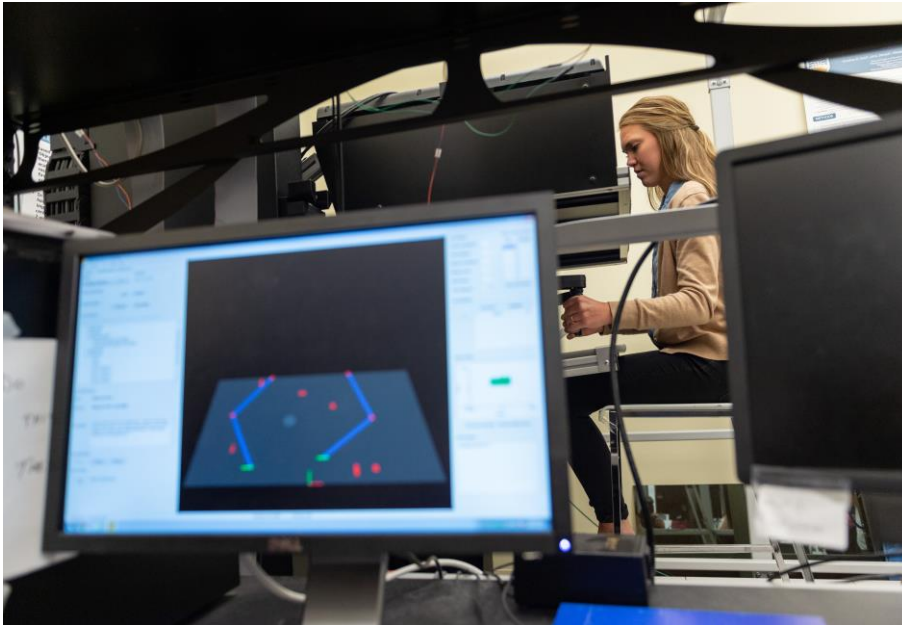
Naomi Maldonado-Rodriguez

- Objective: Assess cognitive-motor deficits in women who have experienced chronic/remote BIs from IPV.
- Participants: 40 women recruited who had experienced IPV.
- Measures: Use KINARM to assess complex cognitive-motor task performance relative to amount of exposure to IPV-BI.



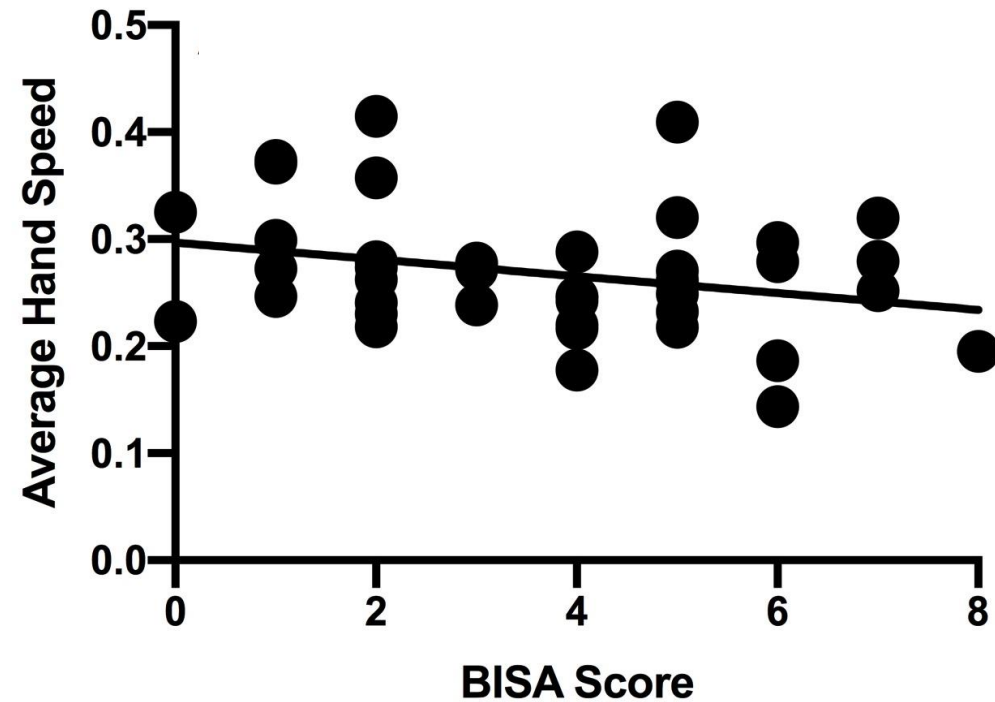
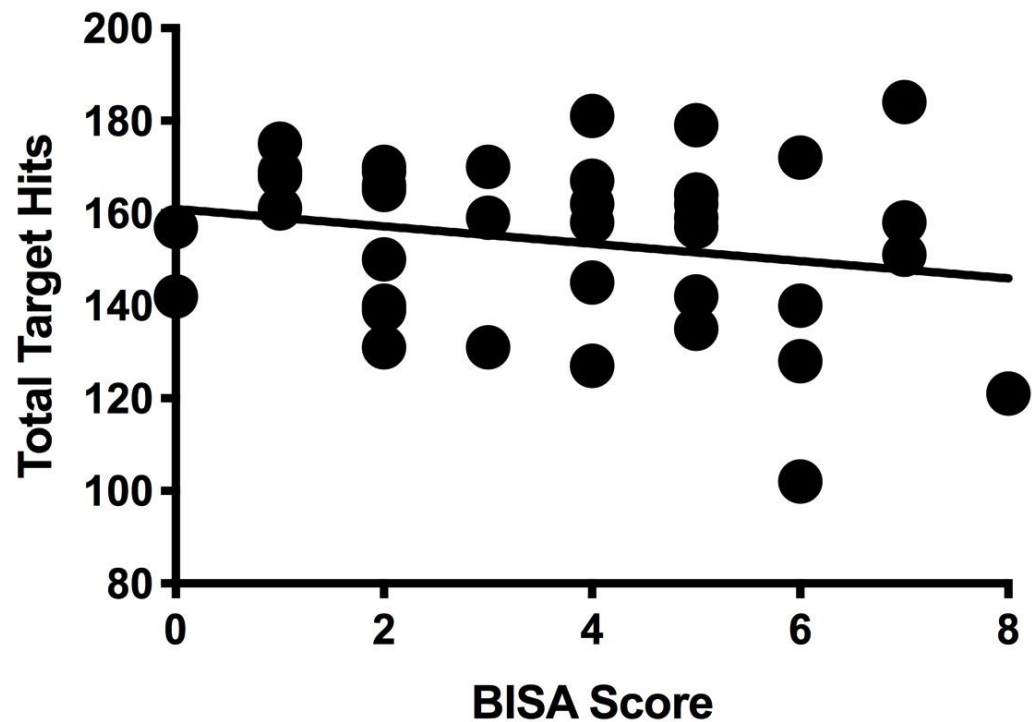
Cognitive-motor effects of chronic/remote IPV-BI

- Used the 'Object-Hit-and-Avoid' task: hit target objects descending from top of display screen while avoiding non-targets.
- Task runs for ~2 minutes and objects fall with increasing speed as trial progresses.
- Measure successful target hits and unsuccessful avoidance of non-targets.



Cognitive-motor effects of chronic/remote IPV-BI

- Several performance parameters were negatively associated with BISA score.
- These associations were modulated by psychopathological comorbid factors (PTSD, depression, anxiety)



Postural control effects of chronic/remote IPV-BI

- 'Quiet stance postural control in women who have a history of brain injury from intimate partner violence' (Accepted for publication, Neurotrauma Reports).



Bradi Lorenz, PhD(c)



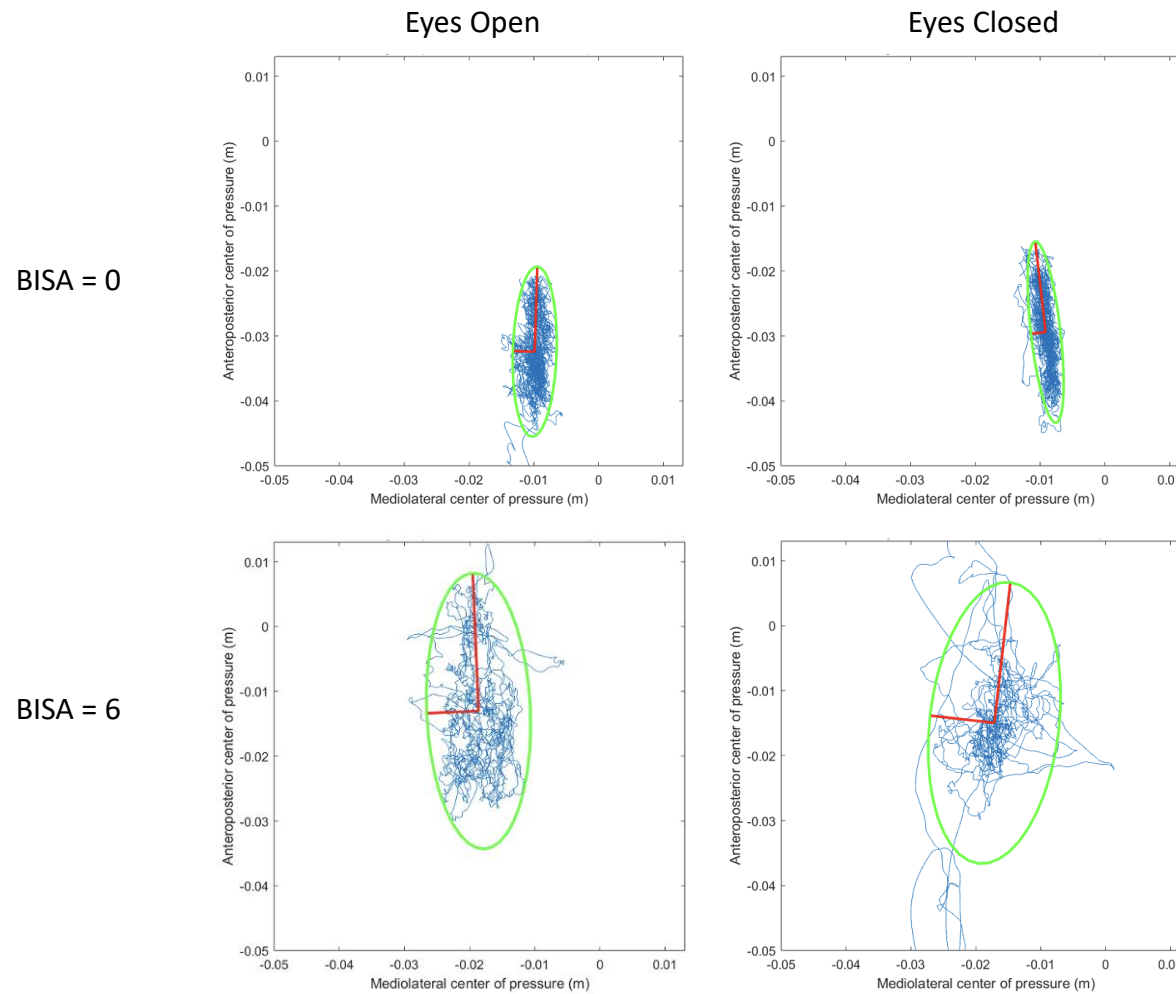
Dr. Shambhu Adhikari

- Objective: Assess potential alterations in postural control responses in women who have experienced chronic/remote BIs from IPV.
- Participants: 40 women recruited who had experienced IPV.
- Measures: Postural control assessed using a forceplate to measure ground reaction forces while participants quietly stood for 60s under two conditions: eyes open and eyes closed.



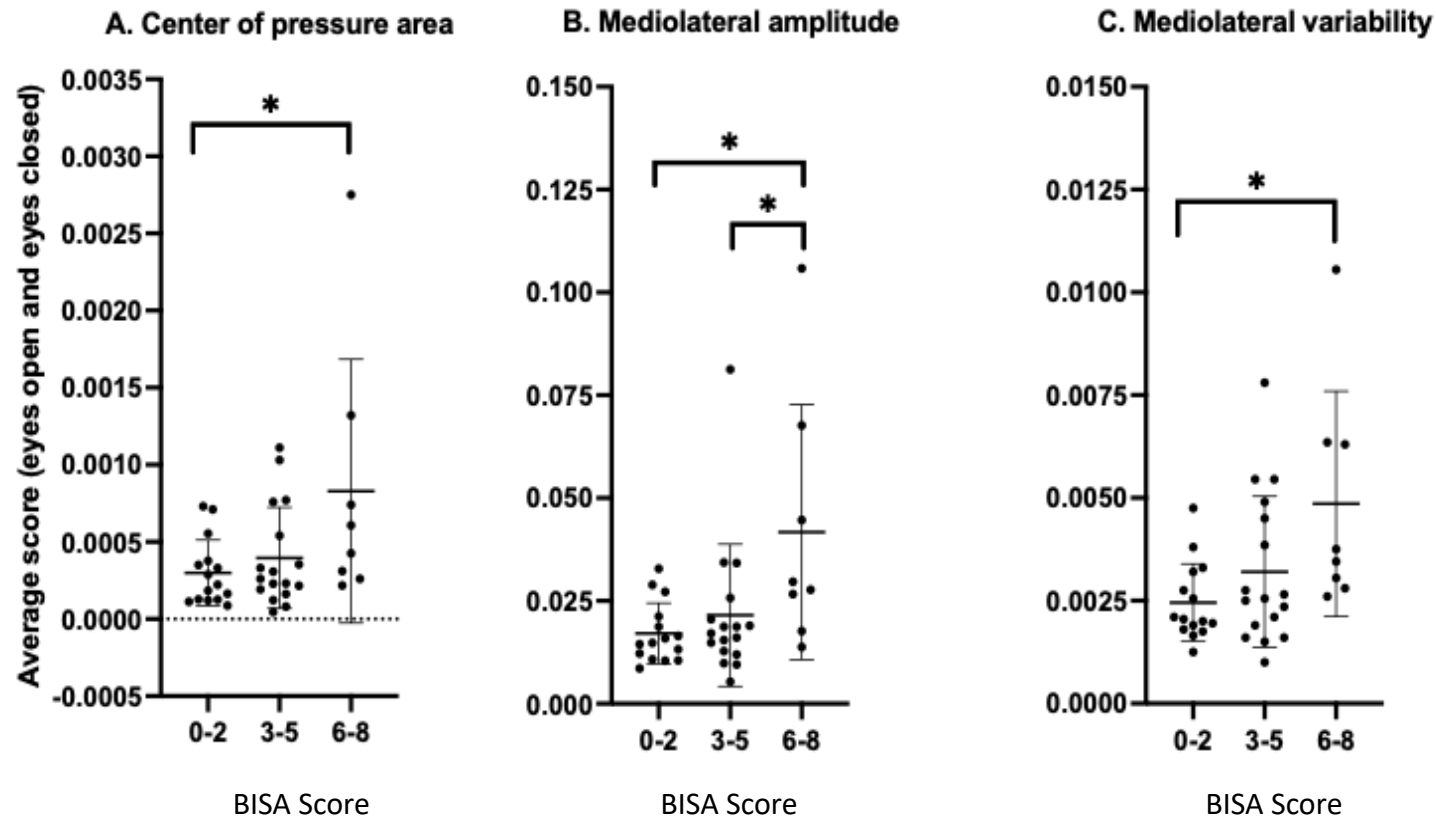
Postural control effects of chronic/remote IPV-BI

- Body sway affected by visual inputs and extent of exposure to IPV-BI.



Postural control effects of chronic/remote IPV-BI

- Several postural control measures – mainly related to mediolateral sway – were worsened with more exposure to IPV-BI and these differences were modulated by PTSD.



Cerebrovascular effects of chronic/remote IPV-BI

 **frontiers** | Frontiers in **Global Women's Health**

TYPE Original Research
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Neurovascular coupling is altered in women who have a history of brain injury from intimate partner violence: a preliminary study

Colin Wallace^{1,2}, Jonathan D. Smirl^{1,3,4,5,6,7,8}, Shambhu P. Adhikari¹, K. Elisabeth Jones¹, Matt Rieger^{1,9}, Krystal Rothlander¹ and Paul van Donkelaar^{1*}



Dr. Colin Wallace

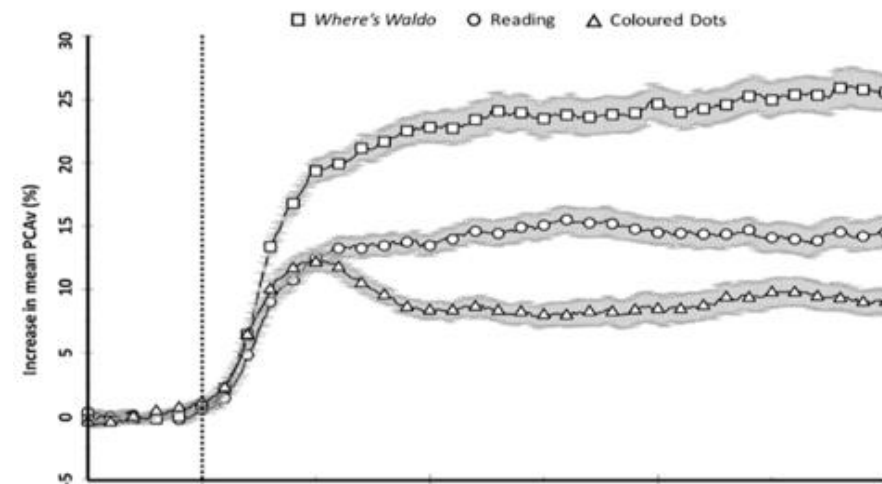
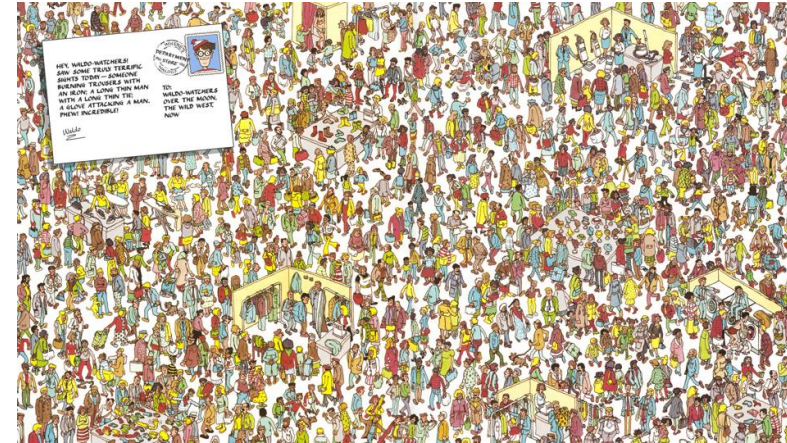


Dr. Jon Smirl



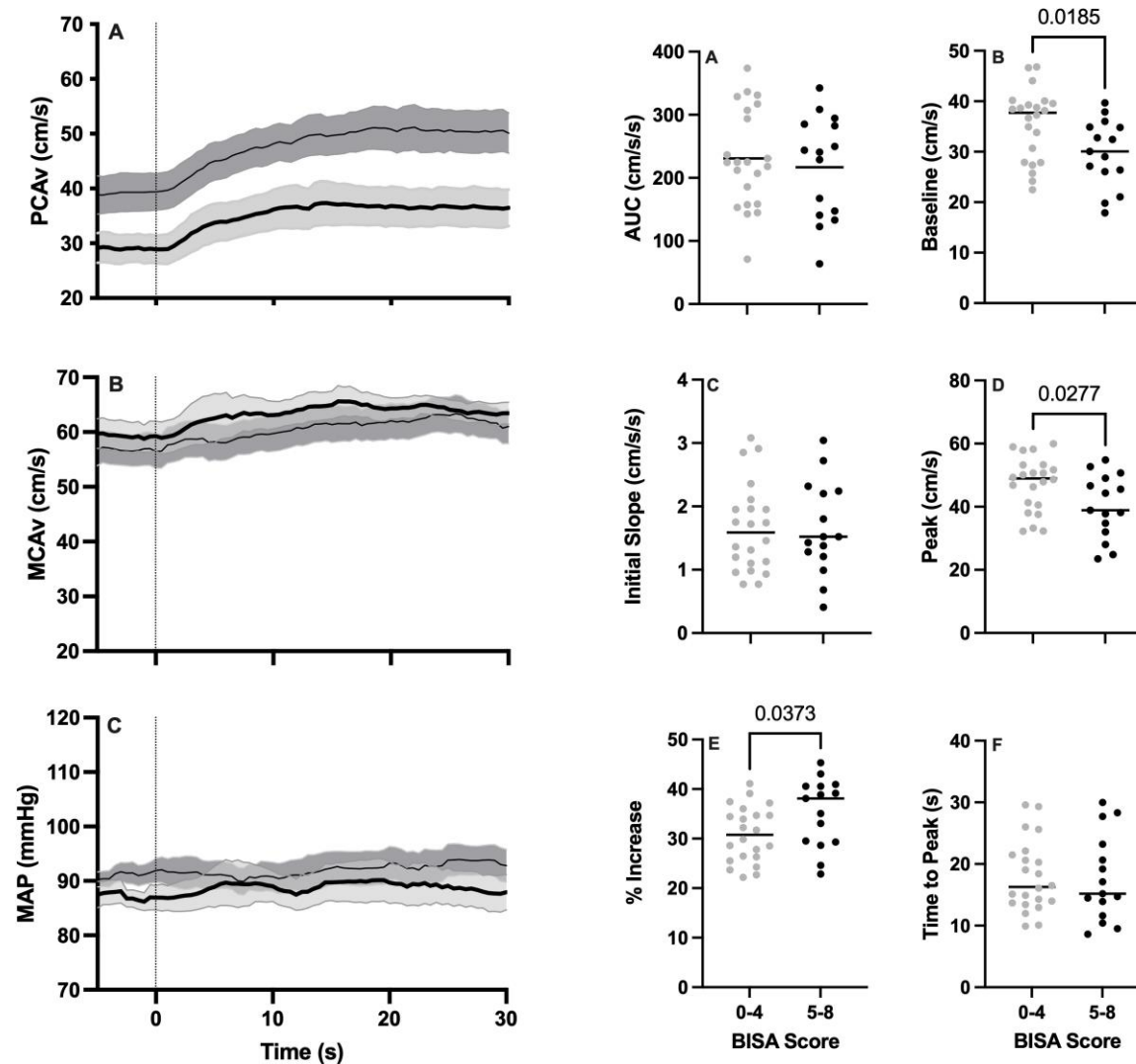
Cerebrovascular effects of chronic/remote IPV-BI

- Objective: Assess potential alterations in neurovascular coupling responses in women who have experienced chronic/remote BIs from IPV.
- Participants: 37 women recruited who had experienced IPV.
- Measures: Neurovascular coupling response assessed with transcranial Doppler ultrasound while participants performed the 'Where's Waldo?' task.



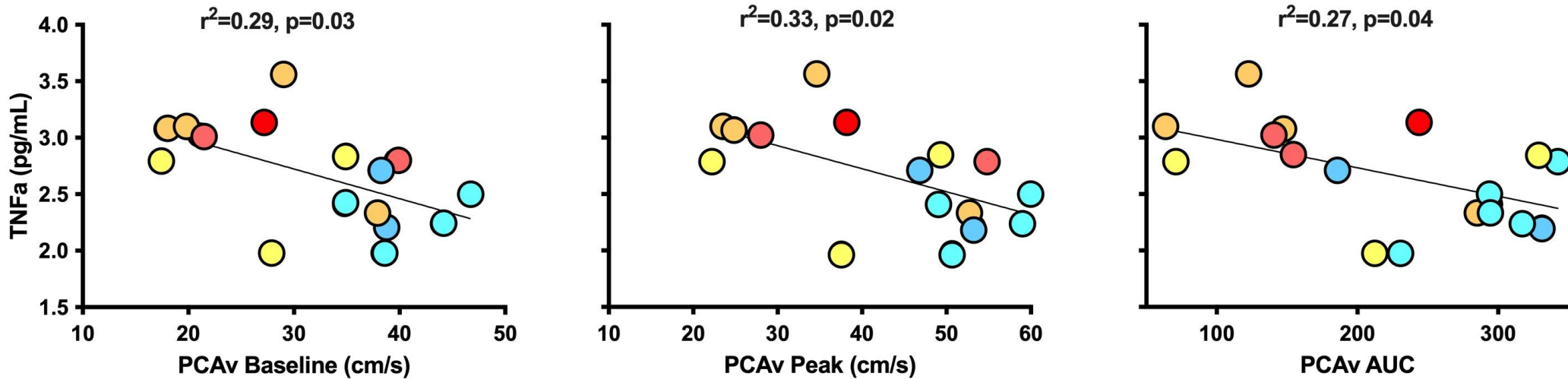
Cerebrovascular effects of chronic/remote IPV-BI

- Neurovascular coupling responses in the PCA were worsened with more exposure to IPV-BI and these differences were modulated by comorbid anxiety and depression.



Cerebrovascular effects of chronic/remote IPV-BI

- Several neurovascular coupling response metrics are associated with levels of the proinflammatory blood biomarker TNF alpha.



- This association appears to covary with BISA scores (cooler colours = low BISA scores; hotter colours = high BISA scores).
- Suggests that more exposure to IPV-BI is linked to both chronic inflammation and reduced cerebrovascular function.
- These factors also play a role in the development of longer-term neurodegenerative disorders like AD/DRD.

Chronic/remote findings

Summary:

- Amount of exposure to chronic/remote IPV-BI leads to:
 - Chronic BI symptoms similar in magnitude to that observed in acute sport-related concussion.
 - Deficits in cognitive-motor and balance control functions.
 - Subtle but significant disruptions to neurovascular coupling responses.
 - These effects are modulated by psychopathological comorbid factors.
 - Preliminary evidence for association between neurovascular coupling responses and the proinflammatory blood biomarker TNF alpha.
 - Potential impact on longer-term neurodegenerative processes.



Acknowledgments

We are grateful to the community organizations who helped with recruiting participants and to the participants themselves for their time and effort.

Funding

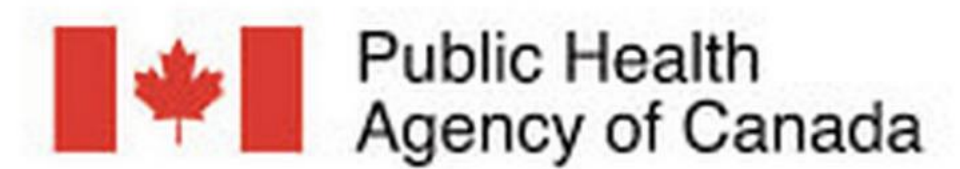


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New Funding



\$1,686,150 to develop resources and training opportunities to equip health care and social service providers across Canada with the knowledge and skills to safely support, and provide comprehensive, multi-sectoral care of clients with a brain injury as a result of gender-based violence.

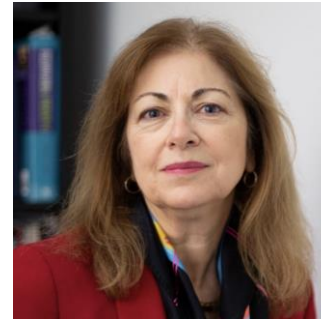
Team



Karen Mason
SOAR



Lin Haag
Wilfrid Laurier



Angela Colantonio
U Toronto



Mike Ellis
U Manitoba





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