The Cognitive Augmented Mobility Program (CAMP): Feasibility and Preliminary Efficacy

Katherine Dittmann¹, Kay-Ann Allen¹, Ashley Bergner², Joyce Chen^{1,3}, Elizabeth Inness⁴, Elizabeth Linkewich^{2,3,5}, Sandra Pacione³, Jennifer Shaffer², Ada Tang⁶, and Sara McEwen^{1,3}
¹Sunnybrook Research Institute, ²Sunnybrook Health Sciences Centre, ³University of Toronto, ⁴Toronto Rehab Institute, ⁵Toronto Stroke Networks, ⁶McMaster University

Purpose

The objective of this project was to examine the feasibility and preliminary outcomes of an evidence-based cognitive augmented mobility program (CAMP) for persons with stroke.

Relevance

- Current mobility treatment approaches for survivors of stroke are not usually associated with improved community participation, transfer of skills learned in therapy to new skills, nor skill maintenance^{1,2}
- A potential solution may be to combine the best practices for improving walking and mobility in persons with stroke with cognitive strategy training to improve problem solving, confidence, maintenance and transfer of skills to the community
- Best evidence suggests therapists should incorporate task-specific training, aerobics, and strengthening to improve mobility in gait in persons with stroke
- Related research suggests that incorporating cognitive problem-solving strategy training may lead to better skill maintenance and transfer^{3,4}

Methods

Two groups of 4 participants post stroke, post usual care, with mobility goals, able to walk at least 3 metres, and able to follow directions.

Analysis & Results

Analysis: Due to the small sample size, non-parametric statistics were used. Medians and ranges were calculated, and to estimate efficacy, differences between assessment points were analyzed using Wilcoxon test and non-parametric effect size *r* was calculated and were are coded as small (.1), medium (.3) or large (.5) effects.³ Additionally, for measures for which an estimate of a minimally important change was available, the proportion of participants who achieved that level was calculated and reported.

Table 1. Effect sizes & Proportion of Cases Greater than Minimal Detectable Change (MDC) or Minimal Clinically Important Difference (MCID)

Outcome	MCID/ MDC	Effect size <i>r</i>		% cases with change score > MDC or MCID	
		T1 – T2	T1 – T3	T1 - T2	T1 - T3
Functional Independence Measure	MCID: 22 ⁵	0.38 ^b	0.25 ^a	0%	0%
5 meter walk test (m/s)*	MCID: 0.16 m/s ⁶	0.39 ^b	0.26 ^a	50%	50%
6 minute walk test (m)	MCID: 34.4m ⁷	0.53 ^c	0.38 ^b	37.5%	37.5%
Stroke Impact Scale – Participation	NA	0.27 ^a	0.03	-	-
Stroke Impact Scale - Recovery	NA	0.25 ^a	0.25 ^a	-	-
Activity-Specific Balance Confidence Scale	NA	0.38 ^b	0.09	-	-
Berg Balance Scale	MDC: 4.7 ^{8,9}	0.59 ^c	0.63 ^c	62.5%	62.5%
Community Balance & Mobility Scale	MDC: 8 ¹⁰	0.63 ^c	0.63 ^{c†}	25%	50% [†]
Canadian Occupational Performance Measure (COPM) – Performance	MDC: 1.7 ¹¹	0.63 ^c	0.59 ^c	100%	75%
Canadian Occupational Performance Measure (COPM) - Satisfaction	MDC: 2.7 ¹¹	0.63 ^c	0.60 ^c	75%	87.5%

Note: ^a=small (.1), ^b=medium (.3) or ^c=large (.5) effect size; * n=4; [†]n=7

Discussion & Conclusion

- The positive results included a large effect on self-selected goal performance at one-month follow-up and transfer of learning to balance and mobility skills
- Findings suggest CAMP is feasible, and, that there is a potential complementary effect in combining *best evidence for mobility and fitness* for persons with stroke with *cognitive strategy training* that warrants further investigation
- These results may be a precursor to future discussions exploring methods to include active problem-solving & shared-decision making throughout care

References: 1. Pollock A, Baer G, Campbell P, et al. (2014). Physical rehabilitation approaches for the recovery of function and mobility following stroke. *Cochrane Database Syst Rev*. 2. Veerbeek JM, van Wegen E, van Peppen R, et al. (2014). What is the evidence for physical therapy poststroke? A systematic review and meta-analysis. *PLoS ONE*;9(2):e87987. 3. Meichenbaum, D. (1977). *Cognitive-behavior modification: An integrative approach*. New York: Plenum Press. 4. Polatajko HJ, Mandich A. (2004). *Enabling occupation in children: The cognitive orientation to daily occupational performance (CO-OP) approach*. First edition. Ottawa, Canada: CAOT Publications ACE. 5. Cohen J. *Statistical power analysis for the behavioral sciences*. 2nd ed. New Jersey: Lawrence Erlbaum Associates, Incorporated; 1988. 6. Beninato M, et al. *Arch Phys Med Rehabil*. 2006;87(1):32-39. 7. Tilson JK, et al. *Phys Ther*. 2010;90(2):196-208. 8. Tang A, et al. *J Neurol Phys Ther*. 2012;36(3):115-121. 9. Hiengkaew V, et al. *Arch Phys Med Rehabil*. 2012;93(7):1201-1208. 10. Mao HF, et al. *Stroke*. 2002;33(4):1022-1027. 11. Howe J, et al. <http://www.tbims.org/>. Updated 2011. Accessed 4/17, 2018. 10. Cup EH, et al. *Clin Rehabil*. 2003;17(4):402-409.