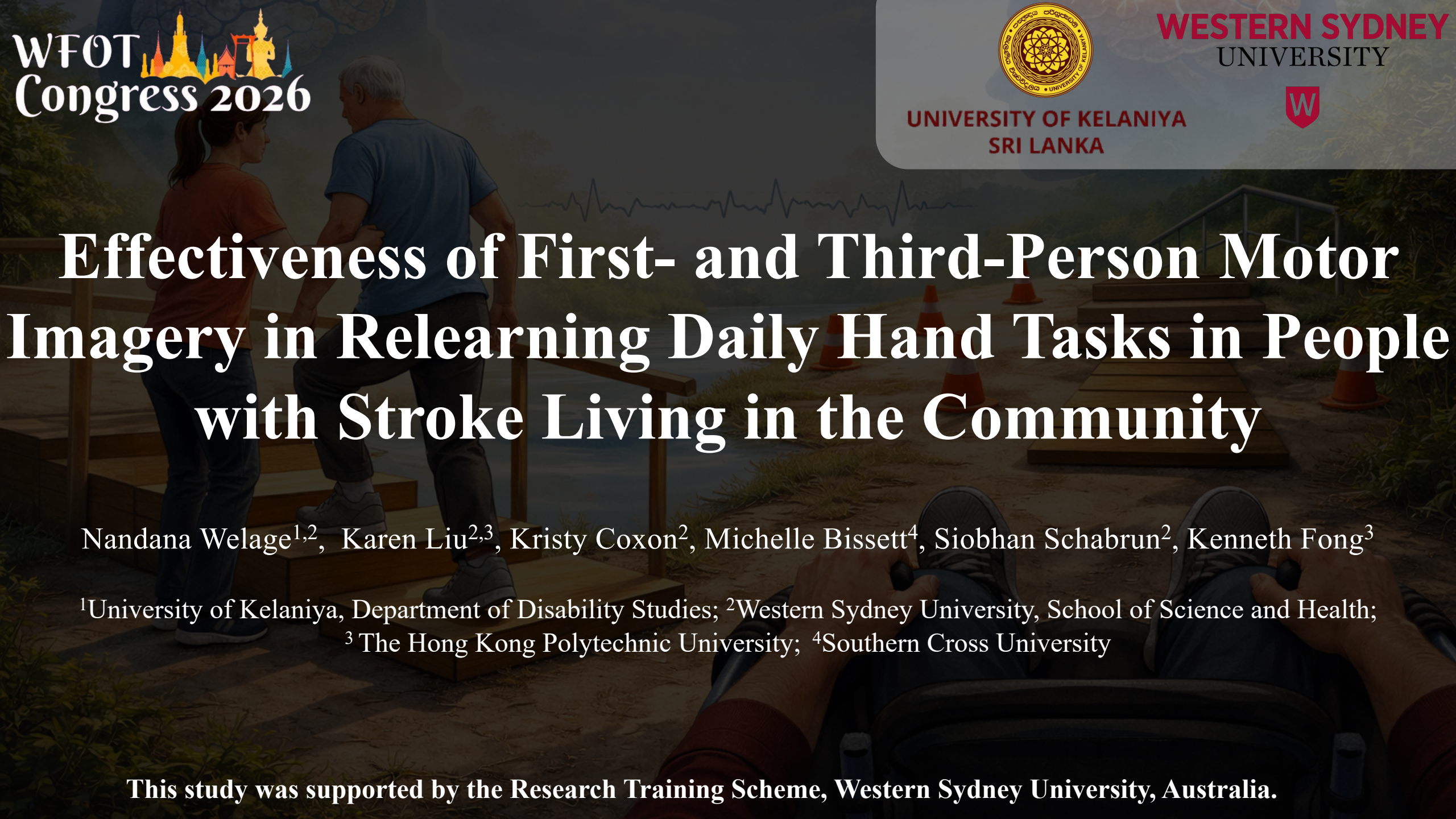

Effectiveness of First- and Third-Person Motor Imagery in Relearning Daily Hand Tasks in People with Stroke Living in the Community

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Imagining and practising
An innovative way to enhance daily
task performance in people with stroke
by Nandana Welage
Reference : https://static.pexels.com/photos/396947/pexels-photo-396947.jpeg

Objectives

- To investigate the effects of the first- and third-person MI intervention programs for people with chronic stroke on:
- Hand and upper limb functions
- Self-perceived performance
- Participation (through a quality of life measure)

Methods

- Multi center double blind three-armed RCT
- 60 participants (20 for each program)
  - Mean age 58.24; stroke onset: 17.88 months
- Setting: four occupational therapy units in Colombo, Sri Lanka

Inclusion criteria		Exclusion criteria	
1	Diagnosis of hemiplegia due to stroke (infarct or haemorrhage)	1	Visual and perceptual problems – hemianopia and unilateral neglect
2	Age – 18 and 80 years	2	Excessive pain ≥ 4 (10-point visual analogue scale)
3	Stroke onset > 3 months	3	Spasticity ≥ (Modified Ashworth Scale)
4	Mini Mental State Examination score of ≥ 24 points (no difficulty with cognitive functions)	4	Pre-existing musculoskeletal, neurological (except stroke) or other conditions affect upper limb function
5	Advanced Hand Activities 1, 2, and 3 of Motor Assessment scale (Carr et al.,1985)		

Intervention programs

	The first-person MI program	The third-person MI program	Active Control
Knowing the steps of the tasks	Participant performs the task (step-by-step)	Participant watches a video of the task performed by someone else	Restorative treatment Functional training
Engaging in the imagery	Participant reads the task steps and imagines himself/herself performing the task	Participant reads the task steps and imagines the presenter, sitting in front of him/her, performing the task that was just shown in the video	
Giving feedback after engaging in imagery	Therapist gets feedback from the participant on any difficulties in practicing imagery.		Therapist gets feedback from the participant
Engaging in actual physical practice of the task	Participant gets engaged in the actual practice of the task		

Intervention programs ctd

Examples of daily tasks:

- Buttoning a shirt
- Eating a biscuit
- Taking money from a purse
- Using a TV remote
- Unpacking groceries

45 mins, 2 days/week for 6 weeks

Welage et al. Pilot and Feasibility Studies (2023) 9:33
https://doi.org/10.1186/s40814-023-01263-9

Pilot and Feasibility Studies

RESEARCH Open Access

Development and feasibility of first- and third-person motor imagery for people with stroke living in the community

Nandana Welage[1,2], Michelle Bissett[3], Kristy Coxon[1,4], Kenneth N. K. Fong[5] and Karen P. Y. Liu[1,4*]

Outcome measures

Domains	Instruments
Hand and upper limb function	Jebsen Taylor Hand Function Test (Jebsen, Taylor, Trieschmann, Trotter, & Howard, 1969)
	Nine Hole Peg Test (Mathiowetz, Weber, Kashman, & Volland, 1985)
	In-hand Manipulation Assessment (Klymenko et al., 2018) - Skill performance
Perceived performance	Motor Activity Log (Uswatte, Taub, Morris, Light, & Thompson, 2006) - Amount of Use - Quality of Movement
	Canadian Occupational Performance Measure (Law et al., 1998) - Performance - Satisfaction
Participation	Stroke Specific Quality of Life (Williams et al., 1999)

Results - Baseline data of outcome measures

Variable	FPMI group (n = 20) (Mean ± SD)	TPMI group (n = 20) (Mean ± SD)	Active Control group (n = 20) (Mean ± SD)	*F*(2, 57)	*P*#
JTHFT	2.39±0.20	2.37±0.21	2.27±0.16	2.88	.111
MAL AOU	1.87±0.22	1.83±0.23	1.54±0.55	4.57	.014*
MAL QOM	1.45±0.59	1.49±0.27	1.55±0.50	0.24	.788
NHPT	2.06±0.30	1.94±0.34	1.72±0.24	6.79	.051
IHMA OSP	1.88±0.20	1.83±0.22	1.75±0.23	1.92	.155
COPM P	0.86±0.12	0.78±0.10	0.74±0.12	2.39	.100
COPM S	0.83±0.11	0.77±0.10	0.76±0.11	2.12	.129
SSQOL	2.17±0.12	2.16±0.09	2.12±0.14	0.80	.452

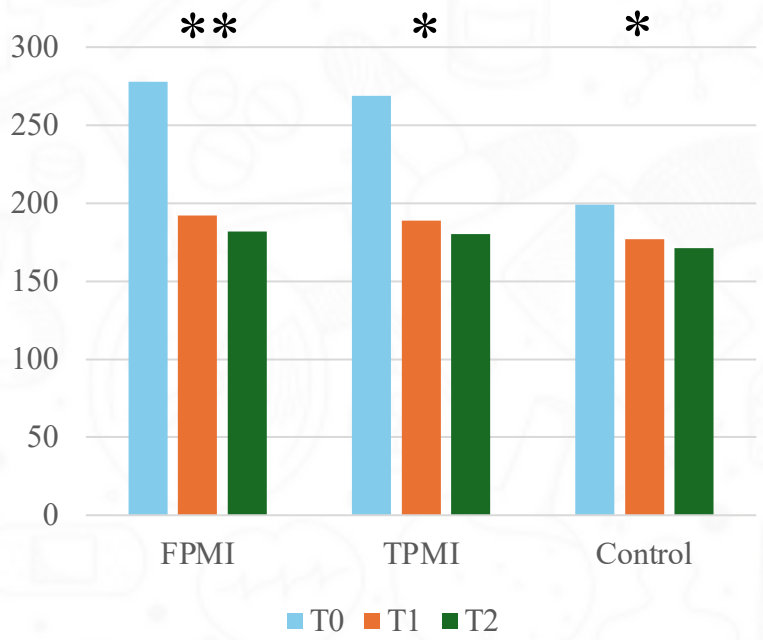
p value * p < .05

FPMI = First-Person Motor Imagery, TPMI = Third-Person Motor Imagery.
COPM = Canadian Occupational Performance Measure; COPM P = Canadian Occupational Performance Measure – Performance COPM S = Canadian Occupational Performance Measure – Satisfaction; IHMA = In-hand Manipulation Assessment; IHMA OSP = In-Hand Manipulation Assessment – Overall Skill Performance; JTHFT = Jebsen Taylor Hand Function Test; MAL = Motor Activity Log; MAL AOU = Motor Activity Log – Amount of Use; MAL QOM = Motor Activity Log – Quality of Movement; NHPT = Nine Hole Peg Test; SSQOL = Stroke Specific Quality of Life.

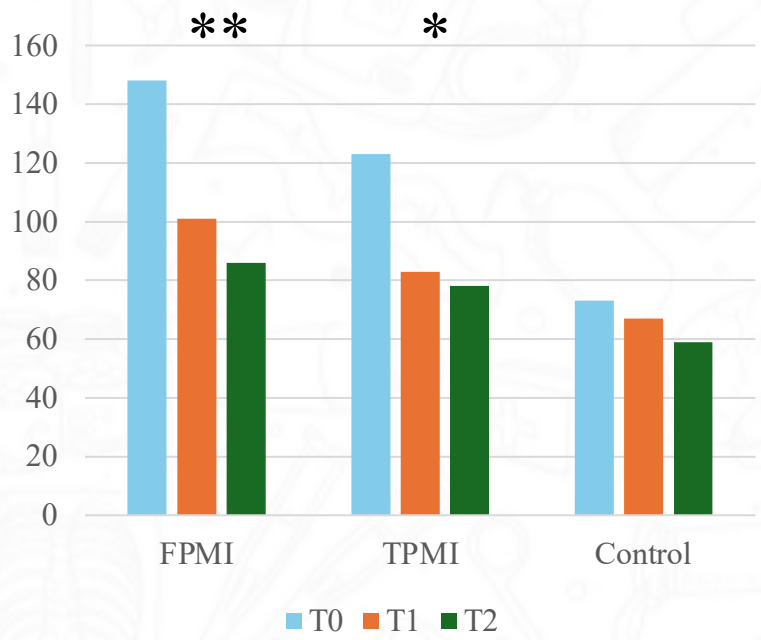
Results – Hand and UL function

Within Group Differences at T0, T1 and T2 Time Points

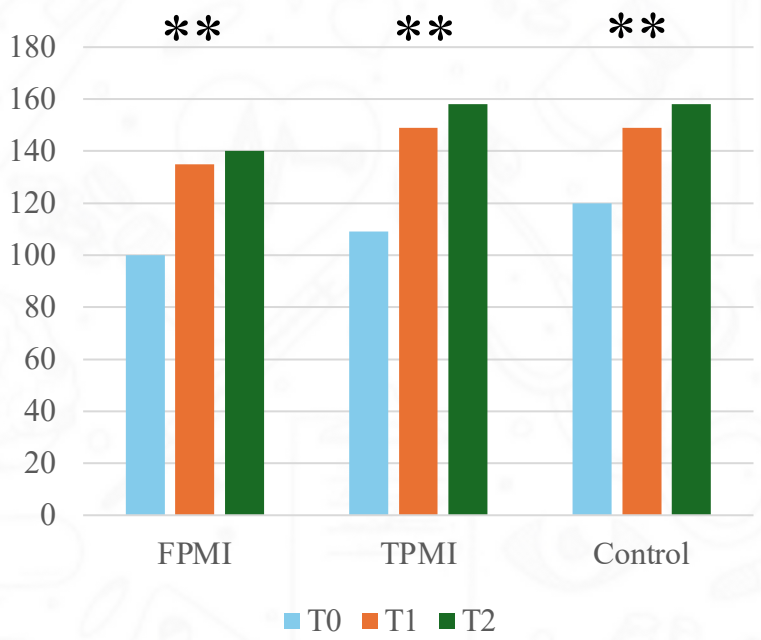
Jebsen Taylor Hand Function Test



Nine-Hole Peg Test



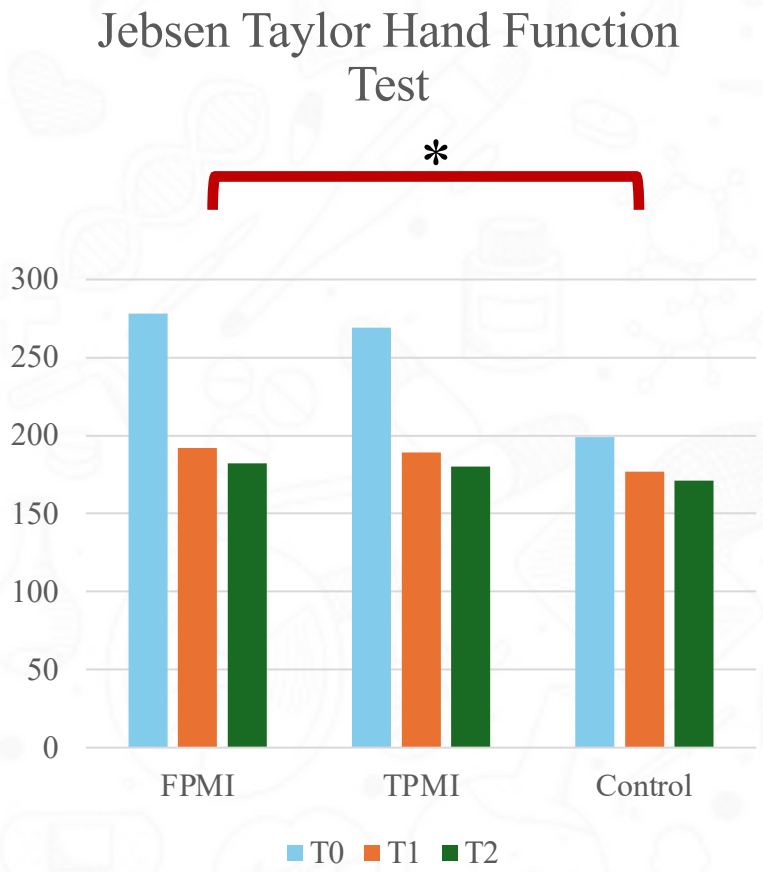
In-Hand Manipulation Assessment

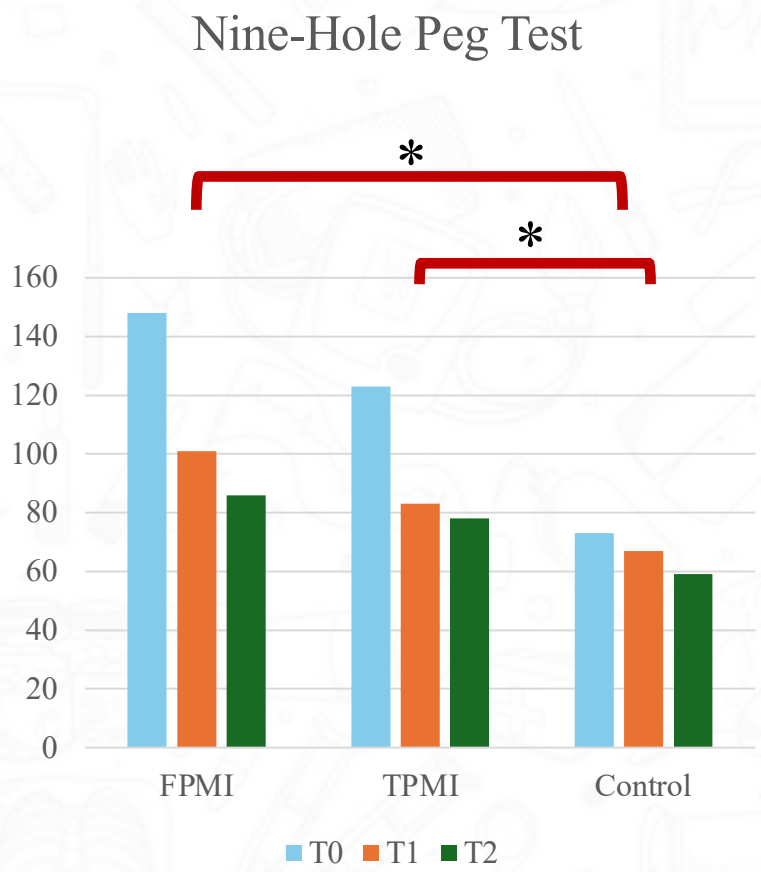


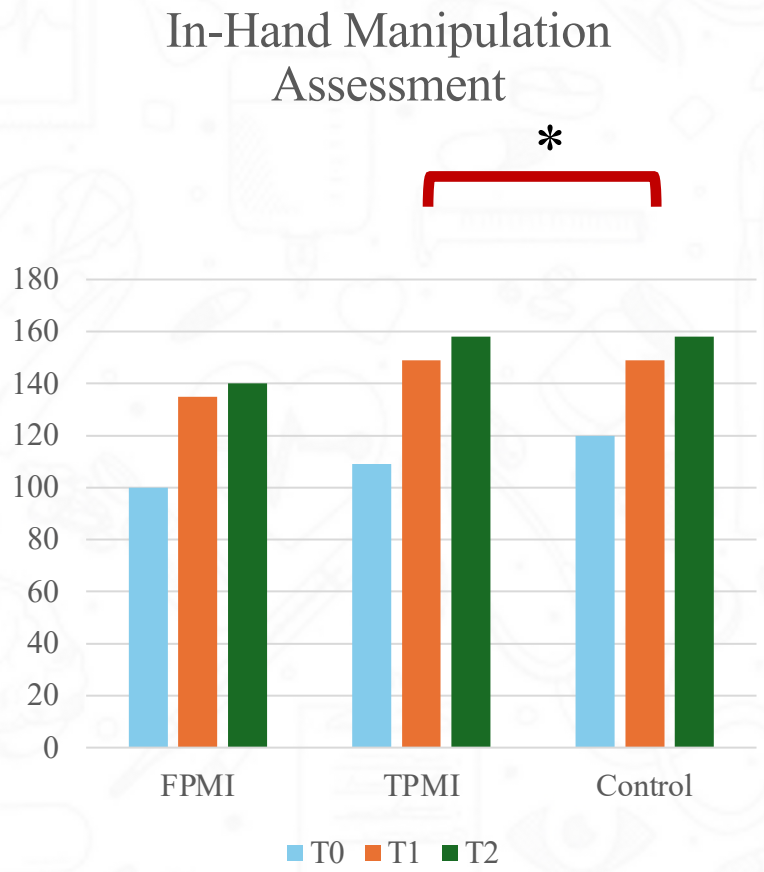
* $p < .05$; ** $p < .001$

Results – Hand and UL function

Between Group Differences at T0, T1 and T2 Time Points



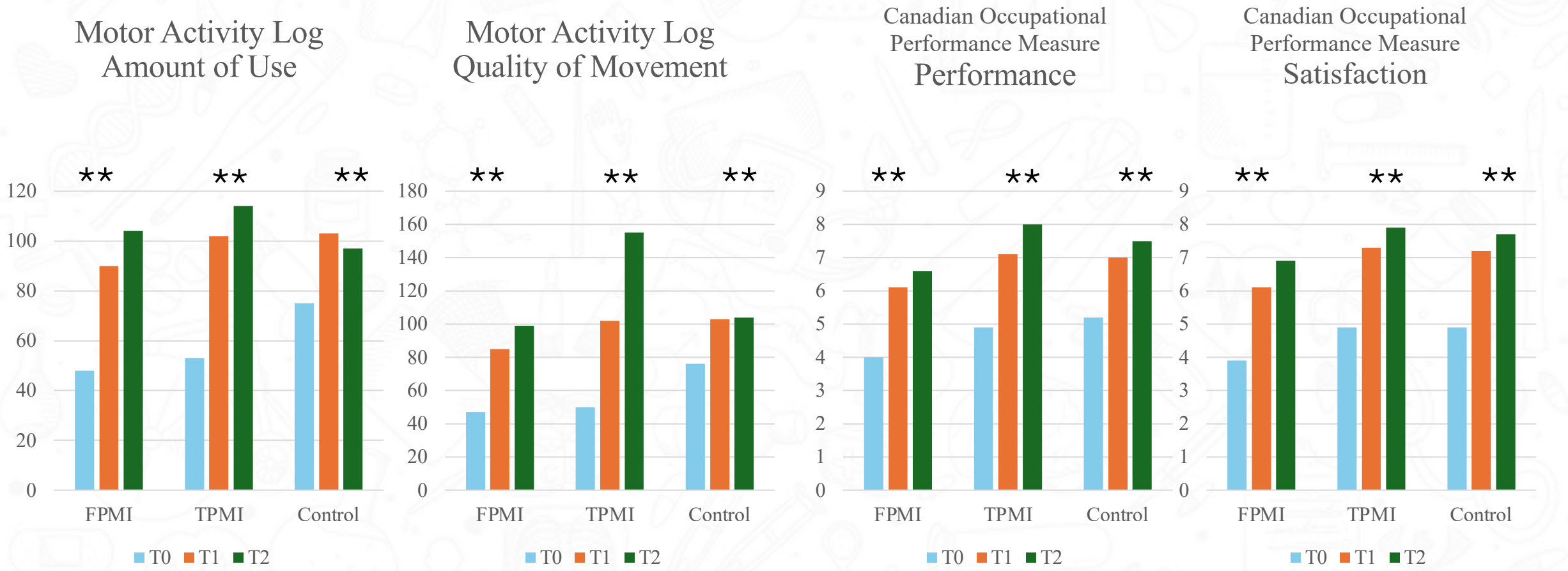




* $p < .05$; Post Intervention

Results – Self-perceived performance

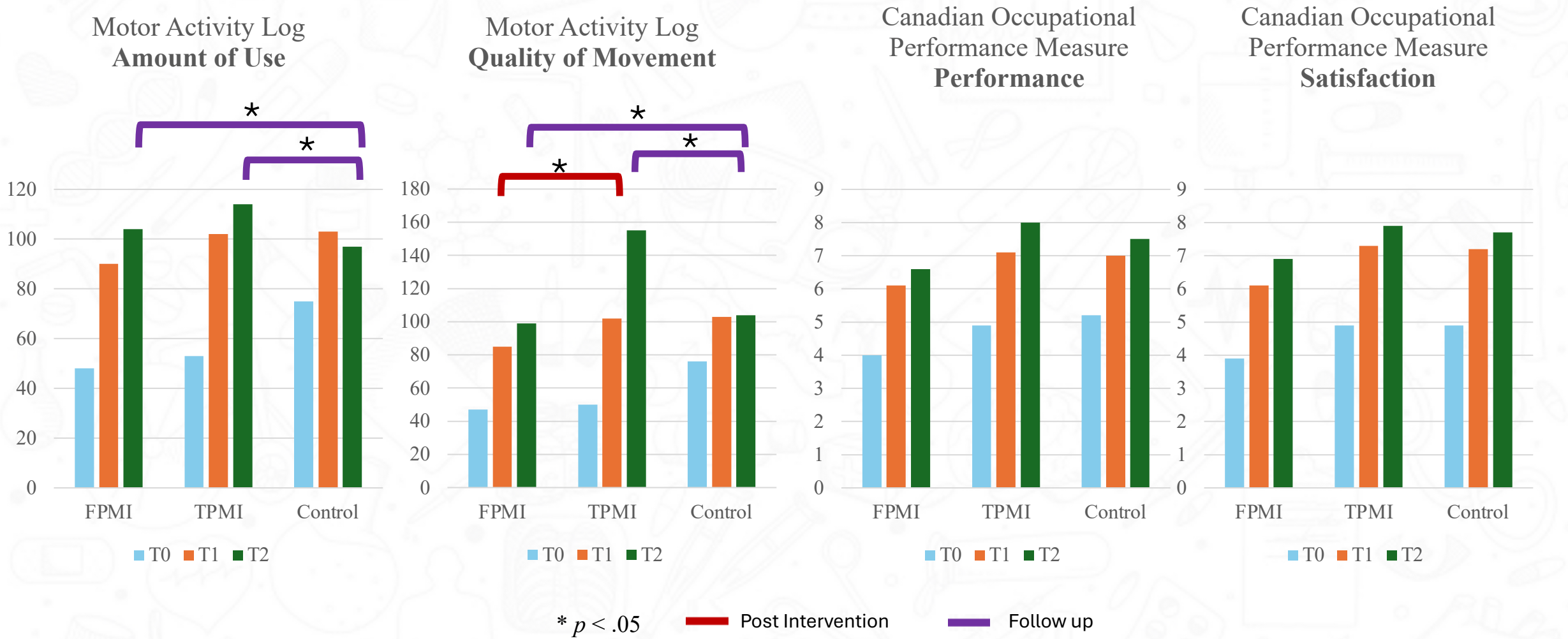
Within Group Differences at T0, T1 and T2 Time Points



** $p < .001$

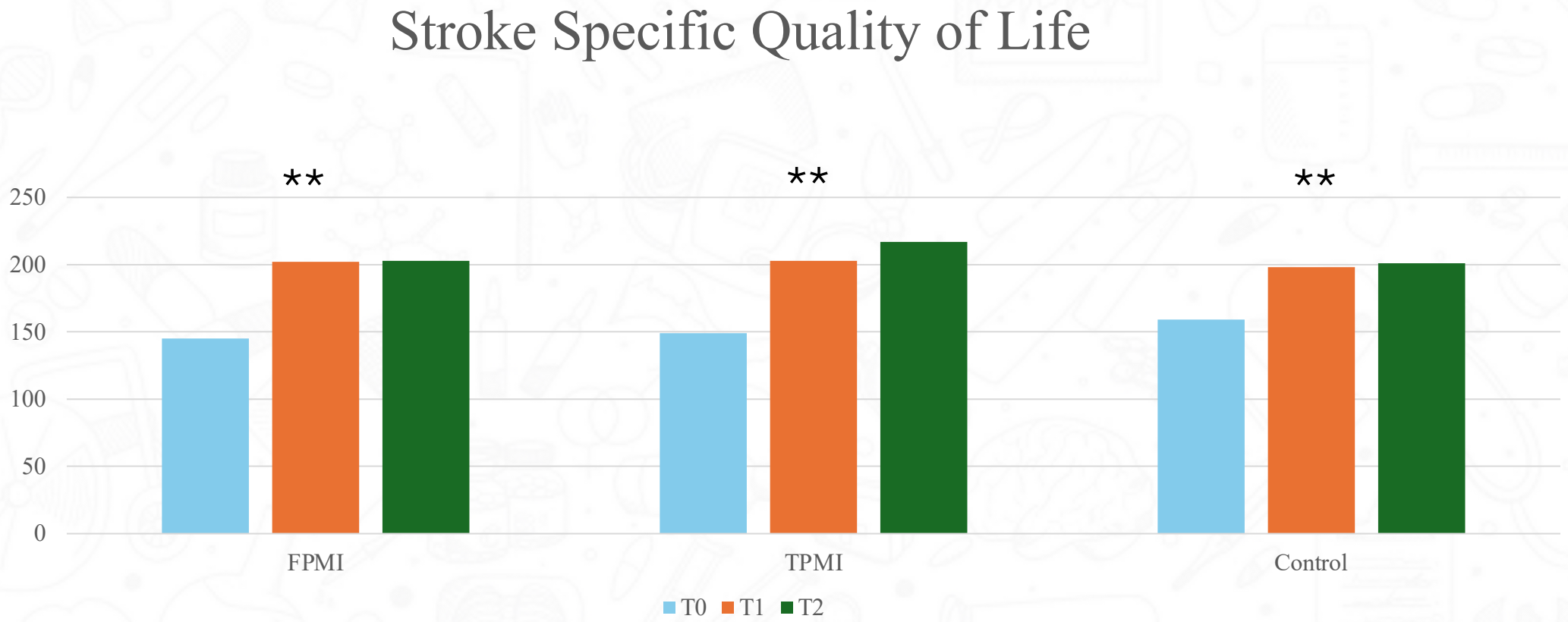
Results – Self-perceived performance

Between Group Differences at T0, T1 and T2 Time Points



Results – Participation

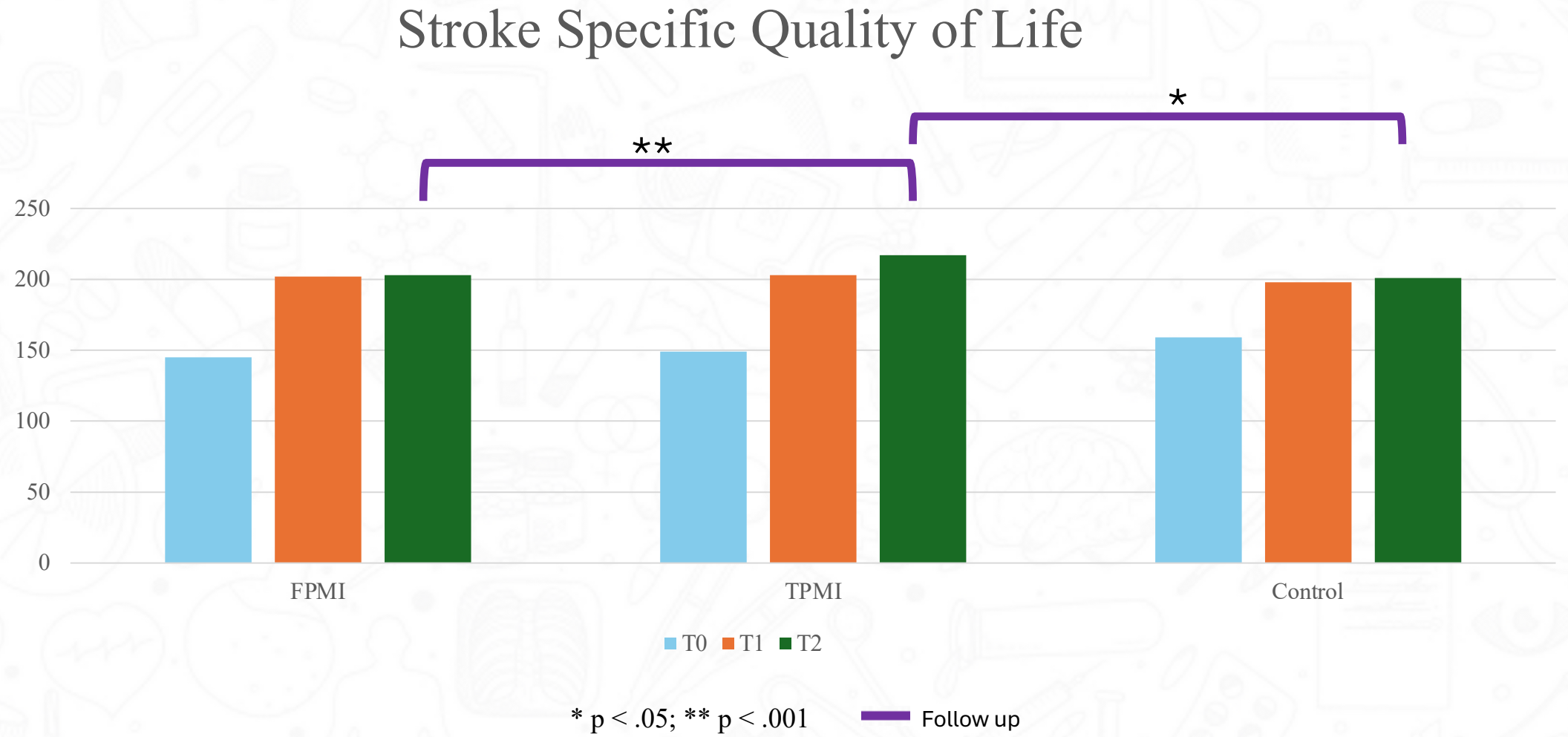
Within Group Differences at T0, T1 and T2 Time Points



** $p < .001$

Results – Participation

Between Group Differences at T0, T1 and T2 Time Points



Discussion

- Both first-person and third-person MI are suitable for stroke rehabilitation
- First-person MI: preferred for upper limb and hand function
- Third-person MI: better for self-perceived performance and quality of life
- Both approaches allow unlimited, repetitive practice - supports neuroplasticity and motor recovery

Reference

Carr, J. H., & Shepherd, R. B. (1982). *A Motor relearning programme for stroke*. London: William Heinemann.

Jebsen, R. H., Taylor, N., Trieschmann, R. B., Trotter, M. J., & Howard, L. A. (1969). An objective and standardized test of hand function. *Archives Of Physical Medicine And Rehabilitation, 50*(6), 311-319.

Klymenko, G., Liu, K. P., Bissett, M., Fong, K. N., Welage, N., & Wong, R. S. (2018). Development and initial validity of the in-hand manipulation assessment. *Australian Occupational Therapy Journal*.

Law, M. C., Baptiste, S., Carswell, A., McColl, M. A., Polatajko, H., & Pollock, N. (1998). *Canadian occupational performance measure*: Canadian Association of Occupational Therapists Ottawa ON.

Mathiowetz, V., Weber, K., Kashman, N., & Volland, G. (1985). Adult norms for the nine hole peg test of finger dexterity. *OTJR: Occupation, Participation and Health, 5*(1), 24-38

Uswatte, G., Taub, E., Morris, D., Vignolo, M., & McCulloch, K. (2005). Reliability and validity of the upper-extremity Motor Activity Log-14 for measuring real-world arm use. *Stroke, 36*(11), 2493-2496.

Williams, L. S., Weinberger, M., Harris, L. E., Clark, D. O., & Biller, J. (1999). Development of a stroke-specific quality of life scale. *Stroke, 30*(7), 1362-1369.

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Thank You

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