Dynamic Cognitive Stimulation for Stroke Patients

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Does dynamic cognitive stimulation targeting attention and executive functions aid stroke rehabilitation?

Background & Aims

Information-processing, mental speed and flexibility are commonly affected after stroke.

The **Dynamic Information Processing Programme (DIPP)** was developed based on previous research assumptions:

- Dynamic cognitive remediation improves cognition following stroke[1]
- Dynamic information-processing training may effectively transfer effects to other mental domains sharing the same underlying mechanism[2]

The study explored:

1) Baseline performance on the DIPP[3]
2) Improvements through repetition
3) Relationship between MoCA score and DIPP performance

Methods

Material was validly matched with standardised cognitive tests[4] targeting underlying stroke-affected functions of **attention**, **mental fluency**, **categorisation** and **shifting**.

The DIPP included **7 tasks** related to:

Orientation	Concept Shifting	Fist-Edge-Palm
Motor Tapping	Trail Making	Searching

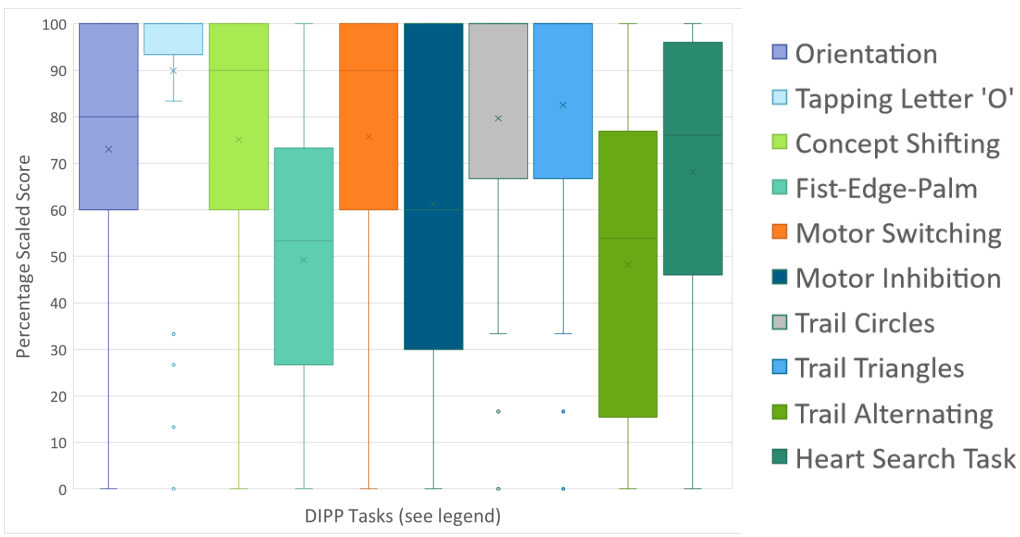
First DIPP administered in first week of admission, subsequent DIPPs at weekly intervals until hospital discharge

63 participants completed baseline DIPP (mean age = 80; male = 57%); 39 participants completed follow-up DIPPS

Results

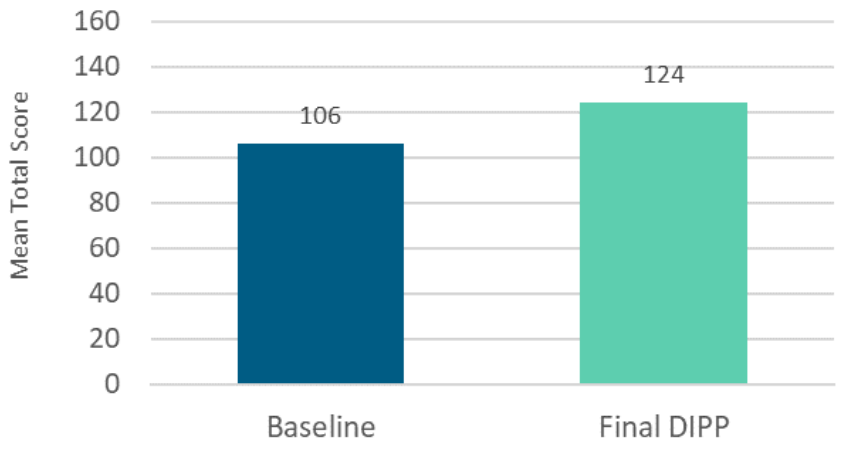
Baseline & Final Performance

Figure 1. *Baseline scores for each DIPP task (N = 63)*



Tapping and Trail making tasks depict poorer performance with greater executive functional load

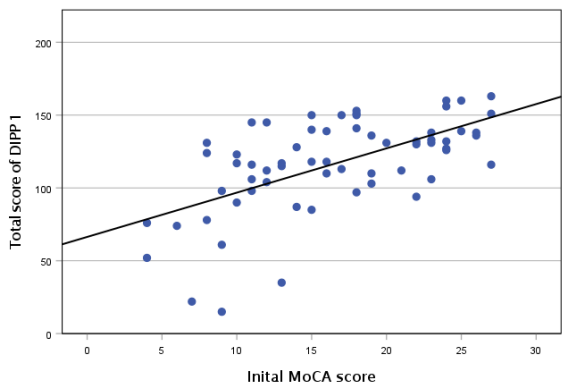
Figure 2. *Mean DIPP score for baseline and final performance (N = 39)*



Paired samples t-test found a significant increase between baseline performance (M = 106, SD = 35) to final DIPP performance (M = 124 SD = 31), *t* (38) = -3.79, p < .01

Relationship with MoCA

Figure 3. *Scatterplot of initial MoCA score and DIPP 1*



DIPP baseline performance **significantly correlated** with level of performance on the MoCA, *r* (61) = .60, p <.001

Initial MoCA performance correlated with final DIPP performance to a **weaker degree**, *r* (37) = .443, p = .005

Conclusions & Future Research

- Acute stroke patients perform well on tasks that require minimal executive function, evidenced by baseline ceiling effects; executive function deficits were indicated on more complex tasks
- Significant **improvements in mental flexibility & shifting functions** over repeated DIPP tasks
- Level of DIPP baseline performance correlated with the level of performance on the generic MOCA
- Future outlook to focus on patterns of improvement and stroke type; natural recovery effects vs training effects (control)

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References:

[1] Rogers, J. M., Foord, R., Stolwyk, R. J., Wong, D., & Wilson, P. H. (2018). General and domain-specific effectiveness of cognitive remediation after stroke: systematic literature review and meta-analysis. *Neuropsychology review*, *28*(3), 285-309.

[2] Lustig, C., Shah, P., Seidler, R., & Reuter-Lorenz, P. A. (2009). Aging, training, and the brain: a review and future directions. *Neuropsychology review*, *19*(4), 504-522.

[3] *King, G., Gurr, B., & Seiss, E. (2022). Dynamic Cognitive Stimulation for Stroke Patients - A Pilot.*

[4] Demeyere, N., Riddoch, M. J., Slavkova, E. D., Bickerton, W. L., & Humphreys, G. W. (2015). The Oxford Cognitive Screen (OCS): validation of a stroke-specific short cognitive screening tool. *Psychological assessment, 27(3), 883.*