Assessing the Impact of Technology-Assisted Cognitive Rehabilitation: A Pre- and Post-Treatment Study with a Novel Telehealth Platform

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Introduction

Cognitive rehabilitation is a key intervention for patients with neurological and cognitive impairments. In recent years, digital innovations have enabled telerehabilitation programs, providing structured remote treatments with real-time clinical supervision. These approaches have demonstrated promising outcomes across various domains, including motor and cognitive rehabilitation.

Objectives

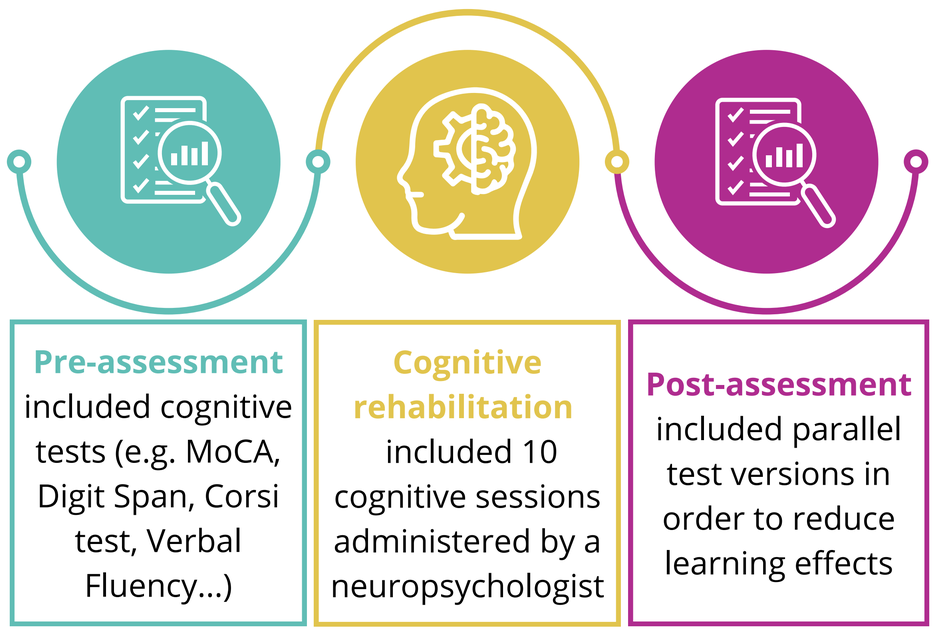
The aim of this preliminary study is to evaluate the effectiveness of a structured cognitive rehabilitation protocol, administered by a licensed neuropsychologist using a novel digital platform *(Homing® System by Tecnobody S.r.l)*. In addition, the study investigates which cognitive domains show the greatest responsiveness to treatment.

Methods and Procedure

Sample:
10 patients (M = 45.65 yrs; 6 males, 4 females) with neurological conditions (e.g., Parkinson's disease, TBI, stroke)

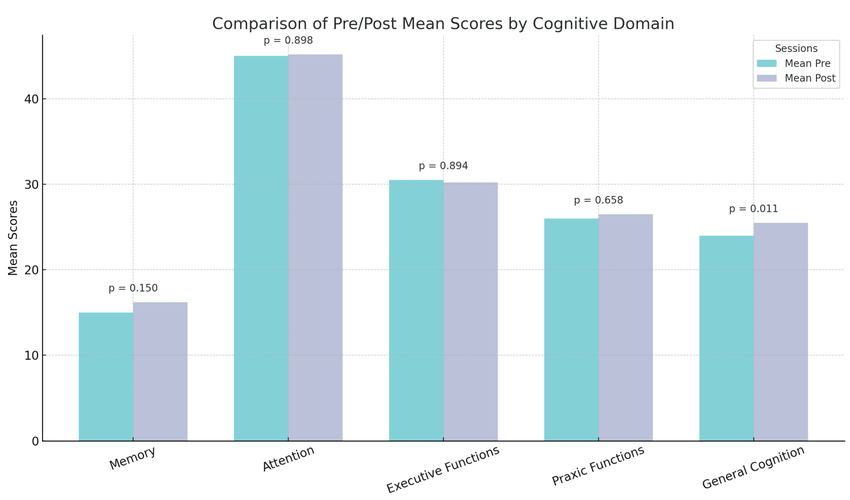
Materials:
Homing Control Station: therapist interface for configuring, monitoring, and conducting live sessions
Homing TT Unit: portable device installed at patient's home, enabling interactive telerehabilitation with real-time feedback and asynchronous exercises





Results

Test	Mean Pre	Mean Post	F-Statistic	P-Value
MoCA	25.164	26.962	2.917	0.126
Digit Span Forward	**5.374**	**6.75**	**8.277**	**0.021**
Digit Span Backward	**3.854**	**5.221**	**7.867**	**0.023**
Corsi Test Forward	5.438	5.728	0.848	0.389
Corsi Test Backward	4.788	4.808	0.002	0.966
Mauri Test Forgetting	27.52	22.46	0.414	0.537
Mauri Test Immediate Recall	34.46	42.0	1.144	0.315
Mauri Test Delayed Recall	7.0	8.02	0.193	0.671
Mauri Test Recognition	27.7	28.4	1.086	0.679
Phonemic Verbal Fluency	38.76	43.02	1.898	0.205
Semantic Verbal Fluency	21.0	22.45	0.138	0.718
Tower of London Time	26.4	28.0	0.347	0.571
Tower of London Accuracy	29.6	30.6	0.163	0.696
Attentive Matrices	48.5	48.67	0.001	0.972
Trail Making Test A (TMT A)	51.5	43.8	0.234	0.642
Trail Making Test B (TMT B)	72.6	88.4	0.49	0.503
Trail Making Test B-A	23.2	52.8	3.592	0.094
Trail Making Test B/A	**1.274**	**1.906**	**7.874**	**0.022**
Clock Drawing Free (CDT FD)	14.2	14.0	0.117	0.74
Clock Drawing Pre-Drawn (CDT PD)	12.35	11.95	1.066	0.331
Clock Drawing Examiner (CDT ED)	31.3	31.2	0.035	0.851
Clock Drawing Total (CDT TOT)	58.14	57.1	0.677	0.434



Discussion

Preliminary findings suggest that the protocol leads to significant improvements in **working memory, cognitive flexibility** and **executive control** as well as **general cognition.**
These results underscore the potential efficacy of structured telerehabilitation for cognitive enhancement.
Further studies with **larger samples** and more refined assessments are needed to confirm efficacy and explore condition-specific outcomes. Furthermore, future research could investigate implementation of this protocol directly at patients' homes.

Non-exhaustive references

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