Clinical utility of the Processing Speed Test in patients with multiple sclerosis

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Introduction

Cognitive dysfunction in patients with multiple sclerosis (MS) is known to be associated with physical disability and impaired quality of life (QOL) but is often overlooked in clinical practice. Several tests have been designed to assess cognitive function in MS patients. However, performing these tests is challenging in routine clinical settings because of time constraints and unavailability of trained technicians. The Processing Speed Test (PST) is a tablet computer application designed to evaluate cognitive function in patients with MS. It is a modified form of the Symbol Digit Modality Test (SDMT), and its close performance correlation with the original SDMT has been validated. Furthermore, the PST can be performed by patients themselves in a relatively short period and is therefore a reliable and convenient method for assessing cognitive function in MS patients in clinical settings.

This study sought to evaluate the usefulness of PST by assessing the relationships between PST performance and physiological disability, brain volume, depression, fatigue, and QOL in patients with MS.

Methods

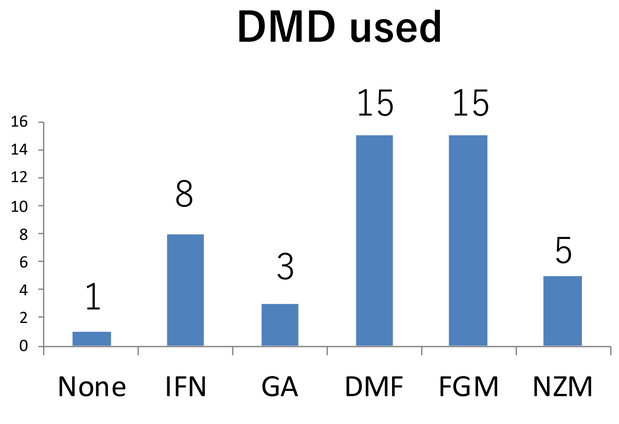
PST was performed in 47 patients with MS using the iPad®-based CogEVAL® application. Normalized brain volume was estimated from three-dimensional T1 brain magnetic resonance imaging data using SIENAX software. Depression, fatigue, and QOL were assessed in a subgroup of 36 patients using Japanese versions of the Beck Depression Inventory (BDI)-II, Fatigue Severity Scale (FSS), and functional assessment of MS (FAMS), respectively.

The Japanese version of CogEVAL®

Results

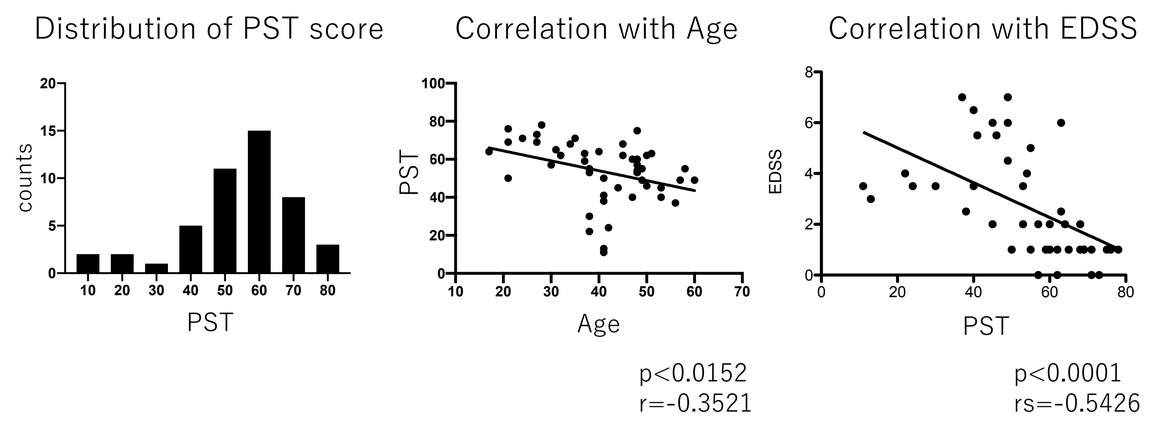
1. Subject demographics (n=47)

Age (mean ± SD)	40.7 ± 10.7
Sex (female : male)	32 : 15
Education (years, median, range)	14 (10-18)
Disease duration (mean ± SD)	10.1 ± 7.1
EDSS (median, range)	2.0 (0 – 7)

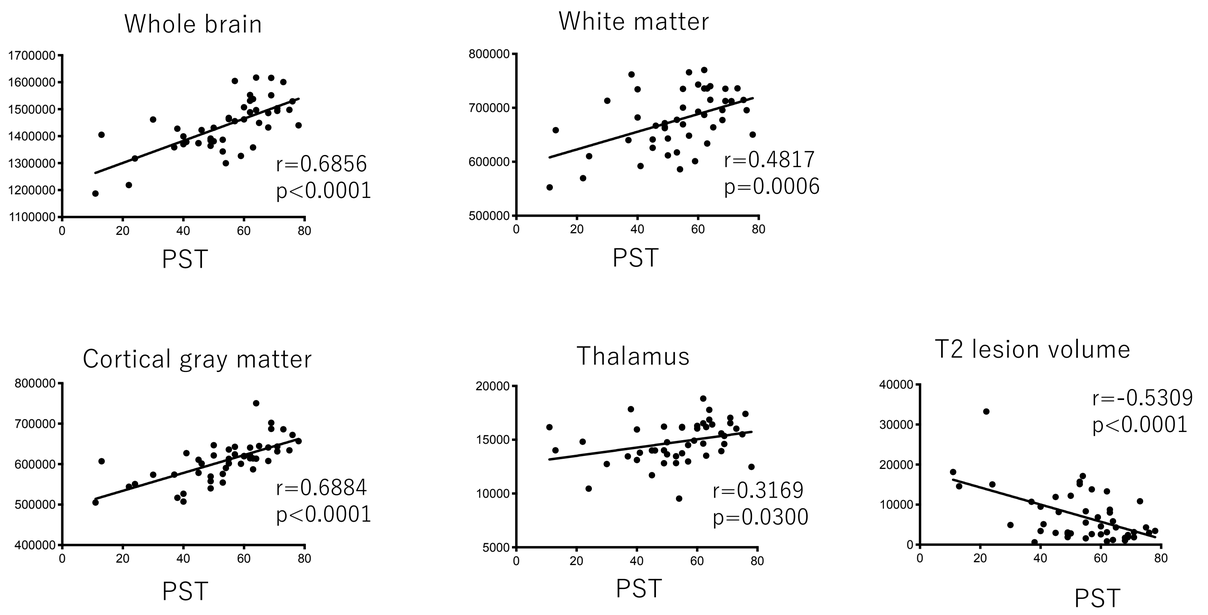


2. Basic statistics and correlation with age and EDSS

- The mean (±SD) of PST score was 53.6±15.8 (±SD).
- The score negatively correlated with age and EDSS.



3. Correlation with normalized brain volume and T2 lesion load

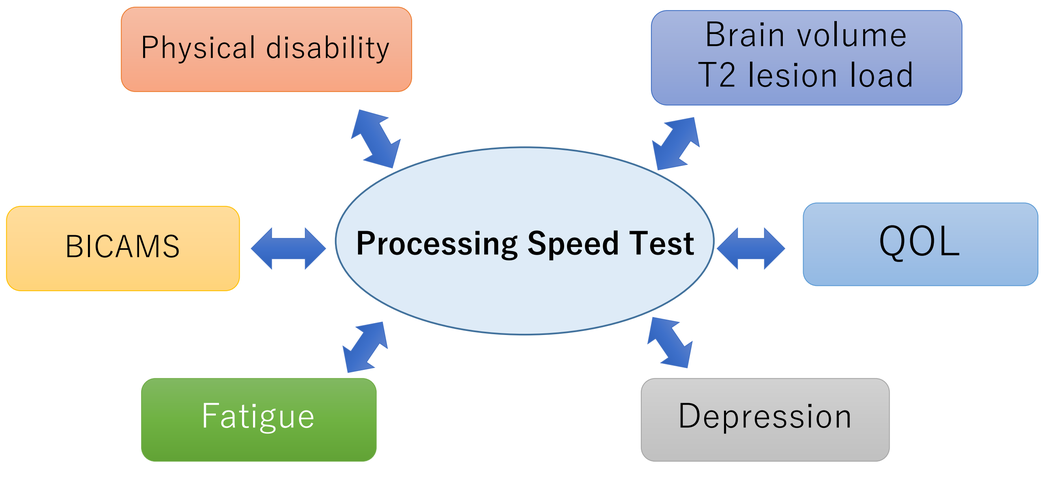


4. Correlation with fatigue, depression, and QOL

	Spearman's rank correlation coefficient	p value
Fatigue Severity Scale	-0.4227	0.0102
Beck Depression Inventory II	-0.5134	0.0014
FAMS total score	0.6469	<0.0001
Mobility	0.7118	<0.0001
Symptoms	0.5183	**<0.0001**
Emotional well-being	0.6355	**<0.0001**
General contentment	0.4346	0.0081
Thinking and fatigue	0.5475	0.0005
Family/social well-being	0.2779	0.1008
Additional concerns	0.5578	0.0004

Discussion and Conclusion

PST score was correlated with physical disability, brain volume, depression, fatigue, and QOL in MS patients. PST is thus a reliable and convenient tool for evaluating cognitive function in MS patients.



The authors have no relevant conflicts of interest to declare.