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P1200

Clinical and vocational relevance of SDMT changes: 1-Year Follow-Up Results (Data) on the SDMT-PRO study population

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SUMMARY

- SDMT-PRO aims to longitudinally evaluate the relevance of SDMT and BVMT-R changes on everyday life issues of patients with relapsing (RRMS) and secondary progressive MS (SPMS) after 12 and 24 months using the PatientConceptApp.
- Interims data after 12 months showed stable cognitive performance in the cohort under study. No major additional impairments of QoL including fatigue and psychological problems were observed. Thus, stabilization in SDMT went hand in hand with stabilization in QoL. Longer observational periods will allow to assess the impact of cognitive performance changes on daily life of MS patients

INTRODUCTION

- Since cognitive changes can occur early in multiple sclerosis (MS) and are considered an important prognostic factor indicating a negative disease course, regular assessment of cognitive status is recommended[1, 2, 3].
- One of the most prominent cognitive functions declining early in MS is slowing of information processing, which can be objectively assessed by the Symbol Digit Modalities Test (SDMT). SDMT is a validated, sensitive, and widely used test for early detection of changes in cognitive processing speed and working memory. A clinically significant change has been defined as a 4-points difference in SDMT raw score or a difference of 10% compared to the previous assessment[3]. More recently, an 8-points change has been suggested reliable when compared to healthy controls[4].
- Whether and to what extend a clinically significant change in SDMT can provide information about a relevant change in patients‘ quality of life or psychosocial functioning has not been sufficiently investigated yet.

OBJECTIVE

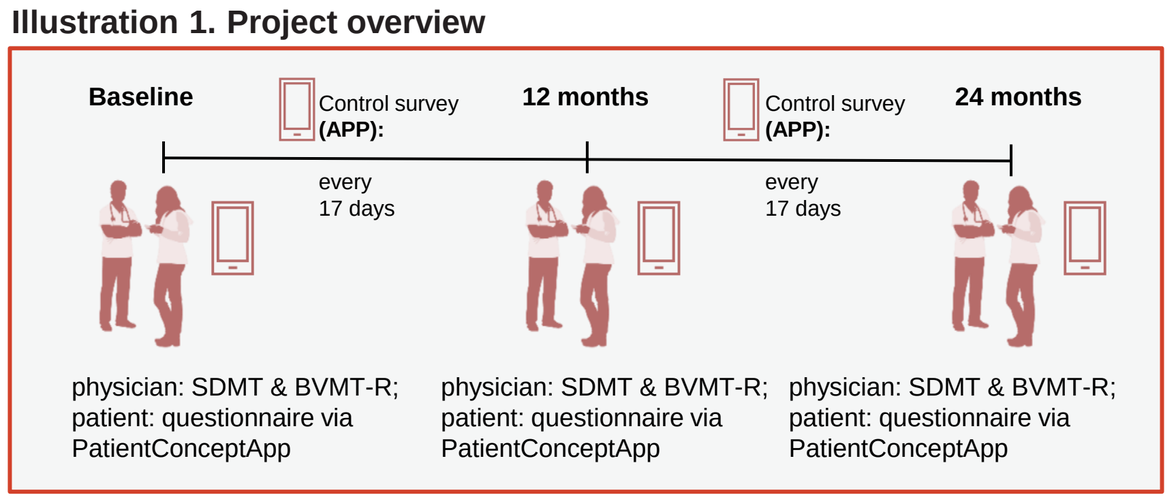
- SDMT-PRO aims to assess the relevance of SDMT changes to everyday problems of patients with advanced **RRMS** and **SPMS**.

METHODS

STUDY DESIGN

- Patients are assessed at baseline and at 12- and 24-months follow-up using SDMT and BVMT-R, as well as by digital patient-reported outcomes (PROs: HADS, MSIS-29, EQ5D) using the PatientConceptApp at the respective time points. In addition, each domain of the PROs is continuously recorded throughout the study using a visual analog scale (VAS) via the app (**Illustration 1**).
- 159 MS patients were enrolled in the study with FPFV in May 2021.
- Data from a 12-month interim analysis including 145 patients is shown here.

Illustration 1. Project overview



RESULTS

- Most commonly, the patients included at data extraction (N=145) were diagnosed with advanced RRMS* and the mean time since initial diagnosis was 16 years. Patient characteristics were similar at baseline and month 12 (**Table 1**).

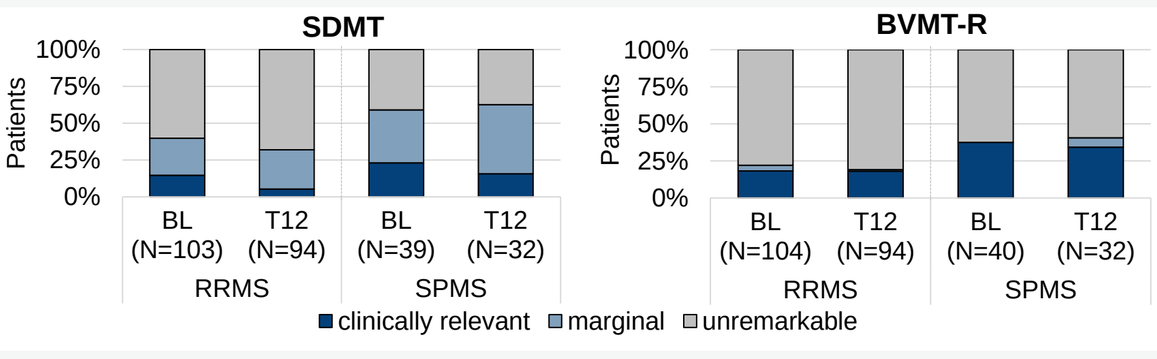
Table 1. Patient characteristics

Patient data		Baseline (N = 145)	Month 12 (N = 135)
Age[a] [years] (average ± SD)		47.0 ± 10.8	47.8 ± 10.9
Sex[a] [%]	female	79.0	78.9
	male	21.0	21.1
Education[a] [%]	No grade/secondary school (*kein Abschluss/Hauptschule*)	12.6	13.3
	Intermediate maturity (*Mittlere Reife*)	49.0	50.0
	Grammar school (*Gymnasium*)	38.5	36.7
Level of employment[a] [%]	Full-time	32.2	30.5
	Part-time (>50%)	23.1	21.1
	Part-time (<50%)	7.7	7.0
	retired	27.3	30.5
	unemployed	9.8	10.9
Diagnosis*			
MS subtype[b] [%]	Advanced RRMS	72.2	73.7
	SPMS with superimposed relapses	17.4	11.3
	SPMS without superimposed relapses	10.4	15.0
Time since first diagnosis[b] [years] (mean ± SD)		16.2 ± 7.8	16.0 ± 7.8
Number of previous DMTs[c] (mean ± SD)		2.6 ± 1.4	n/a
EDSS[d] (mean ± SD)		3.6 ± 1.7	3.7 ± 1.7
T2 lesion load[e] [%]	mild	19.1	15.6
	moderate	30.0	34.4
	severe	33.6	34.4
	not specified	17.3	15.6
Localization of lesions[f] [%]	supratentorial	34.9	26.0
	infratentorial	0.0	0.0
	both	48.6	58.3
	not specified	16.5	15.6

Note: Data for non-missing shown. N(BL || Month12) - a: 143 || 128, b: 144 || 133, c: 142 || -, d: 135 || 127, e: 110 || 96, f: 109 || 96
RRMS: relapsing-remitting multiple sclerosis; SPMS: secondary progressive multiple sclerosis; DMT: disease modifying therapy; EDSS: expanded disability status scale
* Diagnosis according to revised McDonald criteria[5,6]. Patients with RRMS and suspicion of SPMS were defined as advanced RRMS.

- While 40% of the study participants with RRMS and approximately 59% of those with SPMS had clinically relevant low or marginal SDMT (values) scores, 78% of RRMS patients and about 63% of SPMS patients defined their BVMT-R state as „unremarkable“ at baseline. For both - RRMS and SPMS - proportion of patients with clinically relevant low SPMS scores declined after 12 months (**Figure 1**). It must be noted that changes in cognition might need longer time spans to manifest. Patients will be analyzed after 24 months for final data analysis.

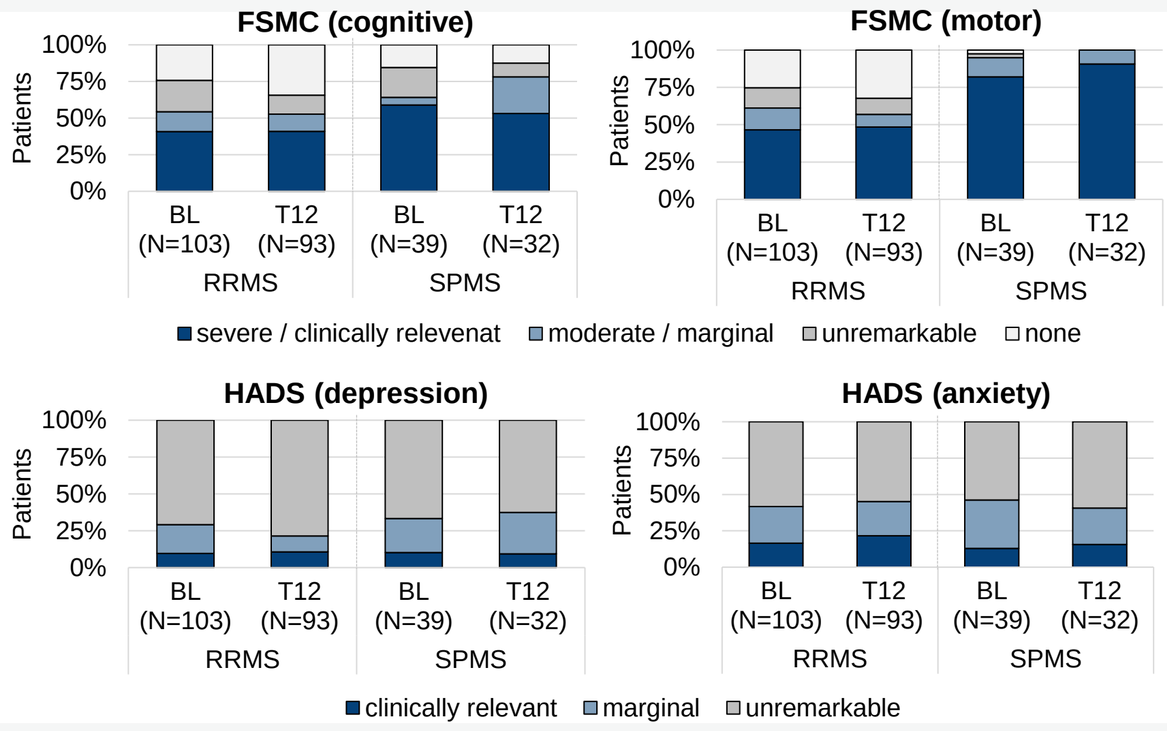
Figure 1. Cognition by MS subtype at baseline and after 12 months



SDMT: Symbol Digit Modalities Test; BVMT-R: Brief Visuospatial Memory Test-Revised; BL: Baseline; T12: Month 12
For SDMT z-scores: clinically relevant ≤-0.5; marginal ≤-1.65; unremarkable >-1.65. BVMT-R percentile ranks: clinically relevant <16; marginal ≤20

- FSMC (Fatigue Scale for Motor and Cognitive Functions) revealed that approximately 61% of the RRMS patients and approximately 85% of the SPMS patients suffered from moderate or severe fatigue at baseline (total score), with motor scale being more affected (**Figure 2**). After 12 months, proportions remained almost constant for patients with RRMS, but increased for SPMS-patients. Follow-up after 24 months will provide further insight on potential disease progression as reflected by FSMC.
- In contrast, regarding HADS, depression and anxiety scored rather low in both MS subgroups, and the subtype of MS had only slight impact on the prevalence of anxiety and depression. Proportion of patients affected did not change substantially after 12 months (**Figure 2**).

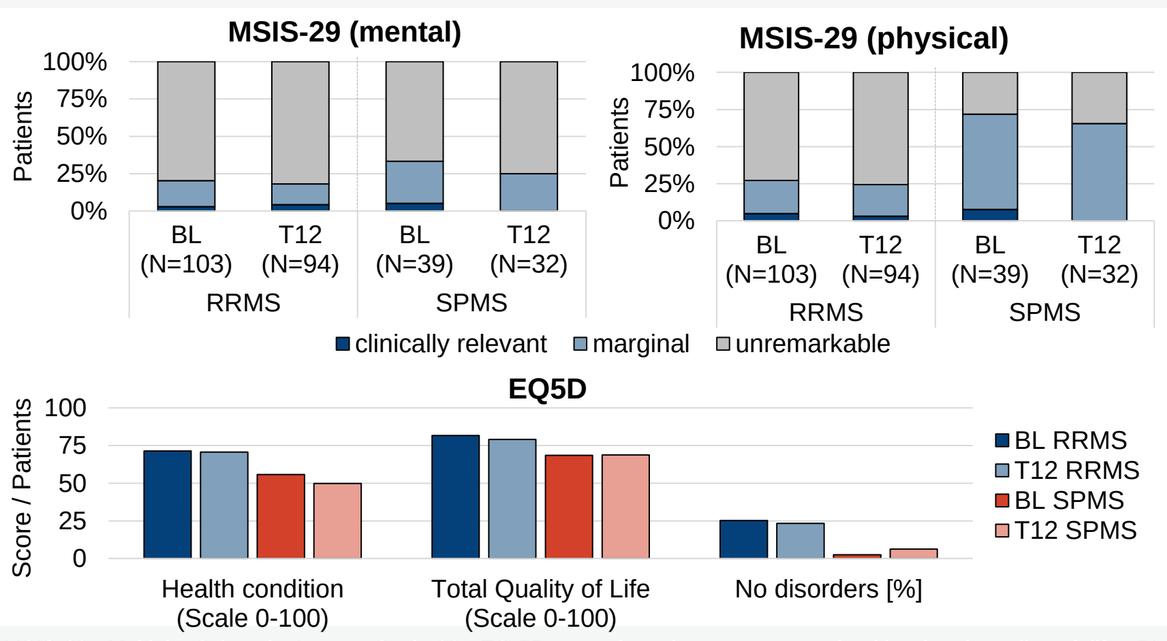
Figure 2. Fatigue, anxiety, and depression at baseline and after 12 months



FSMC: Fatigue Scale for Motor and Cognitive Functions; HADS: Hospital Anxiety and Depression Scale; BL: Baseline; T12: Month 12. FSMC scores: severe≥63; moderate 53-62; unremarkable 43-52; none <52. HADS scores: clinically relevant >10; marginal 8-10; unremarkable 0-7.

- Concerning quality of life (QoL), SPMS patients documented more physical and mental impairment on MSIS-29 compared to RRMS patients (22% vs. 54%; clinically relevant or marginal) at baseline. Proportions were almost stable after 12 months for RRMS and SPMS patients (**Figure 3**).
- In addition, the EQ-5D values associated with global QoL and Health condition were lower in the SPMS group, in that fewer patients were free of disorders and values did not change after 12 months (**Figure 3**).

Figure 3. Quality of life at baseline and after 12 months



MSIS-29: Multiple Sclerosis Impact Scale-29; EQ-5D: questionnaire to measure health-related quality of life; BL: Baseline; T12: Month 12. MSIS-29 z-scores: clinically relevant ≤-0.5; marginal ≤-1.65; unremarkable >-1.65. EQ5D score: clinically relevant ≤40; marginal 41-89; unremarkable ≥90.

CONCLUSIONS

- Baseline characteristics underline that cognitive deficits and fatigue problems are highly prevalent in advanced RRMS and are even more pronounced in patients with SPMS, while psychological and mental self-ratings seem to be less affected. Quality of life is also impaired in both patient groups, suggesting a crucial influence of cognitive performance and fatigue on quality of life, partly detached from psychological factors.
- After one year of follow-up, cognitive core domains (processing speed, non-verbal learning) remained stable in the observed RRMS and SPMS cohort. Stable cognition was in parallel accompanied by no additional impairments of QoL including fatigue and psychological problems being in line with cognitive function as a measure contributing to QoL.
- Longer observational periods are needed to uncover changes in cognitive core domains to develop. The SDMT-PRO project will further investigate the complex pattern of influences on QoL in MS. Continuous recording of SDMT changes and other parameters relevant to patients‘ daily lives over 24 months will allow to better understand the impact of cognitive performance changes on daily life of MS patients.

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