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Challenges in MS Rehabilitation

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Chair dept rehabilitation medicine

No conflicts of interest

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1. Functional prognosis

2. Fatigue
3. Deterioration of gait

4. Measuring individual change
5. (Access to) good quality research

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1. Functional prognosis

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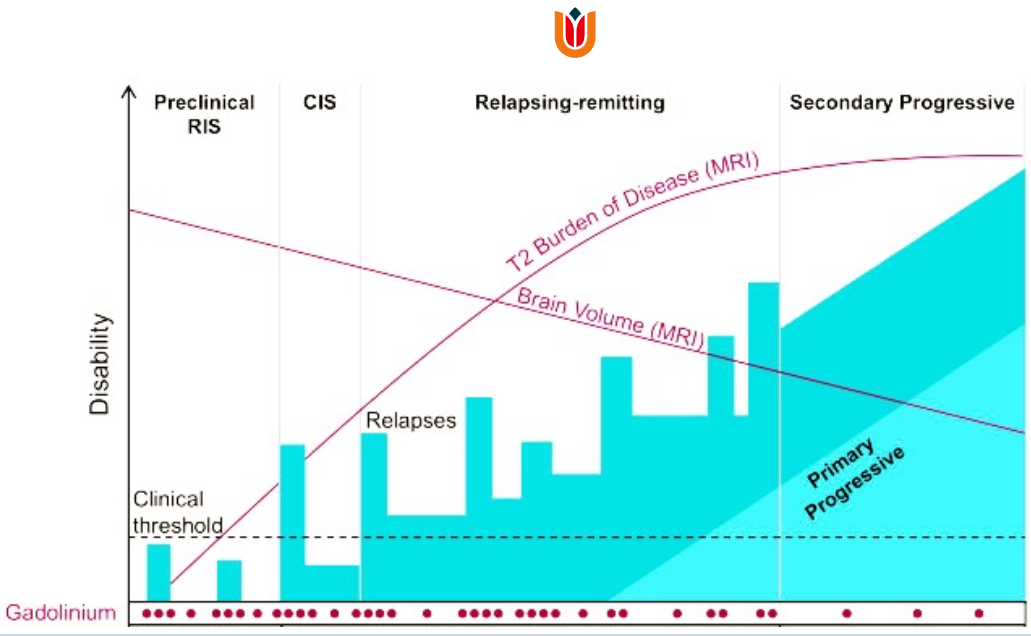

1. Functional prognosis

Neuron 2018: 742-68

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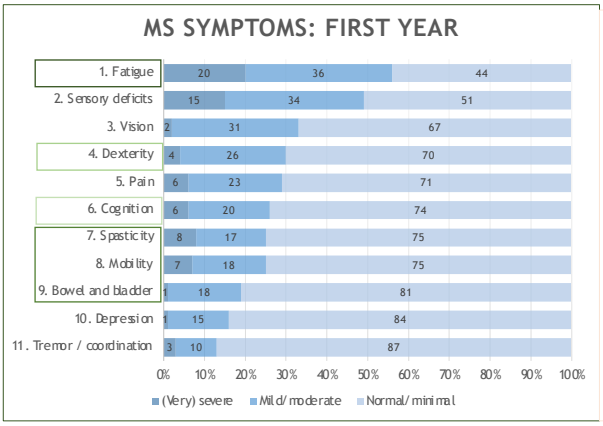

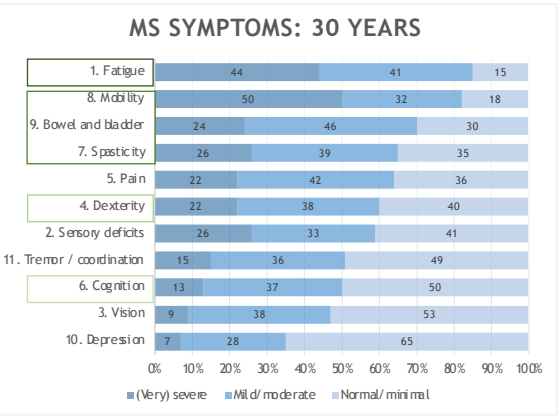

1. Functional prognosis

Adapted from: Int J MS Care. 2013;15(3):146-156

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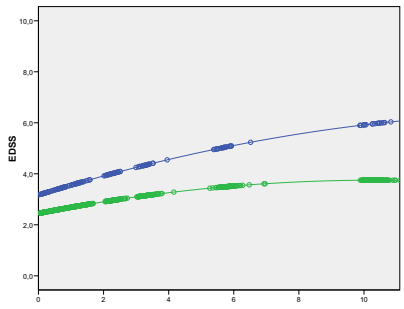
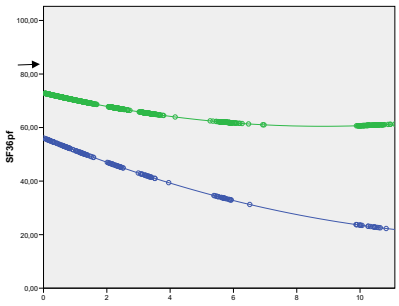
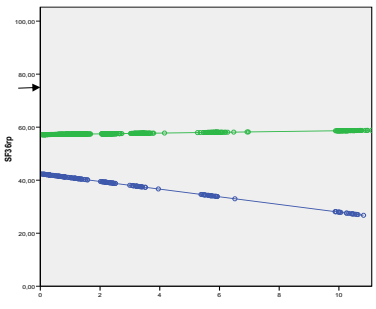
Disease severity



Physical functioning



Social functioning



Blue: PPMS
Green: RRMS

Most important determinants social functioning
- Fatigue
- Perceived social support
- Disease activity

1. Functional prognosis

J Rehab Med. 2013;45:68-75

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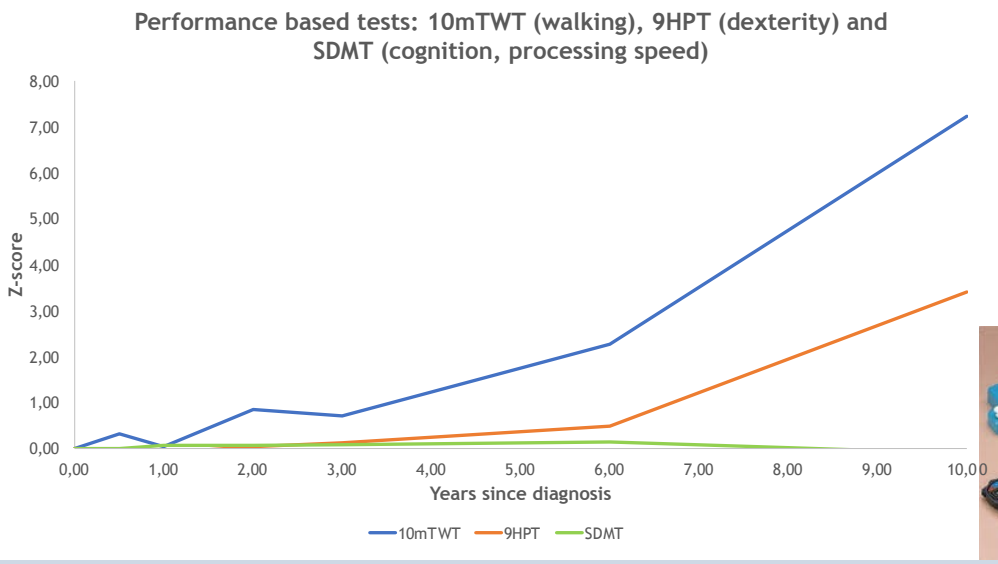

1. Functional prognosis

Mult Scler Relat Disord. 2020;45;102343

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Functional prognosis in clinical practice

Basis: neurodegeneration with slow deterioration of functioning (beware of the exceptions)

- Legs → Arms → (Severe) cognitive problems

Superimposed: inflammation with clinical consequences

- Exacerbations
- Residual deficits after exacerbation, e.g. hemiparesis, ataxia, spinal cord lesion

In addition

- Fatigue / Anxiety / Depression / Psychological adjustment

1. Functional prognosis

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2. Fatigue

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Treatment of fatigue

- Background
  - Multidisciplinary treatment: (only) 2 RCTs showed no effect
  - Aerobic training, energy conservation management and cognitive behavioural therapy: RCTs not conclusive

Ambulatory patients with severe primary MS-related fatigue

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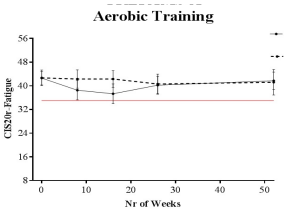
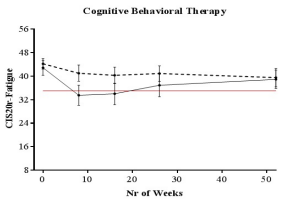
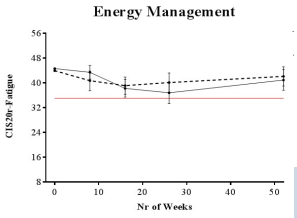


Effect size = -0.54 (-1.00 to -0.06)
NNT = 9
CIS20r<35: never
Other fatigue scales: no effect



Effect size = -0.79 (-1.26 to -0.32)
NNT = 3
CIS20r<35: during treatment
Other fatigue scales: FSS, MFIS, SF36-vitality also positive effect



Effect size = -0.11 (-0.57 to 0.35)
NNT = 158
CIS20r<35: never
Other fatigue scales: no effect

Effect size: standardized mean difference
NNT: number needed to treat
CIS20r: checklist individual strength to measure fatigue

PhD theses Martin Heine, Lyan Blikman and Lizanne van den Akker

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Discussion fatigue

- CBT most effective, but long term effects need to be improved
  - Confirmed by recent review
  - New RCT with 166 patients with MS-related fatigue (PhD Marieke de Gier, inclusion completed despite COVID!)
    1. Non-inferiority trial: CBT versus e-health CBT
    2. Booster sessions after CBT

- Aerobic training does not lead to clinically meaningful reductions in MS-related fatigue
  - Recent review: different kinds of exercise therapy equally effective, but little less than CBT
  - Improve understanding of working mechanisms of exercise therapy in MS

- Energy conservation management not effective
  - Confirmed in recent review
  - Complexity of de-implementation

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3. Deterioration of gait

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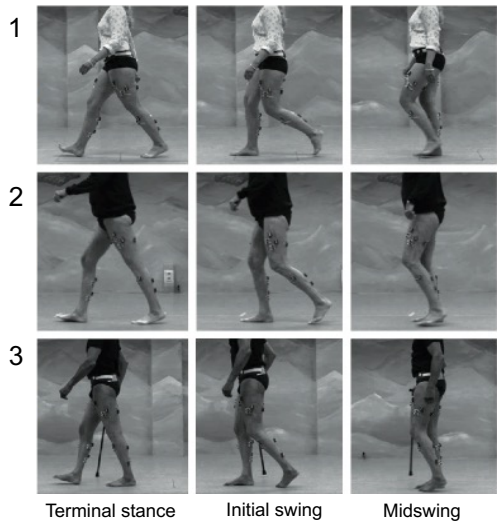
Gait patterns

Insufficient push off and reduced clearance

- Electrical stimulation calf muscles
  - Timing is difficult
- Training: strength and endurance
  - Strength seems most promising
- Energy Storing Ankle Foot Orthosis



Phys Ther. 2016;96:1744-1752

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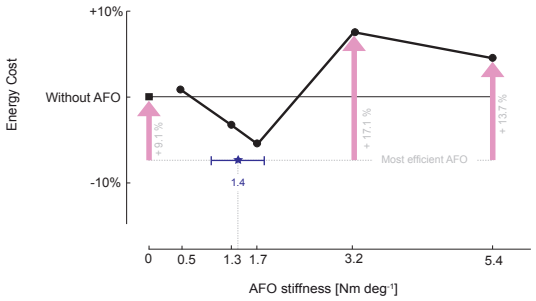
Effect energy-storing Ankle Foot Orthosis



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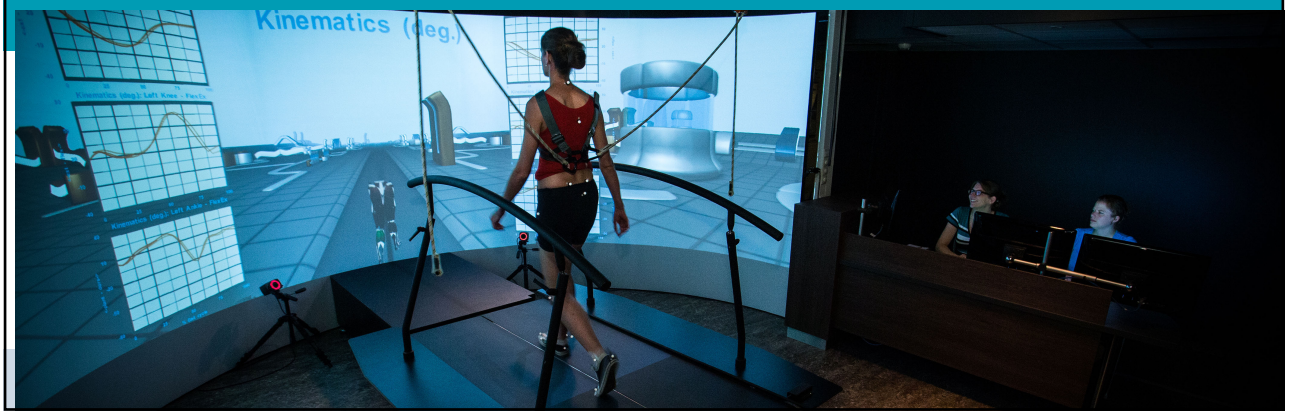
4. Measuring individual change



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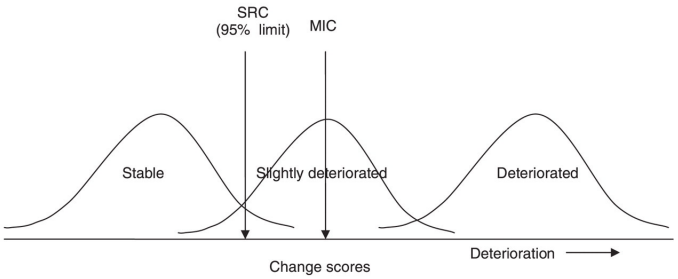
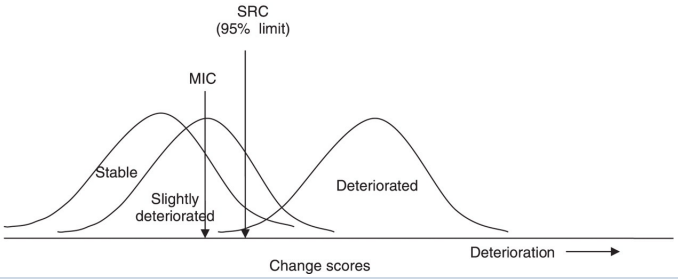
A. MIC > SRC



B. MIC < SRC.



SRC: Smallest Real Change (SRC)
MIC: Minimally Important Change (MIC)

4. Measuring individual change

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	SRC		$MIC_{deterioration}$		$MIC_{improvement}$	
	Patient	Clinician	Patient	Clinician	Patient	Clinician
Patient reported outcome measures						
SF36 mobility[a]	22	28	**9**	**9**		
MS Walking Scale-12[b]	32	36			**10**	**11**
Walking tests short distance						
25-foot usual speed[b] (s)	5	4			0	0.2
25-foot fast speed[b] (s)	4	3			0.4	0
10-meter usual speed[c] (m/s)	0.3		**0.1**	**0.1**		
10-meter fast[c] (m/s)	0,3		**0.1**	**0.2**		
10-meter fast[a] (s)	3	3	1	0.3		
Walking tests longer distance						
2-minute[b] (m)	24	27			**10**	**7**
6-minute[c] (m)	92		**53**	**55**		
6-minute[b] (m)	67	68			**21**	9

Significant MIC estimates are in bold

Very, very often SRC >> MIC!
- **Achilles heel clinimetrics**
- Both patient reported and performance based tests

Potential solutions
- Frequent repeated measurements
  - Reduces SRC
  - Feasible?
- Computer adaptive testing
  - e.g. PROMIS

4. Measuring individual change

[a] De Groot et al. Brain, 2006. [b] Baert et al. JNNR, 2014. [c] Paltamaa et al. Phys Ther, 2008

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5. (Access to) good quality research

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Challenges MS rehabilitation research

- High number of small “pilot” studies with “promising results”
  - Large risk of bias / view on our treatment effects probably too optimistic
- Often no follow-up with Randomized Controlled Trial
  - Selected primary outcome / Sufficient power / Right target population
- Randomized Controlled Trials too often of poor quality
  - Negatively affects guidelines / Hampers the treatment of our patients

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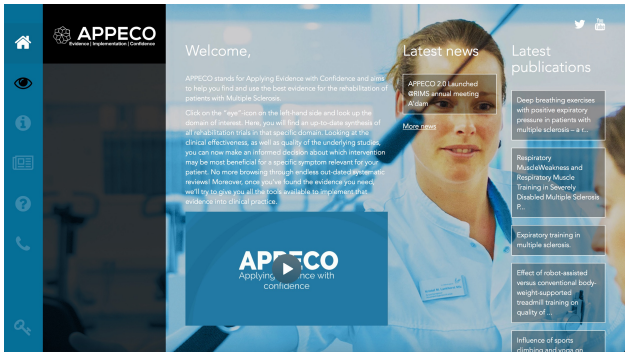
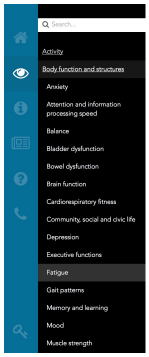
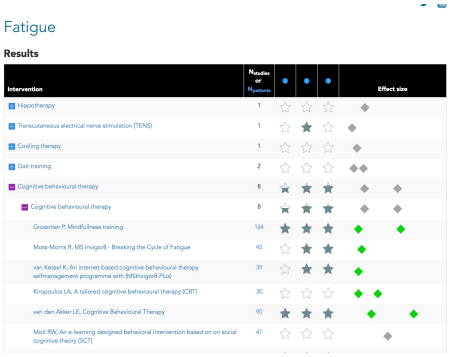
Applying evidence with confidence (APPECO)







5. (Access to) good quality research

www.appeco.net

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Current debates and future perspectives

Functional prognosis	➢ Disease modifying effects of exercise
Fatigue	➢ How do exercise interventions exert their fatigue-reducing effects ➢ E-health CBT interventions
Gait	➢ Optimizing orthotic prescription using gait analysis ➢ Role of rehabilitation technology
Clinimetrics	➢ Computer adaptive testing ➢ Wearables / phone
Good quality research	➢ Large conclusive studies ➢ Reappraisal evidence based medicine (wasn't ever about RCTs only...)

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