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Assessing Short and Graphically Mobility in MS and Other Neurological Diseases with the new Iphone App SaGAS 10

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Mr B. in 2004 - 49y PwMS - 12s T25FW

Mr B. in 2011 – 7y later - 19sec T25WT

Mr B 2004 :
9-HPT right hand
50sec

Mr B 2004 :
9-HPT left hand
30sec

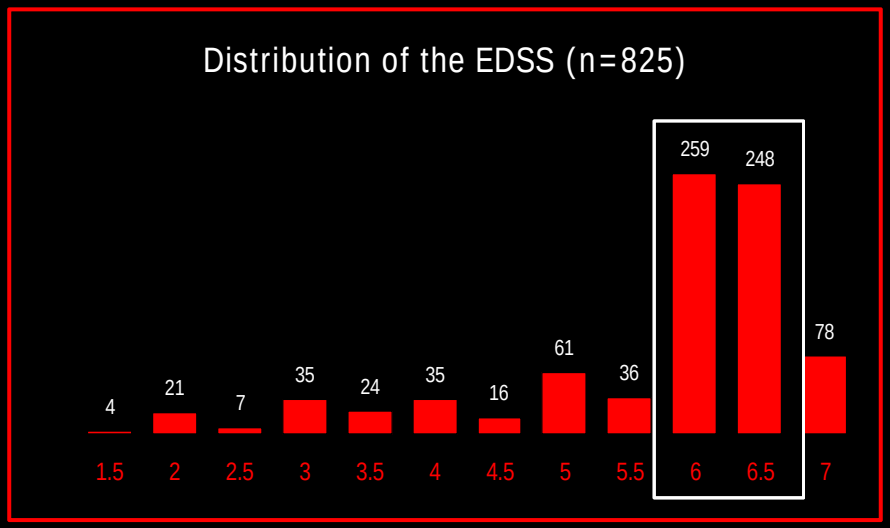
Mr B 2011 :
9-HPT right hand
65sec

Mr B 2011 :
9-HPT left hand
36sec

Summary

year	2004	2011
T25WT	12s	19s
9HPT r	50s	65s
9HPT l	30s	36s

Most of the patients seen in our MS clinic are at EDSS levels 6-7,where the scale is not very precise



« The EDSS has many shortcomings and should be replaced by a composite outcome measure... »
(Goodkin DE et al. *Multiple Sclerosis* , 1994)

- Relies on a not very precise assessment of ambulation.
- Is not sensitive enough to measure minor changes.
- Scores 6.0 when walking needs an aid almost without regards to the required walking time.
- Doesn't consider sufficiently manual dexterity.

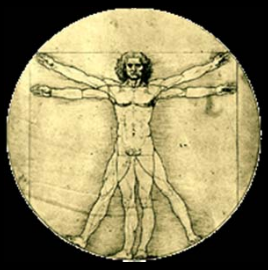
What about the
MS Functional Composite Measure ?
(Cutter et al. *Brain* 1999; 122: 871-882)

- Nine-Hole Peg Test uses average of mean of 2 hands... why not assess both hands individually ?
- PASSAT Test is a stressful test and the are results weakened by a practice effect.
- MSFC Score = ($Z_{\text{arm average}} - Z_{\text{leg average}} + Z_{\text{cognitive}}$) / 3 is not easy to communicate and the results depend on study population.
- Z-score differences…when and at what level are they clinically relevant: 0.5 ? 1.0 ?

Properties of SaGAS 10 as an alternative to the MSFC and as a complement to the EDSS ?

Short and simple

Graphical properties



Independant of study population

Includes walking and manual dexterity

Interval scale

SaGAS 10
The
Short ***a***nd ***G***raphic
Ability ***S***core

Vaney C , Wade DT et al. *Mult Scler* 2004; 10:231-242

The timed 25-foot walk test (T25WT) and the nine-hole peg test (NHPT), the motor components of the Multiple Sclerosis Functional Composite, have been shown to be clinically meaningful disability measure

The timed 25-foot walk test (T25WT) and the nine-hole peg test (NHPT), the motor components of the Multiple Sclerosis Functional Composite, have been shown to be clinically meaningful disability measure

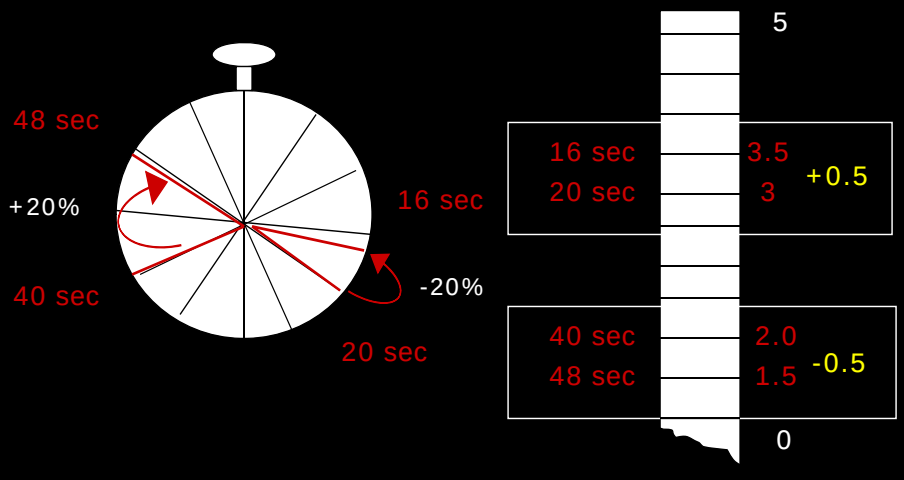
Ask your patient to walk a 25 feet distance as fast as he can using an aid if necessary and record the time in seconds.
A healthy, middle aged person needs : 4 seconds

The timed 25-foot walk test (T25WT) and the nine-hole peg test (NHPT), the motor components of the Multiple Sclerosis Functional Composite, have been shown to be clinically meaningful disability measure

Ask your patient to place the 9 pegs from the tray into the holes and back again, as fast as possible, with each hand separately and record the time in seconds.

A healthy, middle aged person needs : 20 seconds.

Mathematical background informations



Kragt JJ, van der Linden FA, Nielsen JM, et al.
Clinical impact of 20 % worsening on Timed 25-Foot Walk and Nine Hole Peg Test in multiple sclerosis. *Mult Scler* 2004 231-242

A 20% change is percieved as a significant change for the patient in any of the 2 SaGAS components…

Mult Scler. 2004 Feb;10(1):55-60.

The patient's perception of a (reliable) change in the Multiple Sclerosis Functional Composite.

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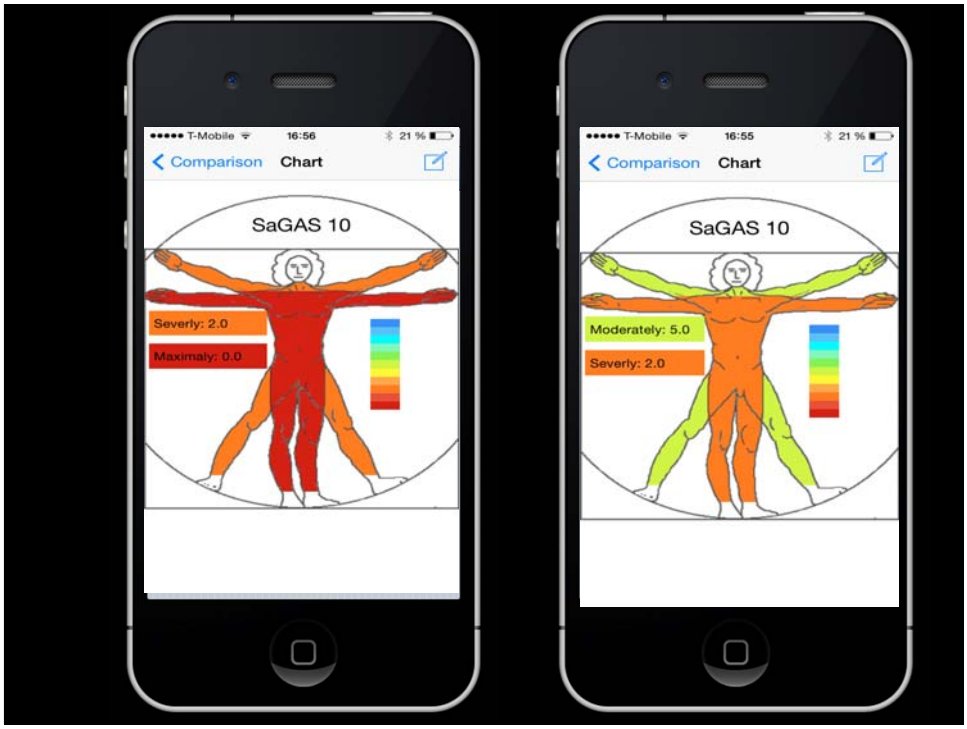
Abstract

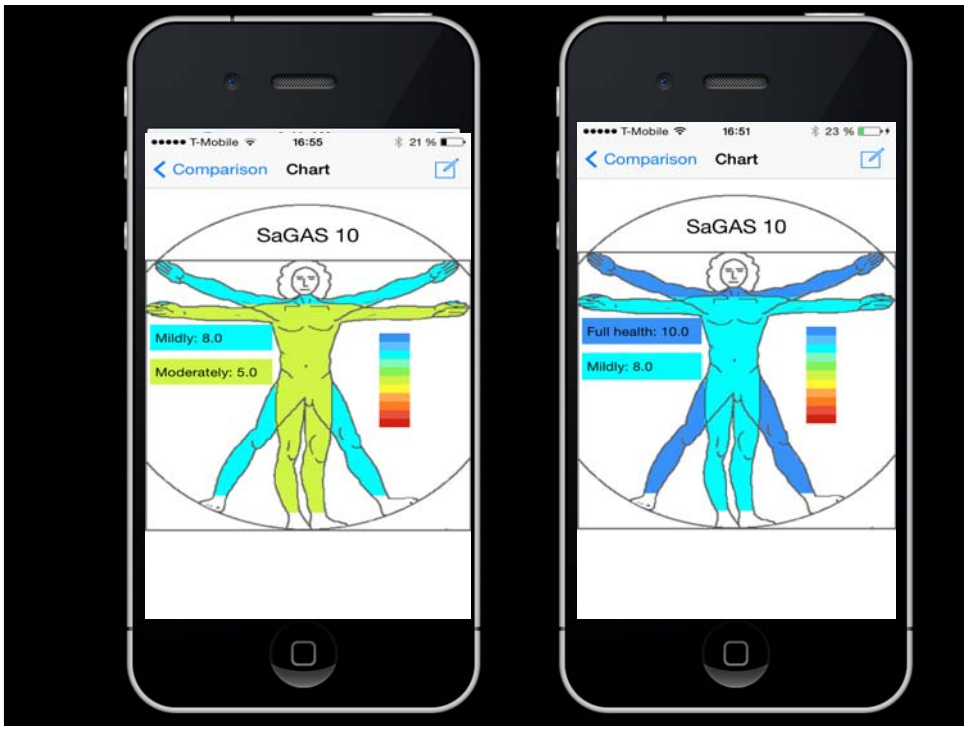
OBJECTIVE: To prospectively characterize the relation between two-year changes in functional impairment as measured by the Multiple Sclerosis Functional Composite (MSFC) and changes in patient perceived disability as measured by the Guy's Neurological Disability Scale (GNDS).

METHODS: One hundred and eighty-eight patients with multiple sclerosis (MS) were recruited at our outpatient clinic. Impairment and disability were assessed using the MSFC and GNDS at baseline and follow-up. Longitudinal correlations were studied between changes in MSFC and GNDS and their corresponding components. We also studied changes in GNDS in relation to what can be classified as a reliable change in MSFC; for example, 20% change in each MSFC component or a change of 0.5 in total MSFC score. In addition, we studied the change in total number of GNDS subcategories with a score of 3 or higher in relation to the predefined MSFC changes, these subcategories being indicative of the requirement for help by another person.

RESULTS: Despite good cross-sectional correlations between MSFC and GNDS, no significant correlation was found between longitudinal changes in MSFC and GNDS. Analysing the change in GNDS in relation to the predefined MSFC changes shows that GNDS changes are nicely rank ordered when more stringent definitions of reliable change were applied. In addition, analysing the number of GNDS subcategories scored 3 or higher indicate that there is a profile of worsening on the MSFC being associated with increase in the amount of help required from others.

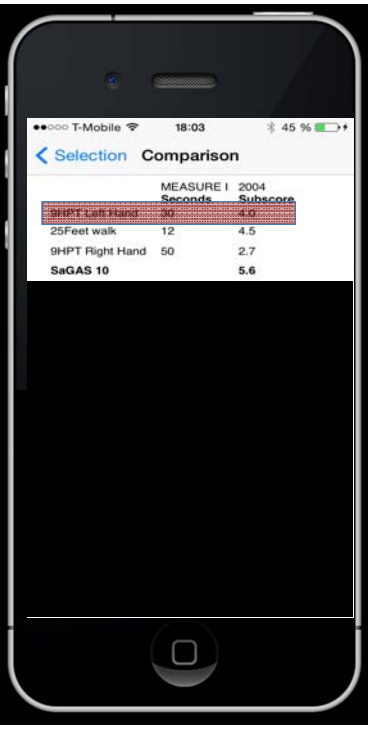
CONCLUSION: Our longitudinal data suggest that a reliable change is associated with a likewise change in patient perceived disability, the smallest reliable change being identified by at least 20% change in each MSFC component.


T-Mobile 16:56 21 %
Comparison Chart
SaGAS 10
Severly: 2.0
Maximaly: 0.0
T-Mobile 16:55 21 %
Comparison Chart
SaGAS 10
Moderately: 5.0
Severly: 2.0


T-Mobile 16:55 21 %
Comparison Chart
SaGAS 10
Mildly: 8.0
Moderately: 5.0
T-Mobile 16:51 23 %
Comparison Chart
SaGAS 10
Full health: 10.0
Mildly: 8.0

20 % change

- 0.5 points



Maybe the SaGAS 10 could be useful for other neurological pathologies where hand and gait function are impaired ?

We planed to use SaGAS 10 for all the patients attending our clinic during the year 2012 and 2013

601 patients with different neurological diseases could be included in the study

Groups	N
MS	282
Stroke	141
Park	19
N'm	50
other	109

Mean age:
59.9 years

Lenght of stay:
24.1 days

5 different mobility measures were used at the beginning and at the end of the stay

	n	entry	final
SaGAS	601	6.2	6.8
FIM	281	99	106
RMI	601	8.5	10.0
25f v	482	0.80m/s	1.0m/s
2m v	460	0.75m/s	0.90m/s

Measurement of outcome in Rehabilitation

The British Society of Rehabilitation medicine

"Basket" of Measures

Instruments selected should, as far as possible, be:

- Valid
- Reliable
- Sensitive to change
- Clinically useful
- Feasible to use in the given setting

Is SaGAS 10 valid ?

The construct validity of SaGAS was given by the correlation coefficients (>0.7)

Groups	N	RMI
MS	282	0.846
Stroke	141	0.789
Park	19	0.567
N'm	50	0.856
other	109	0.769

Is SaGAS 10 reliabel ?

Neurology. 2000 Feb 22;54(4):802-6.

Intrarater and interrater reliability of the MS functional composite outcome measure.

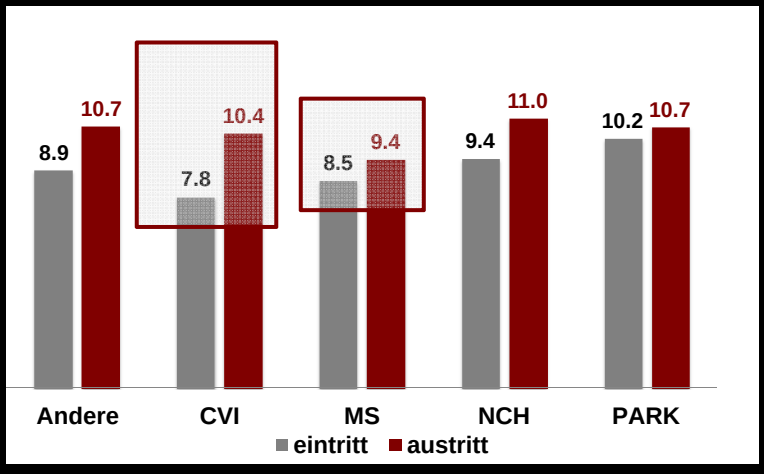
Cohen JA, Fischer JS, Bolibrush DM, Jak AJ, Kniker JE, Mertz LA, Skaramagas TT, Cutter GR.

Mellen Center for Multiple Sclerosis Treatment and Research, Department of Neurology, Cleveland Clinic Foundation, OH 44195, USA.

The MS functional composite (MSFC) outcome measure had excellent intrarater and interrater reliability when standardized procedures were used to train examining technicians and to assess patients.

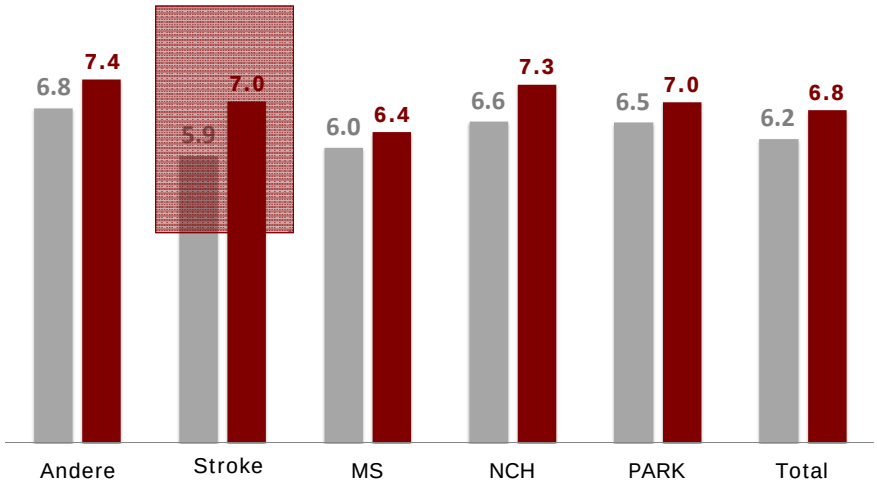
Is SaGAS 10 sensitive to changes ?

Changes in the Rivermead Mobility Index during the rehabilitation period



Sensitivity to changes of SaGAS 10 in 601 neurological patients attending rehabilitation

effect-size *(Cohen's d value): 0.41 highest for the stroke patients*

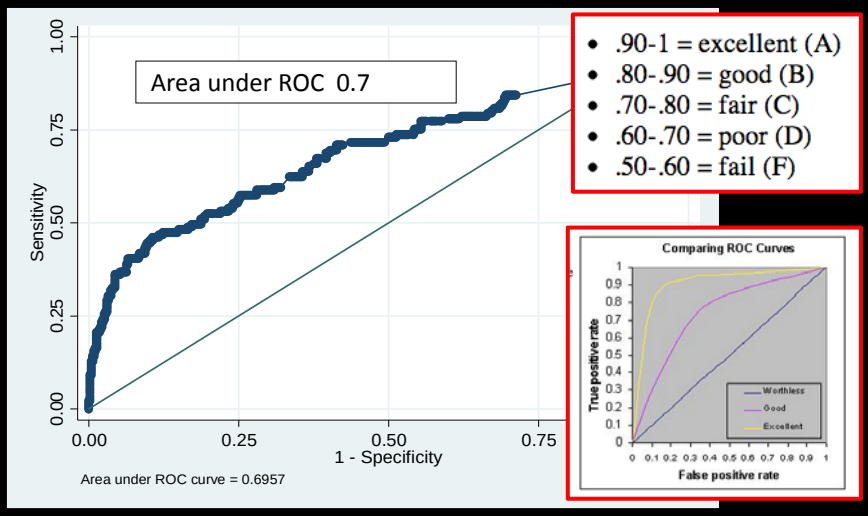


Judged by the distribution based responsiveness (calculating the effect size) SaGAS is senstive, however less than walking speed and the Rivermead Mobility Index (RMI)

	Stroke		
Variable	N	Effect Size	95% CI
sagas	141	-0.41	(-0.64 to -0.17)
speed2min	102	-0.48	(-0.75 to -0.21)
speed25ft	141	-0.52	(-0.76 to -0.28)
RMI	141	-0.59	(-0.83 to -0.35)
fimein	71	-0.47	(-0.8 to -0.13)

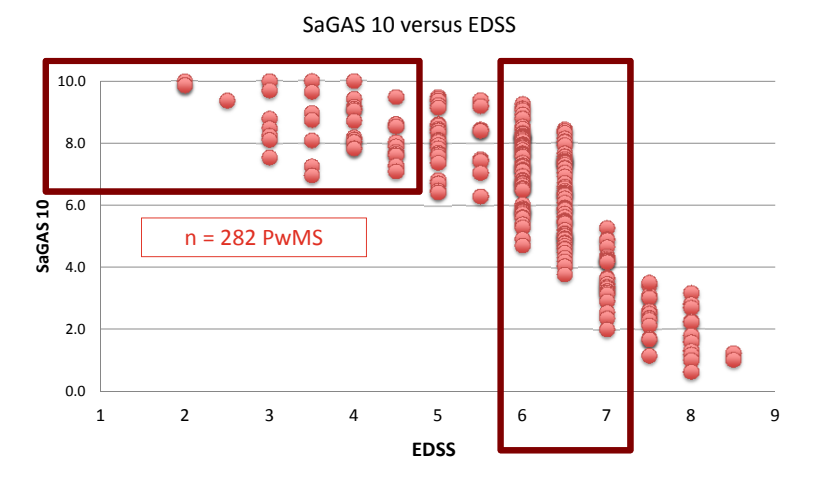
The changes are more marked patients after stroke !

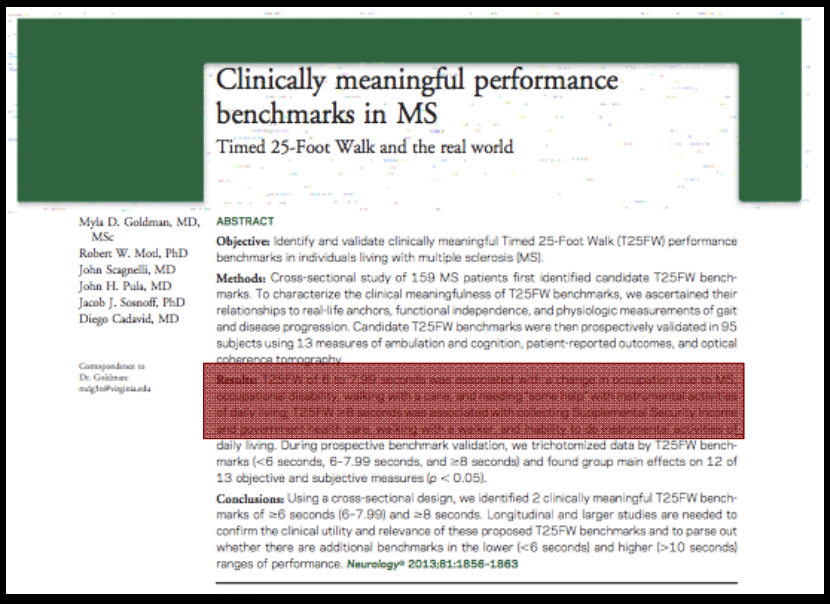
Responsiveness was also assessed by receiver operating characteristic curves (ROCs) , comparing changes in SaGAS with minimal clinically important changes in the RMI (3points) as anchor.



Is SaGAS 10 clinically usefull?

SaGAS 10 has the advantage of more closely differentiating the degree of disability at the not so precisely defined levels of EDSS between 6.0-7.5.





Clinically meaningful performance benchmarks in MS

Timed 25-Foot Walk and the real world

Myla D. Goldman, MD, MSc
Robert W. Motl, PhD
John Scagnelli, MD
John H. Pula, MD
Jacob J. Sosnoff, PhD
Diego Cadavid, MD

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ABSTRACT

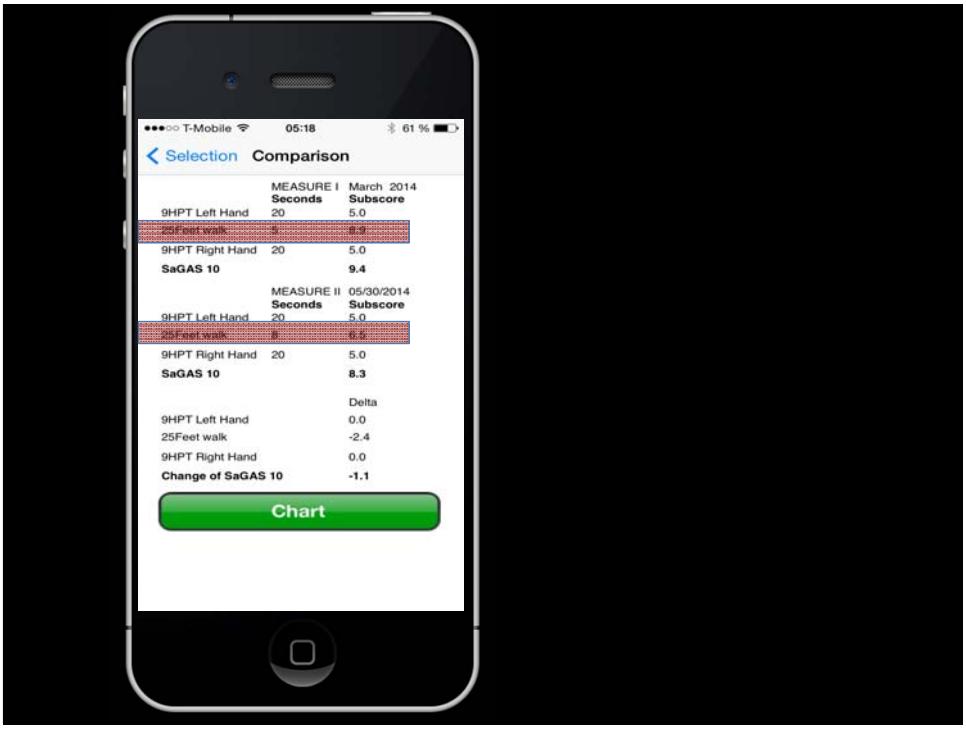
Objective: Identify and validate clinically meaningful Timed 25-Foot Walk (T25FW) performance benchmarks in individuals living with multiple sclerosis (MS).

Methods: Cross-sectional study of 159 MS patients first identified candidate T25FW benchmarks. To characterize the clinical meaningfulness of T25FW benchmarks, we ascertained their relationships to real-life anchors, functional independence, and physiologic measurements of gait and disease progression. Candidate T25FW benchmarks were then prospectively validated in 95 subjects using 13 measures of ambulation and cognition, patient-reported outcomes, and optical coherence tomography.

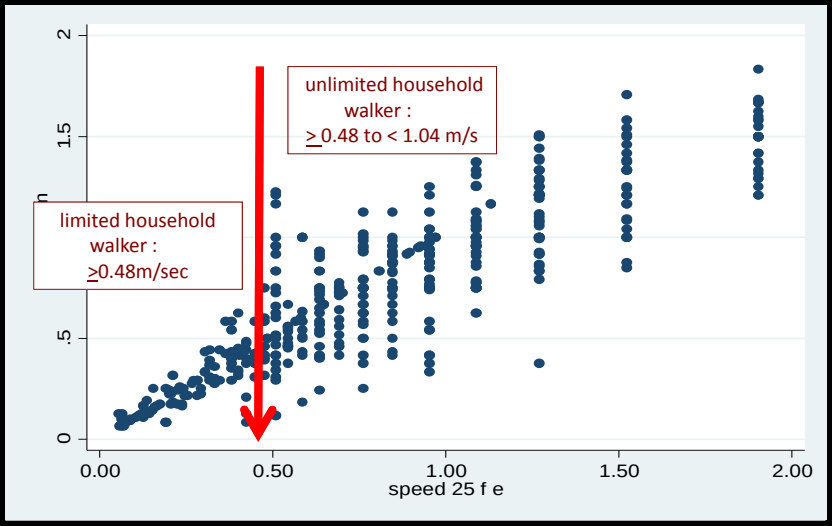
Results: [redacted]

daily living. During prospective benchmark validation, we trichotomized data by T25FW benchmarks (<6 seconds, 6–7.99 seconds, and ≥8 seconds) and found group main effects on 12 of 13 objective and subjective measures ($p < 0.05$).

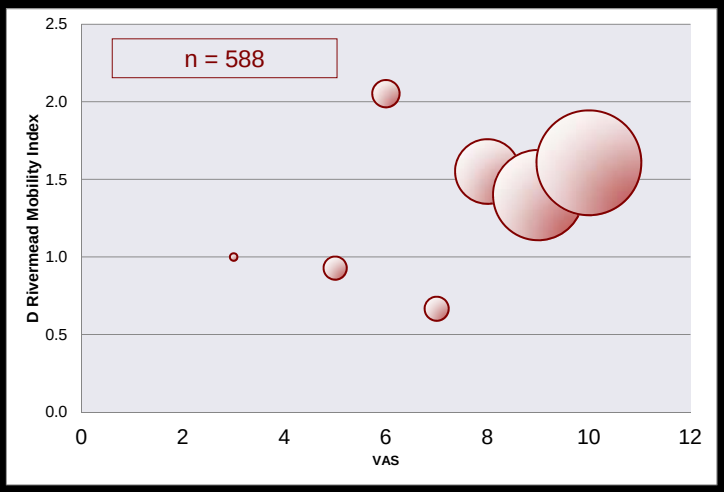
Conclusions: Using a cross-sectional design, we identified 2 clinically meaningful T25FW benchmarks of ≥6 seconds (6–7.99) and ≥8 seconds. Longitudinal and larger studies are needed to confirm the clinical utility and relevance of these proposed T25FW benchmarks and to parse out whether there are additional benchmarks in the lower (<6 seconds) and higher (>10 seconds) ranges of performance. *Neurology*® 2013;81:1856–1863



Our data suggest that for slow walkers (>16sec) the 25 feet walking test might be a good alternative for the 2-minutes walking test…



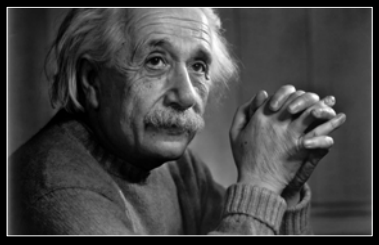
Degree of Satisfaction with the rehabilitation stay (VAS) versus changes In Rivermead Mobility Index units



Even little functional changes seem to make patients happy….

"Not everything that can be counted counts, and not everything that counts can be counted.".

Albert Einstein 1879-1955



5 Take home messages

- SaGAS 10 is a **complement** for the **EDSS** (4.5-7.0) and can be also used for patients after stroke.
- SaGAS 10 is an **interval score** where a **1.0 point** difference represents a **clinically meaningful change**.
- SaGAS 10 is more **sensitive to changes** than the EDSS.
- SaGAS 10 **correlates well** with validated mobility measures such as the Rivermead Mobility Index & FIM.
- SaGAS 10 can be used with as an **Iphone application** , it can be downloaded for free on App store.

My special thanks goes to the brothers Thierry and Sébastien Rapillard for designing the app

..and to you for your attention!