RIMS REHABILITATION IN MULTIPLE SCLEROSIS

European network for best practice and research

WALKING ASSESSMENT

Walking speed, ability & beyond

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Foundation Serono Symposia International

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KNOWLEDGE IN ACTION

REVAL (SINCE 2005)
BIOMED, UHASSELT, BELGIUM

3 yrs BAC – 2 yrs MA program
Rehabilitation Sciences & Physiotherapy

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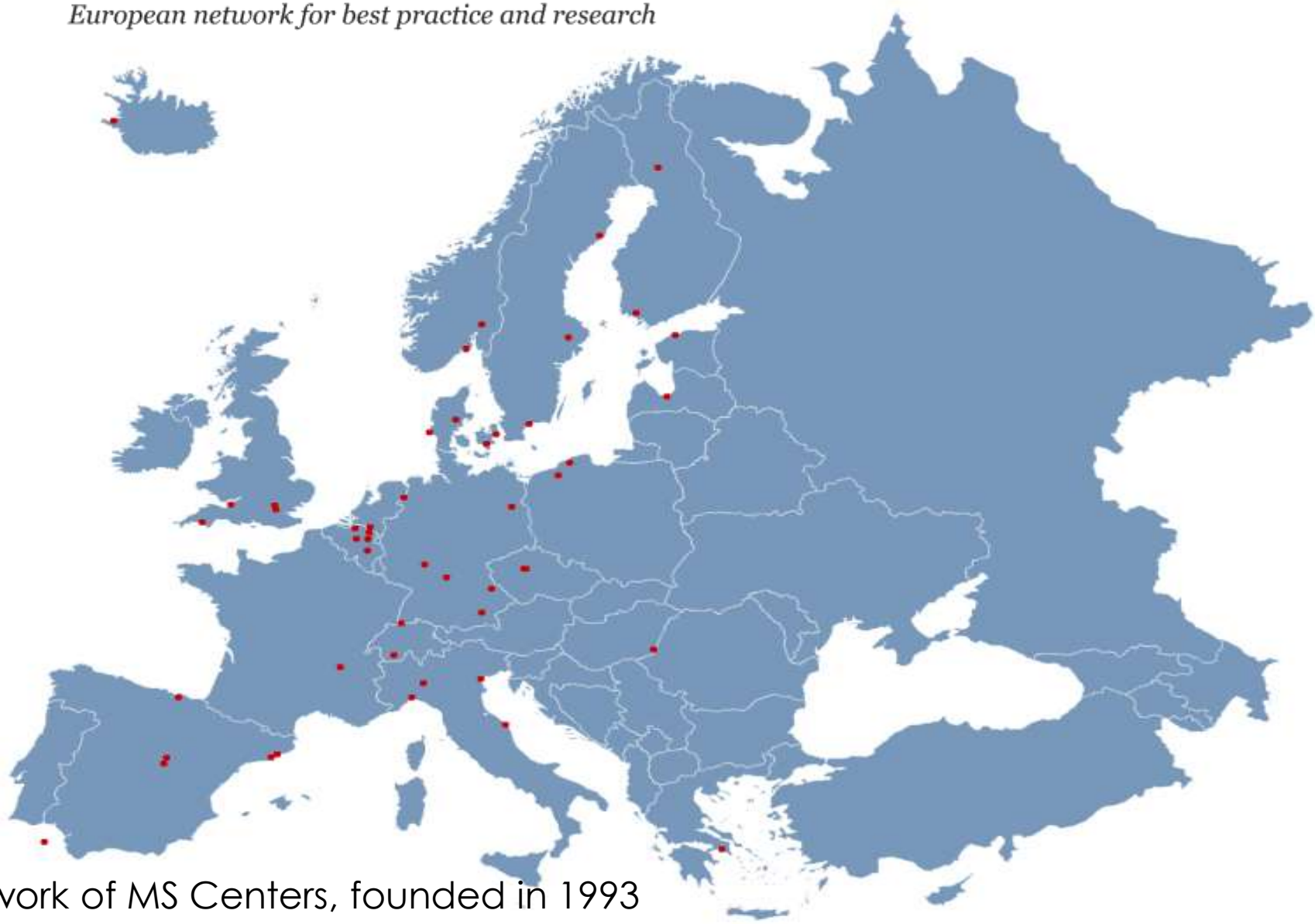
www.euRIMS.org



Network of MS Centers, founded in 1993
Network for best practice & research (2011)

MISSION STATEMENT OF RIMS

Rehabilitation is a highly *individualised education and adaptation process* to gain maximum activity and participation.

- **Mission**
  We aim to enhance activity, participation and autonomy of people with MS by *developing and advocating evidence-based rehabilitation.*

- **Vision**
  All people with MS throughout Europe have access to evidence-based rehabilitation when they need it.

RIMS

NEWSLETTER VIA WWW.EURIMS.ORG

RIMS REHABILITATION IN MULTIPLE SCLEROSIS

European network for best practice and research

HOME | NEWS | SIGS | CONFERENCES | PROGRAMS | LINKS | MS CENTERS | CONTACT

RIMS present in the Multiple Sclerosis Journal –Network

The Multiple Sclerosis Journal has launched an on-line MSJ network that aims to connect researchers and professionals working in the field of MS. Discussions can be initiated based on scientific papers or self-initiated, besides announcement of events or jobs and other reflections. Also RIMS is present as a group in the MSJ network. We invite you to join the network and to become a member of our organization, where rehabilitation topics can be discussed. See http://multiplesclerosisjournal.ning.com/group/rims.

MSJ NETWORK

SaGAS now available as I-phone app

The SAGAS, an acronym for Short and Graphic Ability Score, was developed by Dr. C. Vaney (Berner Klinik Montana, CH), former president of RIMS and chair of the special interest group on Mobility.
It summarizes and visualizes the scores on the motor components of the Multiple Sclerosis Functional Composite scores, being the Timed 25 Foot walk and the Nine Hole Peg test. With this application, one can add the scores to a database in a mobile way, and compare with previous performances. See http://itunes.apple.com/us/app/sagas-20-10/id520129522?ls=1&mt=8 for more information.

RIMS NEWSLETTER

Register here if you want to receive our RIMS newsletter!

Name

E-mail

Subscribe

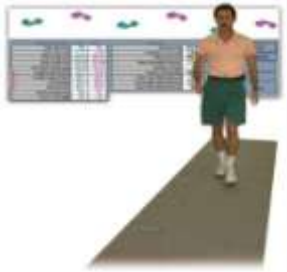
PRECEPTORSHIP ON REHABILITATION

- *October 2012, Multiple Sclerosis Journal*
- *See also Ravnborg & Freeman*

Rehabilitation Research

- Overall effects of "In-patient rehabilitation"
  Freeman et al 1999, Solari et al 1999, Ravnborg 2006
- Effects of specific interventions, selected patient samples primary outcome measures

ABNORMAL GAIT PATTERN IN MS
EARLY STAGE



ARTICLE

Multiple Sclerosis 2006; 12: 620–628

Gait and balance impairment in early multiple sclerosis in the absence of clinical disability

CL Martin[1,2], BA Phillips[1,2], TJ Kilpatrick[3,4], H Butzkueven[3,4], N Tubridy[3,4], E McDonald[5] and MP Galea[1,2]

Muscular and Gait Abnormalities in Persons With Early Onset Multiple Sclerosis

Alon Kalron, PT, MSc, Anat Achiron, MD, PhD, and Zeevi Dvir, PhD

Contents lists available at ScienceDirect

Gait & Posture

journal homepage: www.elsevier.com/locate/gaitpost

Short communication

Quantifying gait impairment in multiple sclerosis using GAITRite™ technology

Jacob J. Sosnoff[a,*], Madeline Weikert[a], Deirdre Dlugonski[a], Douglas C. Smith[b], Robert W. Motl[a]

[a] Department of Kinesiology and Community Health, University of Illinois at Urbana-Champaign, United States
[b] School of Social Work, University of Illinois at Urbana-Champaign, United States

- Martin et al 2006, MSJ
- Kalron et al 2010, Gait & Posture
- Kalron et al 2011, JNPT
- Sosnoff et al 2011, APMR
- Sosnoff et al 2011, Gait & Posture

J Neurol (2010) 257:103–113
DOI 10.1007/s00415-009-5282-4

ORIGINAL COMMUNICATION

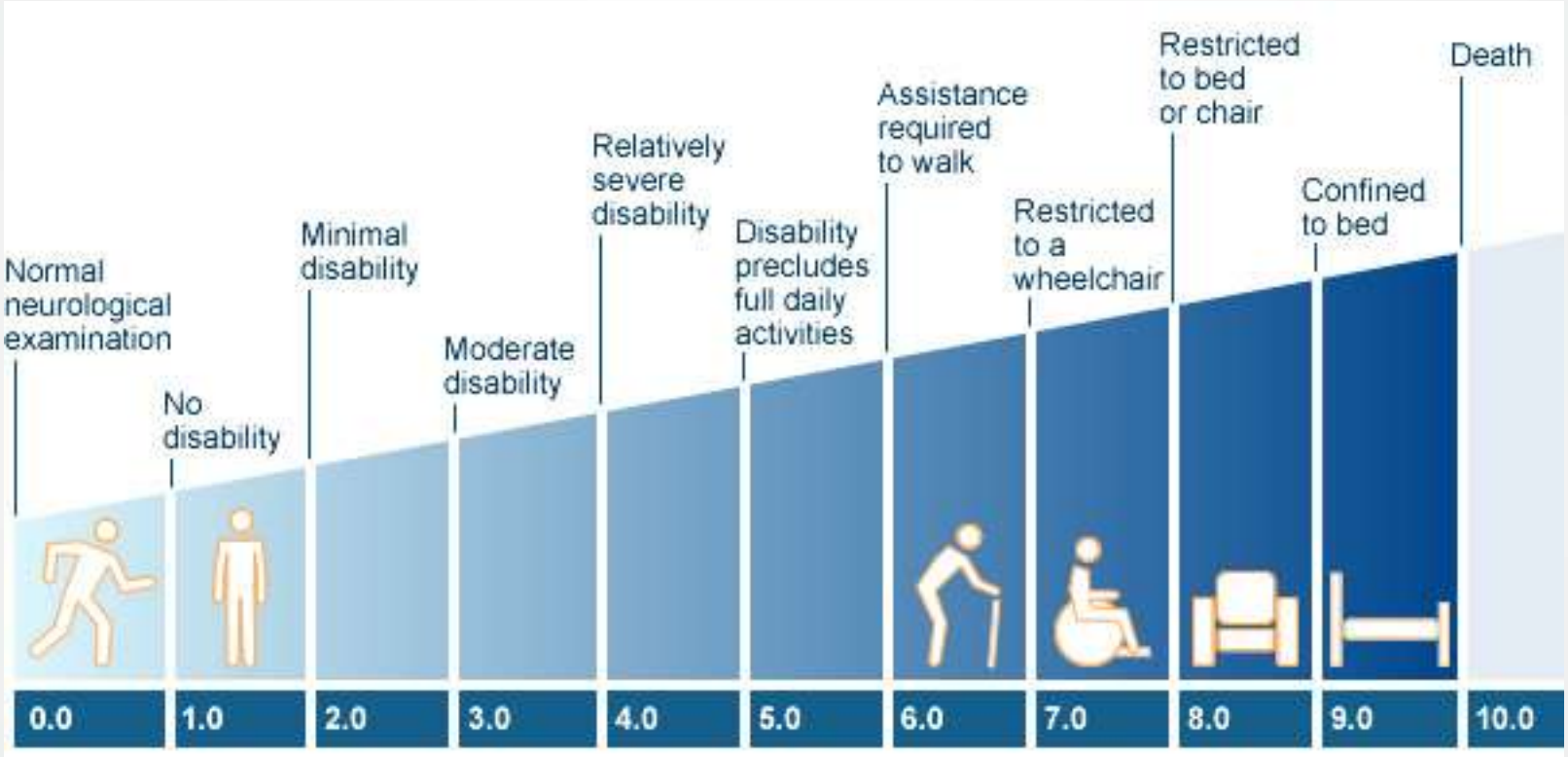
Characterization of functioning in multiple sclerosis using the ICF

Lisa Holper · Michaela Coenen · Andrea Weise · Gerold Stucki · Alarcos Cieza · Jürg Kesselring

Goal of Medical treatment & Rehabilitation

WALKING ASSESSMENT
Which tests do you use?

EDSS & DISABILITY
IMPACT OF WALKING DYSFUNCTION



Walking distance *Walking aid*

MS-FC

- T25FW: walking speed
- NHPT: manual dexterity
- PASAT: cognition

T25FW

Static start

As quick as possible

Assistive devices allowed
(cane, crutch, wheeled rollator)

Two trials – average

Stopwatch (0,1s accuracy)
leading foot crossing the line

Time limit is 180”

25 foot = 7.62 meter

MULTIPLE SCLEROSIS FUNCTIONAL COMPOSITE (MSFC)

ADMINISTRATION AND SCORING MANUAL

Revised, October 2001

Manual Prepared By

Jill S. Fischer, Ph.D.
Amy J. Jak, M.A.
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Cleveland Clinic Foundation
Cleveland, Ohio

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AMC Cancer Research Center
Denver, Colorado

T25FW

Practical Questions

√ Do I repeat the trial if another person interfered with walking?

√ Do I repeat the trial if the patient dropped his cane (or other)?

⊘ Do I repeat the trial if the patient tripped but did not fall?

√* Do I repeat the trial if the patient fell?

√ Is the patient allowed to pause while walking?

⊘ Is the patient allowed to run?

⊘ Is the patient allowed to use the wall/lean on me for support?

√* Is the patient allowed to temporarily touch the wall or me?

⊘* Can the patient carry a purse/coat during walking?

MEASUREMENT AT ICF LEVELS
INTERACTION BETWEEN ICF LEVELS

Person / Environment

Impairment

Activity

Participation

Capacity ⇔ Performance
Objective ⇔ subjective measures

DEFINITIONS

- CAPACITY MEASURES
  - Maximal Ability to execute a task or action in a standard or uniform environment
  - Highest probable level of functioning of a person

- PERFORMANCE MEASURES
  - What does an individual in his/her current environment

Accelerometry as a measure of walking behavior in multiple sclerosis

Motl RW, Pilutti L, Sandroff BM, Dlugonski D, Sosnoff JJ, Pula JH. Accelerometry as a measure of walking behavior in multiple sclerosis. Acta Neurol Scand: 2013: 127: 384–390.
© 2012 John Wiley & Sons A/S.

R. W. Motl[1], L. Pilutti[1], B. M. Sandroff[1], D. Dlugonski[1], J. J. Sosnoff[1], J. H. Pula[2]
[1]Department of Kinesiology and Community Health,

MSWS-12
MS WALKING SCALE

- Standing
- Ability to run
- Need for support
- Moving around the home
- Concentration needed to walk
- Walking speed
- Maintaining balance
- Climbing stairs
- Walking distance
- Effort needed to walk
- Ability to walk
- Gait

WALKING MEASURES

Topical Review

MULTIPLE SCLEROSIS JOURNAL | MSJ

Assessing walking disability in multiple sclerosis

Bernd C. Kieseier[1] and Carlo Pozzilli[2]

Multiple Sclerosis Journal
0(0) 1–11
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sagepub.co.uk/journalsPermissions.nav
DOI: 10.1177/1352458512444498
msj.sagepub.com
SAGE

- Published in 2012
- Overview of Common Measures
  - Instructions
  - Test-retest Reliability
  - Validity (relation between measures)

USUAL OF FASTEST SPEED DOES IT MATTER?

- Gianfresco et al (2011) Gait & Posture
- Gijbels, Dalgas, Feys et al (2012) MSJ
- Feys et al (2013) MSARD
  - 27 pwMS
    - REVAL Hasselt
    - Rehabilitation & MS Center Overpelt
  - **3 subgroups based on usual gait speed** (Lord/Perry)
    - MLCW<0,82m/s mean EDSS 6,79
      most limited community walkers
    - LCW and mean EDSS 3,64
      limited community walkers
    - CW>1,14m/s mean EDSS 2,89
      community walker

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KNOWLEDGE IN ACTION

Walking distance

6mWT[23]	Total distance covered in 6 min (m) 30 m hallway Information of time (per minute) No verbal encouragement *Goldman et al (2008); MSJ* *Gijbels et al (2012), MSJ*	Person directed to walk for 6 min at maximal speed back and forth in a hallway turning at each end; may use assistive device, no permitted rest, no encouragement. Sometimes administered without emphasis on speed and for allowing rest and verbal encouragement[21, 22]
2mWT[19]	Total distance covered in 2 min (m)	Same as for 6mWT but for 2 min

6MWT AS GOLDEN STANDARD

- No Floor or ceiling effect
  ⇔ T25FW/10MWT in fast walkers

- Normative data (age, sex) available

- Construct: Muscle 'strength' & **'endurance'**
  - Related to 'muscle fatigue/fatiguability' *Broekmans et al (2012) MSJ*
  - Heart rate/Energy consumption *Dalgas, Feys et al (2013) J Rehab Med*
    Motl et al (2012) BMC Neurology

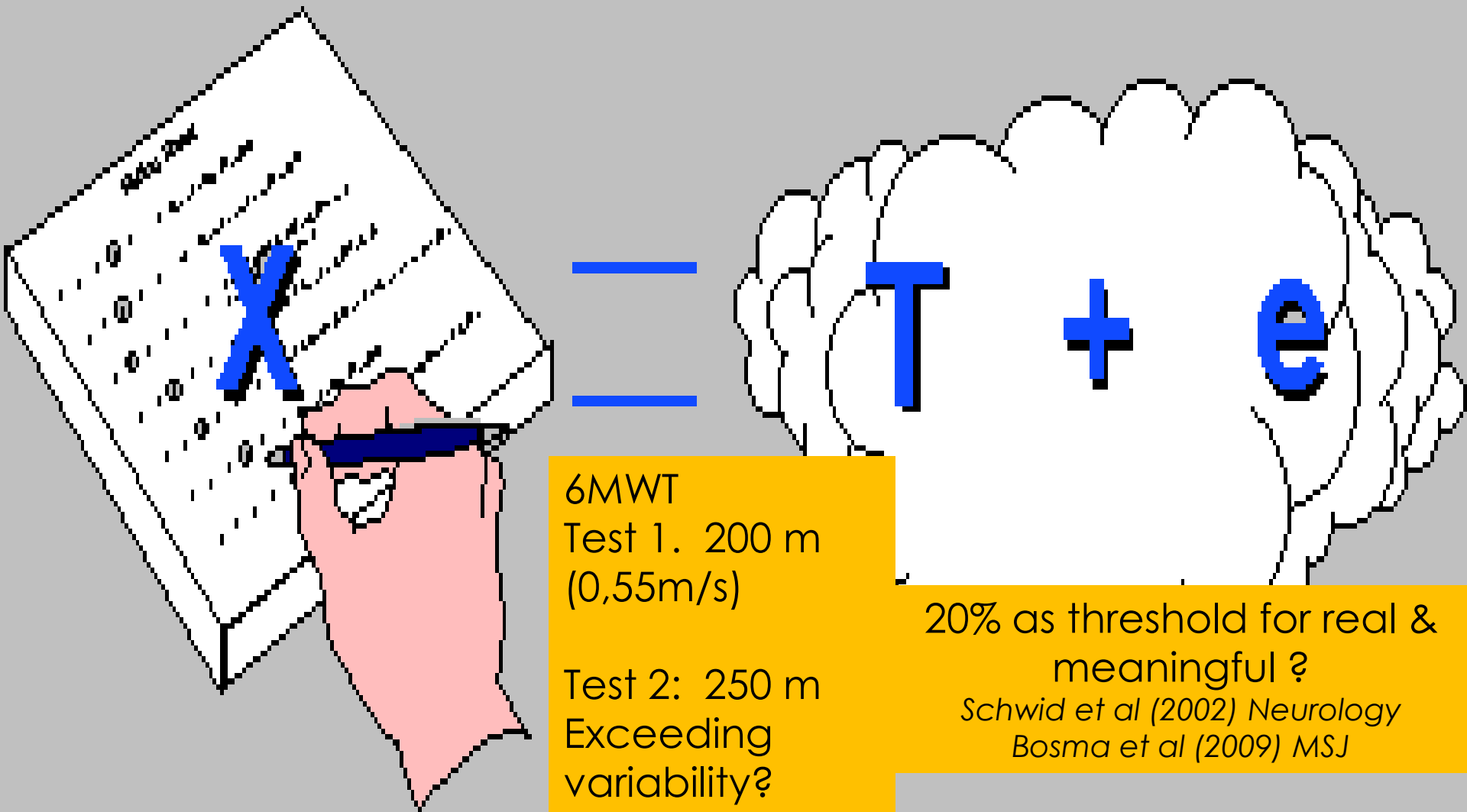
- Related to habitual walking *Gijbels, Feys et al (2010) MSJ*

Goal of Medical treatment & Rehabilitation

? WALKING ASSESSMENT ?

Test-retest reliability & Responsiveness

Observed Score = **True Ability** + **Random Error**



6MWT
Test 1. 200 m (0,55m/s)

Test 2: 250 m
Exceeding variability?

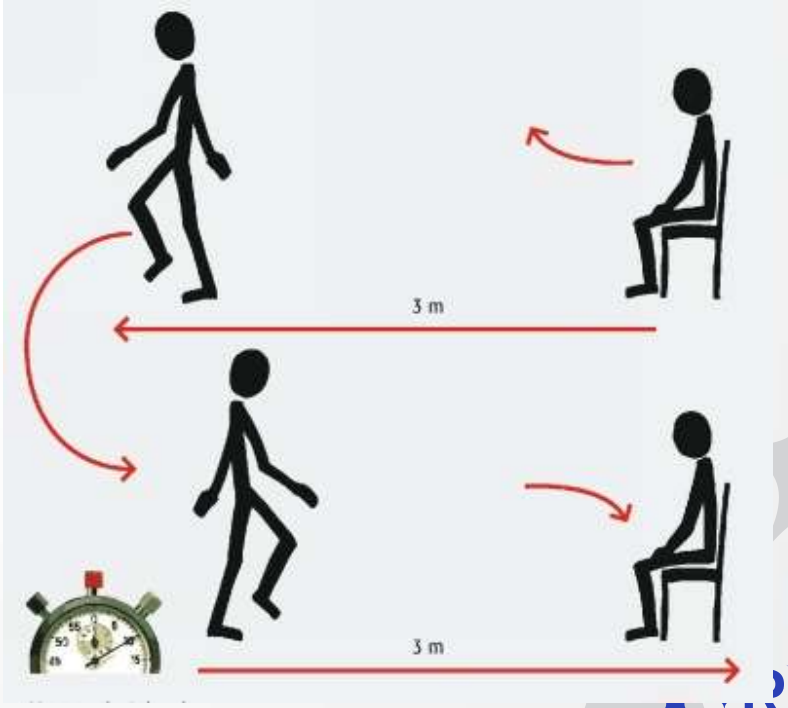
20% as threshold for real & meaningful ?

Schwid et al (2002) Neurology
Bosma et al (2009) MSJ

TIMED UP AND GO TEST (TUG)

- Stand up, walk 3m and back, sit down
- Assesses mobility, dynamic balance, walking ability, and fall risk in older adults (14-21")

- Nilsagard et al 2007
  good test-retest (ICC)
- Good validity
  - Walking
  - Balance



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- Good validity
  - Walking
  - Balance

- **Dual Tasking**
  - Motor
  - Cognitive

Gait & Posture 32 (2010) 332–335

Contents lists available at ScienceDirect

Gait & Posture

journal homepage: www.elsevier.com/locate/gaitpost

ELSEVIER

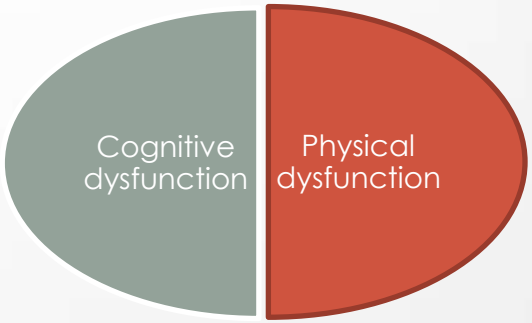
Walking while talking—Difficulties incurred during the initial stages of multiple sclerosis disease process☆

Alon Kalron[a,c,*], Zeevi Dvir[b,c], Anat Achiron[a,c]

[a] Multiple Sclerosis Center, Sheba Medical Center, Tel Hashomer, Israel
[b] Institute of Motor Functions, Sheba Medical Center, Tel Hashomer, Israel
[c] Sackler Faculty of Medicine, Tel-Aviv University, Israel

Walking and Thinking in Persons With Multiple Sclerosis Who Vary in Disability

Jacob J. Sosnoff, PhD, Morgan K. Boes, BS, Brian M. Sandroff, BS, Michael J. Socie, BS, John H. Pula, MD, Robert W. Motl, PhD



TAKE HOME MESSAGES

Walking

- Can be measured at different ICF levels
- Is Multi-dimensional (ability, speed, mobility, behavior) & can be impacted by cognition
- Test selection depending on treatment goal
- Careful interpretation of test scores to conclude on real and meaningful change

CLINICAL ORIENTED LITERATURE

- International Journal of MS Care

IJMSC 2011

Evaluating Walking in Patients with Multiple Sclerosis

Which Assessment Tools Are Useful in Clinical Practice?

Francois Bethoux, MD; Susan Bennett, PT, DPT, EdD, NCS, MSCS

ACKNOWLEDGEMENTS

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National MS center Melsbroek

Revalidatie & MS Centrum | Overpelt

FACULTATIS MEDICAE TERTIAE UNIVERSITATIS CAROLINAE • SIGILLUM

MS Hospitals Denmark

AARHUS UNIVERSITET

AVOKUNTOUTUS AKSONI

MSC

HELSE BERGEN Haukeland University Hospital

MASKUN NEUROLOGINEN KUNTOUTUSKESKUS

MS Norwegian Multiple Sclerosis COMPETENCE CENTRE

ms-senteret HAKADAL AS

univerzitetni klinični center ljubljana
University Medical Centre Ljubljana

UNIVERSITETET I TROMSØ

NORDLANDSSYKEHUSET NORDLÁNDA SKIHPPIJVIESSO

RESEARCH WITH PLYMOUTH UNIVERSITY

Poole Hospital NHS
NHS Foundation Trust

Cemcat Centre d'Esclerosi Múltiple de Catalunya

RIMS

- Questions

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