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LIFE AFTER THE ACCIDENT

POST POLIO SYNDROME
– a challenge of today

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Outcomes measures for physical functioning in post-polio research

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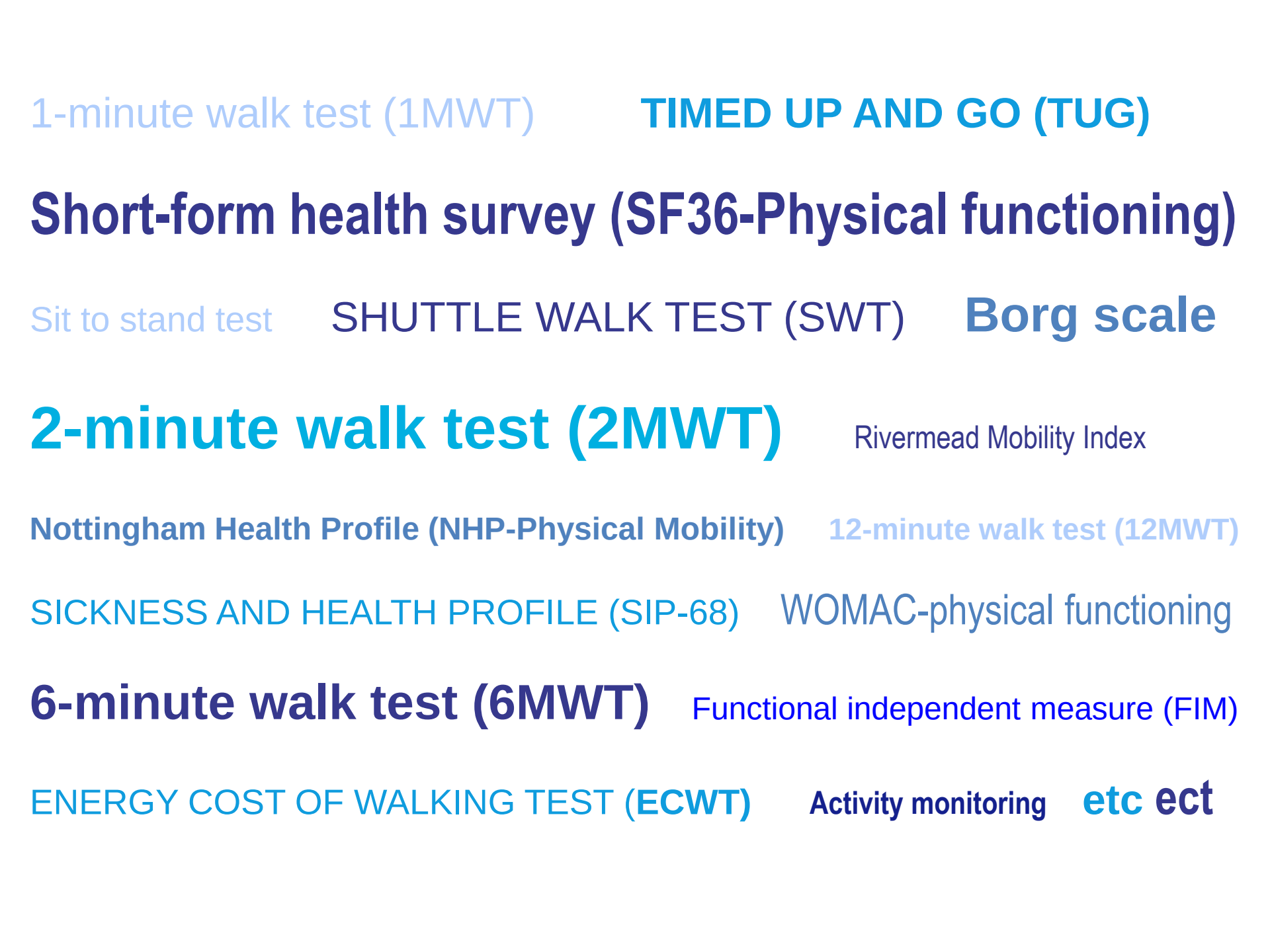
Program

1	**Background -** *Introduction and Aims of the presentation*
2	**Methods -** *What to measure and What instruments to use?*
3	**Results -** *Applicable and valid outcome measures of physical functioning*
4	**Discussion -** *Conclusion and Key points*
5	**Questions -**

1. Background

Introduction

- Physical functioning is an important health outcome in post-polio research.
- Many instruments are available to measure it.
- However, clear recommendations regarding which instruments or outcome measures to use are lacking.


1-minute walk test (1MWT)
TIMED UP AND GO (TUG)
Short-form health survey (SF36-Physical functioning)
Sit to stand test
SHUTTLE WALK TEST (SWT)
Borg scale
2-minute walk test (2MWT)
Rivermead Mobility Index
Nottingham Health Profile (NHP-Physical Mobility)
12-minute walk test (12MWT)
SICKNESS AND HEALTH PROFILE (SIP-68)
WOMAC-physical functioning
6-minute walk test (6MWT)
Functional independent measure (FIM)
ENERGY COST OF WALKING TEST (ECWT)
Activity monitoring
etc ect

1. Background

Aims of the presentation

- Discuss some issues surrounding outcome assessment of physical functioning.
- Consider the most applicable and valid outcome measures in this area, based on the ICF.
- Define two primary qualifiers to evaluate physical functioning in PPS.

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2 Methods

What to measure?

- PPS is very slowly progressive, with muscle weakness, muscle fatigability and general fatigue as major symptoms.
- These symptoms negatively affect mobility, motor performance, and quality of life.
- To quantify the effectiveness of rehabilitation treatment, it is important to evaluate these aspects of physical functioning.

2 Methods

What to measure?

- Physical functioning covers several domains of the ICF, and within these domains several 2nd and 3rd domains.

- d4 Mobility
  - d415 maintaining a body position (e.g. standing)
  - d420 transferring oneself
  - d450 walking
    - d4500 walking short distances
    - d4501 walking long distances
    - d4502 walking on different surfaces
    - d4503 walking around obstacles
  - d455 moving around
  - d460 moving around in different locations

Define the prime concept to be measured prior to choosing specific instruments to evaluate the concept!

Body functions	Activity capacity	Activity performance	Participation
b2. Sensory functions -Pain	**d4. Mobility** -Standing -Transferring oneself -Walking short distances -Walking long distances -Walking around obstacles	**d4. Mobility** -Transferring oneself -Walking short distances -Walking long distances -Walking around obstacles -Moving around -Moving in different locations	**d6. Domestic life** -House hold tasks
b7. Movement functions -Joint mobility -Muscle power -Muscle endurance -Muscle stiffness -Gait pattern	**d5. Self-care** -Washing oneself -Toileting -Dressing	**d5. Self-care** -Washing oneself -Toileting -Dressing	**d8. Major life areas** -Work and employment **d9. Community life** -Recreation and leisure

2 Methods

What instruments to use?

- The suitability of a measurement instrument is also dependent on the psychometric properties in a given sample and context.

  - Feasibility
  - Validity
  - Reproducibility
  - Responsiveness

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Body functions	Activity capacity	Activity performance	Participation
b2. Sensory functions -Pain (TUG) (1MWT) (2MWT)	**d4. Mobility** -Standing -Transferring oneself -Walking short distances -Walking long distances -Walking around obstacles (6MWT) (ECWT)	**d4. Mobility** -Transferring oneself -Walking short distances -Walking long distances -Walking around obstacle -Moving around -Moving in different locations (SF36-Physical functioning) Activity monitoring	**d6. Domestic life** -House hold tasks
b7. Movement functions -Joint mobility -Muscle power -Muscle endurance -Muscle stiffness -Gait pattern	**d5. Self** -Washin -Toileting -Dressin Borg scale (12MWT)	**d5. Self-care** hing oneself -Toileting -Dressing	**d8. Major life areas** -Work and employment **d9. Community life** -Recreation and leisure

3 Results-1

- 2MWT

  - Purpose: measure of walking capacity (distance)

  - Instruction: “walk at a comfortable speed for two minutes as far as you can”.

  - Outcome measure: distance walked (m) in 2 minutes

  - Psychometric properties:
    - Good feasibility: inexpensive, little time; simple to perform
    - Good validity: 2MWT v 6MWT in stroke (n=18): r = 0.99 (Kosak 2005)
      2MWT v SF36 in PSS (n=57): r = 0.69 (Stolwijk-Swűste 2008)
    - Good reliability: in PSS (n=63): ICC = 0.94 (Horemans et al 2004)
      in PSS (n=57): ICC = 0.92 (Stolwijk-Swűste et al 2008)
    - Responsiveness: in PPS (n=168): decrease of 3.6% p/year (Stolwijk-Swűste 2010)
      in PPS (n=20): no change in walked distance (Brehm 2008)

      Reasons for poor responsiveness: the individual’s speed is also influenced by balance; small speed range.

3 Results-2

- ECWT

  - Purpose: measure of walking capacity (energy cost (EC), distance, speed)

  - Instruction: “walk at a constant, comfortable speed for six minutes”.

  - Outcome measures: EC of walking (J/kg/m), distance walked (m), speed (m/min)

  - Psychometric properties:
    - Moderate feasibility (expensive; requires 30 minutes; can be inconvenient)
    - Good validity: EC v strength in PSS (n=14): r = -0.84 (Brehm et al 2006)
      EC v SF36-PF in PSS (n=44): r = -0.40 (Brehm, unplublished)
    - Good reliability: in PSS adults (n=14): ICC = 0.96; SDD = 9.4% (Brehm 2006)
    - Responsiveness: in PPS (n=20): 18% decrease in EC (Brehm 2008)

      Reasons for good responsiveness: the physical demands of walking in PPS are high compared to normal, indicating a large scope for functional gain.

3 Results-3

- 6MWT
  - Purpose: measure of walking capacity and physical fitness
  - Instruction: “walk at a maximal speed for 6 minutes, without running”.
  - Psychometric properties: in PPS; reliability is good (Flansbjer 2010)
- Shuttle walk test (SWT, incremental (I) or endurance (E))
  - Purpose: measure of physical fitness
  - Instruction: Patients are asked to walk along a 10-m circuit. Walking pace (incremental or at an intensity of 80% of VO2max) is controlled by a series of pre-recorded bleeps. Patients walk until they are too breathless, too tired or can no longer maintain the pace.
  - Psychometric properties: in PPS; unknown
    in COPD; ESWT more responsive than 6MWT (Revill 2010)

3 Results-4

- SF36-Physical functioning

  - Purpose: measure of self-perceived walking performance

  - Instruction: the patient is asked to fill in a 9-scale questionnaire, with the physical functioning (PF) scale consisting of 10 questions on a 3-point scale.

  - Outcome measures: PF score (range 0-100, with 100 as maximum score)

  - Psychometric properties:
    - Good feasibility: inexpensive, little time; simple to perform
    - Good validity: Cronbach's alpha = 0.84 (Aaronson 1998)
    - Good reliability: in PSS (n=57): ICC = 0.92; SDD = 16.5 (Stolwijk-Swűste 2008)
    - Responsiveness: in PPS (n=168): decrease of 9.2 in 5 years (Stolwijk-Swűste 2010)
      in PPS (n=20): no change in SF36_PF score (Brehm 2008)

      Reasons for poor responsiveness: SF36-PF can only detect large changes, that might not be adequately responsive to interventions effects; environmental and personal factors also play a role.

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4 Discussion

Conclusions

- Physical functioning covers several domains of the ICF.

- Always define the prime concept to be measured, prior to choosing specific instruments to evaluate the concept.

- The suitability of a measurement instrument is also dependent on its psychometric properties in a given sample and context.

4 Discussion

Key points

- The 2MWT is recommended as preferred outcome measure to evaluate walking capacity in post-polio research.

- The 6MWT or the ESWT may be interesting alternatives.

- Walking performance, as perceived by the patient, should be preferably assessed with the SF36-PF scale.

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