

# Implementing the ICF: Using the Wheelchair Skills Program to Quantify and Address Mobility Limitations

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# Wheelchair Skills Program (WSP)

- Wheelchair Skills Test (WST)
- Wheelchair Skills Training Program (WSTP)

– Source: [www.wheelchairskillsprogram.ca](http://www.wheelchairskillsprogram.ca)

1) Using the Wheelchair Skills  
Test to *Quantify* ICF Mobility  
Limitations

# Hierarchy of Rehabilitation Outcome Measures

- Global
- Intermediate-level
- Highly specific

# The Ultimate Wheelchair Skills Test (ICF *Performance*)

- Wheelchair users, in their own wheelchairs and in their own environments
- BUT...
  - Difficult to standardize
  - Often impractical

# Simulation of Wheelchair Use (ICF *Capacity*)

- Well standardized environment
- Compression of space and time
- Results can be documented
- Safety can be assured
- Other wheelchairs are available
- Expertise is available

# Wheelchair Skills Test: Design Criteria (“Wish List”)

- reflect wheelchair-user capability
- be safe for subjects and test personnel
- be fast (30 minutes or less on average)
- be inexpensive
- not take up too much space

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- be usable in the community setting
- include a wide range of wheelchair skills
- reflect commonly used skills
- reflect commonly used components
- be non-restrictive re user techniques
- be non-restrictive re chair design

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- be applicable to all ages and diagnoses
- be independent of culture and language
- exhibit good measurement properties
- be useful to clinicians, users, institutions, researchers and manufacturers

# Some Intermediate-Level Measures of Manual Wheelchair Skills

- Webster JS et al. Arch PMR 1995;76:924-8
- Harvey LA et al. Spinal Cord 1998;26:427-30
- Mills T et al. Disabil Rehabil 2002;24:38-46
- Stanley RK et al. JRRD 2003;40:301-308
- Kilkins OJ et al. Arch PMR 2002;83:1783-8
- Kilkins OJ et al. Arch PMR 2004;85:424-31
- Kirby et al. Arch PMR 2002;83:10-18
- Kirby et al. Arch PMR 2004;85:794-804

# Evolution of the WST

- Version 1.0: 1995-1999
- Version 2.4: 1999-2003
- Version 3.0: 2003-present

# WST 2.4 Measurement Properties

- Participants: 298
  - 169 wheelchair users
  - 129 able-bodied subjects
- WST administrations: 431
- age 17-88 years
- Time taken: 27.0 ( $\pm 9.3$ ) minutes
- Safety: no serious adverse incidents

# Reliability of Total WST Scores

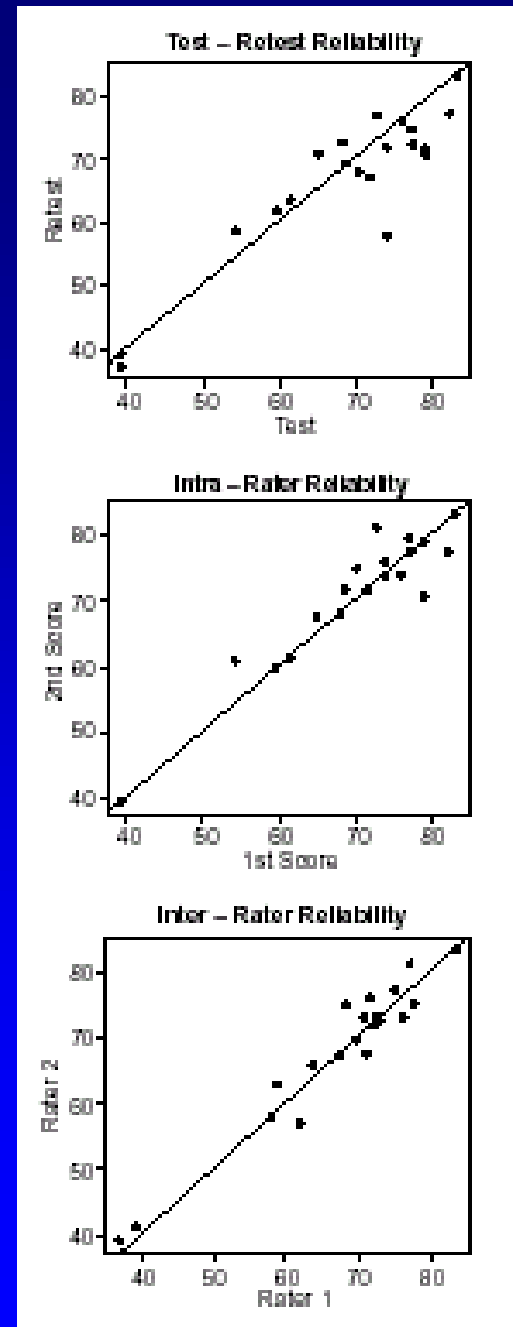
test-retest 0.90

intra-rater 0.96

inter-rater 0.97

n = 20

Kirby et al Arch PMR 2004;85:794-804



# Individual Skills

- Success rates: 0.3-100%
- Reliability (% concordance): 73-100%

## WST 2.4: Validity

- **Content:** No “floor” or “ceiling” effects
- **Concurrent:** Correlations of total WST scores with:
  - Global assessments of therapists: 0.39
  - Functional Independence Measure (FIM): 0.38

# WST 2.4: Construct Validity

- **Age:** inverse correlation ( $-0.434$ )
- **Gender:** males > females ( $p < 0.001$ )
- **Experience:** positive effect ( $p = 0.01$ )
- **Wheelchairs:** lightweight > conventional WCs ( $p < 0.001$ )
- **Diagnosis:** WCUs with stroke had a lower mean score ( $p < 0.05$ ) and more asymmetry

# WST 2.4: Usefulness to Clinicians

- 94% of therapists felt that the WST had been useful in some way

# Subjective vs Objective WST: the Questionnaire Version (WST-Q)

- Newton et al. Arch PM&R 2002;83:1295-9
- Mountain et al. Arch PM&R 2004;85:416-23
- Minimizes “training to test” problems
- More *Participation* than *Activity*

# WST 3.1 Hierarchy

- Total Score
- Skill Levels: 3
  - Indoor
  - Community
  - Advanced
- Individual Skills: 57

# WST 3.1: Calculated Scores

- Routine:
  - Total Percentage Score
- Optional:
  - Symmetry Index
  - Goal Attainment Score (%)
  - Skill Level Subtotals (%)
  - Caregiver-Assisted (%)
  - Special Purpose (e.g., RAD-Relevant)

# Clinical Vision for WST

- For individual wheelchair users:
  - To document initial status
  - To identify needed interventions
  - To assist in wheelchair prescription
  - To assist in justifying funding for wheelchairs
  - To assist in wheelchair training
  - To document changes in function

# Other Uses of the WST

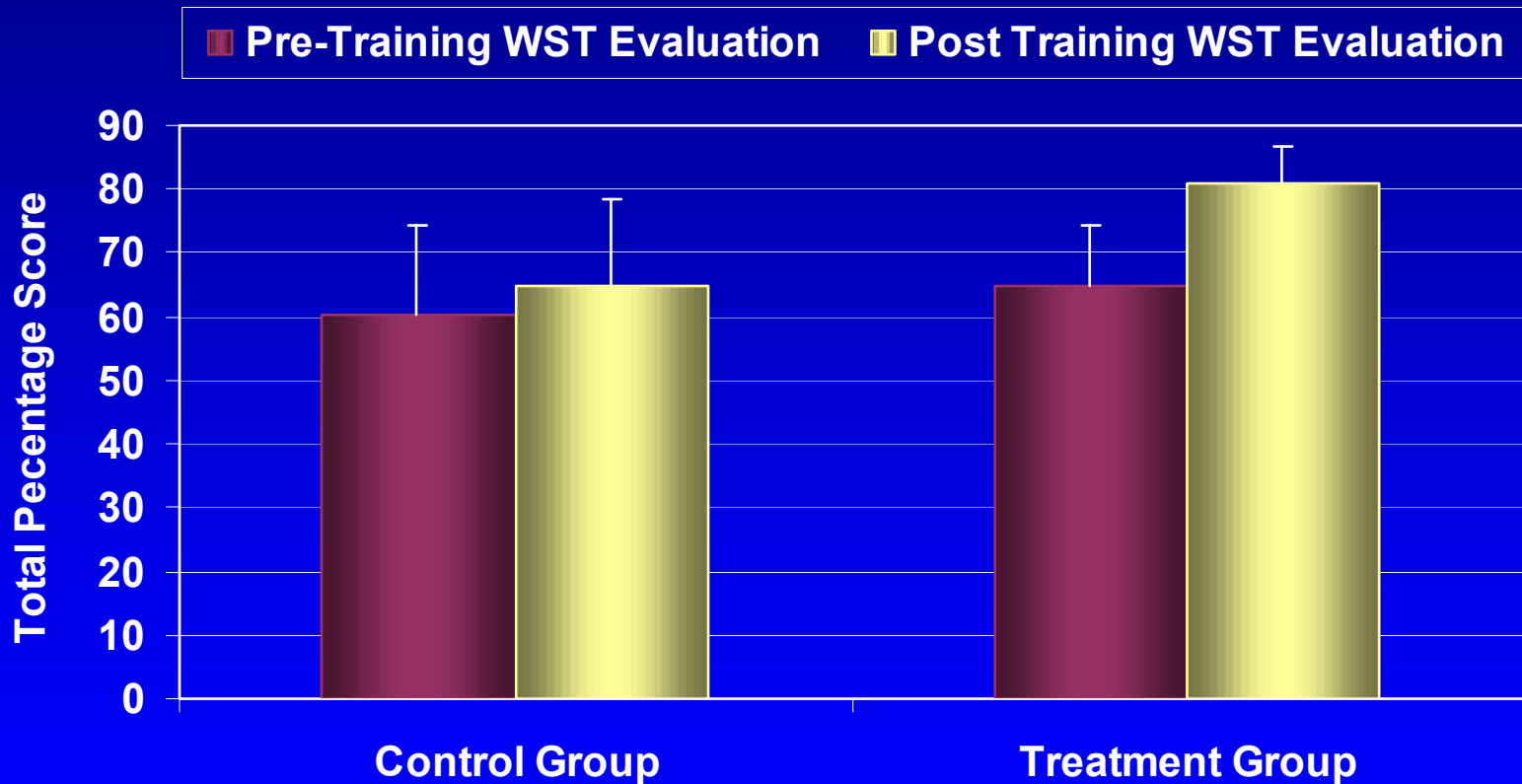
- Cross-mapping to other classification and quantification systems (e.g., ICF, CIHI NRS)
- “Drill-down” from other systems
- Outcome measure for programs
- Institutional (“driver’s license”)
- Medico-legal
- Product development
- Research

2) Using the Wheelchair Skills  
Training Program to *Address* ICF  
Mobility Limitations

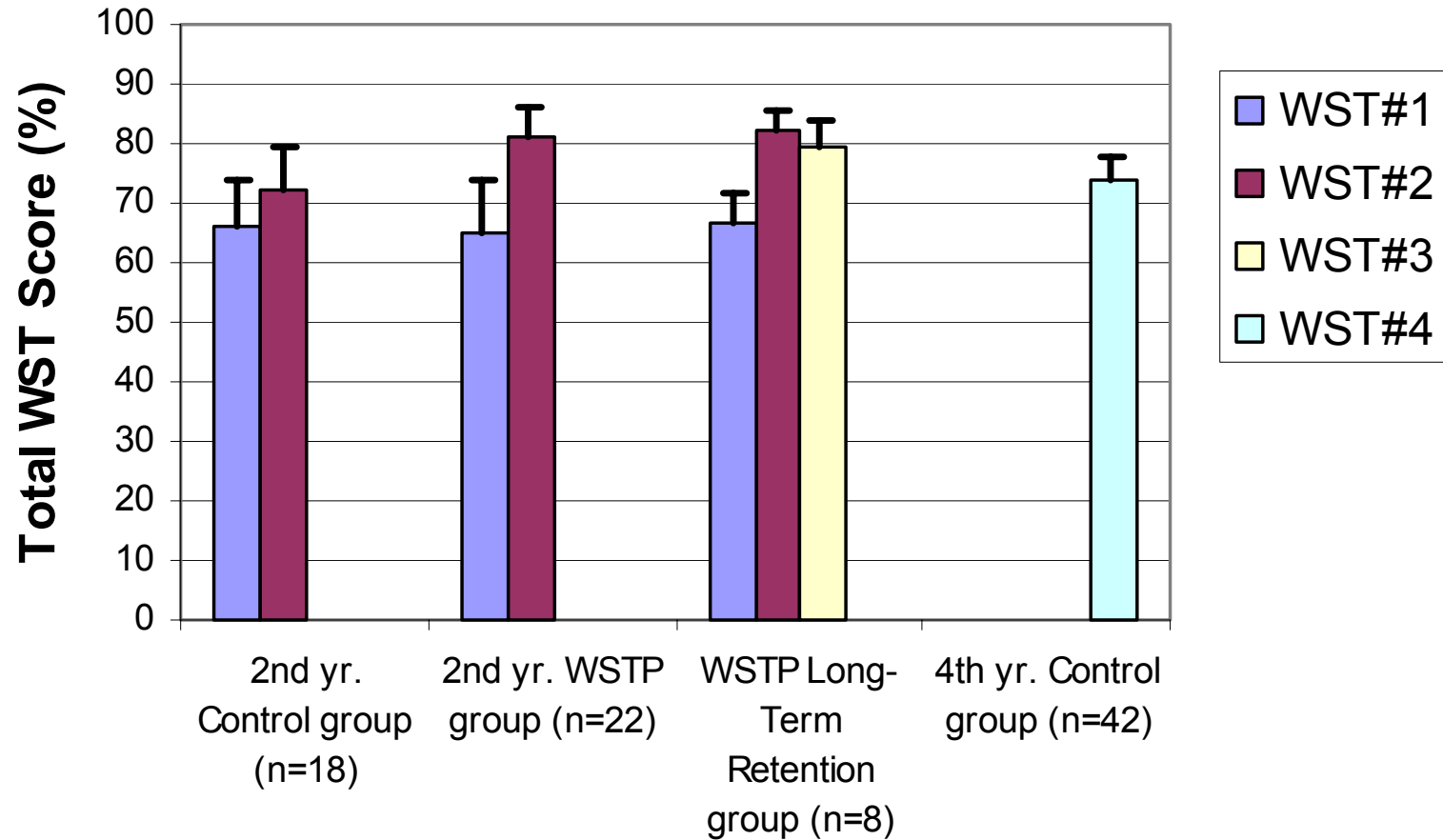
# Wheelchair Skills Training Program (WSTP)

- Same skill set as for WST
- Pre-training WST
- Objectives from goals, failures
- Curriculum (extensive wheelchair and motor-skills literature)
- Post-training WST

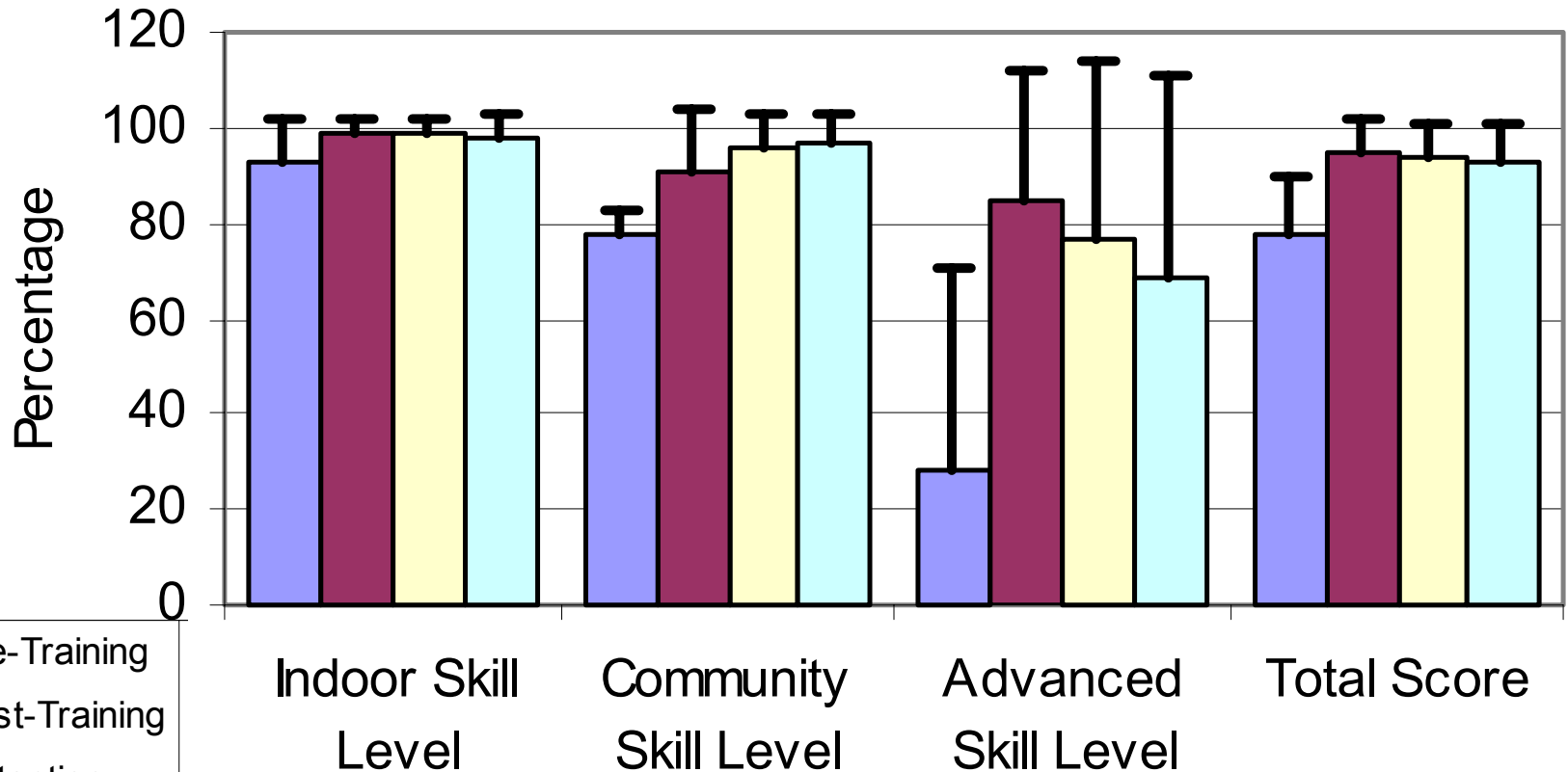
# WSTP 2.4 During Initial Rehabilitation



# WSTP 2.4 for OT Students



# WSTP 2.4 for Caregivers



- Pre-Training
- Post-Training
- Retention
- Skill-Transfer

N = 24, 9, 10

Kirby et al, Arch PM&R 2004;85:in press

# WSTP 3.1 Work in Progress

- Powered mobility aids
- The community setting
- Long-term-care setting
- In-depth analyses for specific skills
- Formalization of training and certification process for testers and trainers

# Examples of Future Work Planned

- Acute-care setting
- Pediatric setting (Wee-WSP)
- Translation into other languages

# Conclusions

- The WST is a new and robust means of implementing the ICF, by providing means to quantify and address mobility limitations