Demystifying the Use of Outcome Measures in Physical Therapy Practice

FPTA Spring conference, 2015

Neurologic Physical Therapy Practice

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Objectives

- Define and distinguish between the terms Minimal Detectable Change (MDC) and Minimal Clinically Important Difference (MCID)
  - Discuss the clinical interpretation of the MDC and MCID
- List the factors a clinician can use to select an outcome measure appropriately
  - Neurologic Outcome Measure selection via the ICF and EDGE recommendations
- Synthesize and evaluate the results of outcome measure assessments
- Formulate goals and an intervention plan based on outcome measure assessment
- Identify and describe web based resources to facilitate the use of outcome measures
  - rehabmeasures.org
  - Evidence Database to Guide Effectiveness: EDGE core sets
Clinical Scenario

- Mr Jones is a 56yo man admitted to inpatient rehabilitation 6 days s/p L MCA stroke

- As part of the initial examination the therapist assesses balance and gait:
  - BERG Balance Scale: 37/56
  - 10m walk test (self selected): 0.41m/s with stand by assist (limited community ambulation speed)

- 10 days later Mr Jones is re-assessed:
  - BERG Balance Scale: 46/65, an improvement of 9 points
  - 10m walk test (self selected): 0.78m/s, an improvement of 0.37m/s

What do the change scores mean?

- Is it real change?
- Is it clinically meaningful change?
- Will my patient feel the change?
- Will the change result in an improvement in their QOL?
Measures of responsiveness can help answer these questions

- Minimal Detectable Change Score (MDC)
- Minimal Clinically Important Difference (MCID)

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**Minimal Detectable Change (MDC)**

- The smallest change that is considered above measurement error.

**Sources of random measurement error:**

1. **Patient**: fatigue, cognitive status, disease stability state, medication state
2. **Clinician**: lack of familiarity
3. **Instrument**: vague scoring

**MDC Clinical Bottom Line**: Real change

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Beninato and Portney (2011)
Methods for calculating MDC value

- Based on SEM (expected variation in a set of stable scores)
  - standard deviation, test re-test reliability
- Confidence intervals (MDC\(_{90}\) or MDC\(_{95}\))

Beninato and Portney (2011)

Minimal Clinically Important Difference (MCID)

- The smallest change in a score that is worthwhile or meaningful to the patient

Clinical Bottom Line: Important change

Beninato and Portney (2011)
Methods for calculating MCID value

- **Distribution-Based**
  - Group change scores from time 1 to time 2
  - Effect Size and standard deviations of group samples included

- **Anchor-Based**
  - Likert Scale used to determine patient’s (clinician or caregiver) opinion of important change
    - 15-point Likert Scale (7: A very great deal better, 0: No change, -7 A very great deal worse)
  - QOL measures may be used as the anchor
    - A change in the MRS is the anchor for important change in gait speed

Beninato and Portney (2011)

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**Figure 1.** Continuum of change. Illustration of continuum of change from no measurable change to very large and important change. MDC indicates minimal detectable change, is the minimal score required to demonstrate real change by exceeding measurement error; MCID, minimal clinically important difference, is the minimal score associated with having achieved important change.

Where to find MDC and MCID values

Let's take a tour of:
www.rehabmeasures.org

Clinical scenario:
Interpretation of BERG

- Mr Jones improved 9 points on the BERG (46/56)
- MDC is 6 points for patient’s with stroke in in-patient rehab who walk with SBA (Stevenson 2001)
- Thus change in balance is real and not due to error
- MCID does not exist for inpatient setting and stroke population

IMPORTANT NOTES:
MDC for community dwelling persons with PD is 5pts, and 8pts for older adults in residential care (see rehabmeasures.org)
MDC values are great starting points for goal writing and to determine effectiveness of intervention:
In 2 weeks pt will demonstrate a ≥ 6 pt change on the BBS to demonstrate a real change in functional balance and a reduction in fall risk.
Clinical scenario: Interpretation of 10m walk test

- Mr Jones improved 0.37 m/s in gait speed (0.41 to 0.78 m/s)
- **MDC is 0.36 m/s (0.80 miles/hr)** for patient’s with stroke in in-patient rehab who can walk without assist (Fulk and Echterach 2008)
- Thus his change in gait speed is real and not due to measurement error
- The change is not necessarily meaningful since he remains a limited community ambulator (Perry et al. 1995; Schmid et al. 2007)

<0.4 m/s: household ambulator
0.4 - 0.8 m/s: limited community ambulator
>0.8 m/s: community ambulator

Thus treatments are working but more therapy is needed to make a meaningful difference

Limitations to MDC and MCID

- Reported MDC and MCID values are an estimate with limited generalization
- Values vary based on:
  - Diagnostic groups
  - Level of impairment
  - Setting
  - Age of patient
  - Clinician versus patient versus caregiver perspectives (MCID)

Beninato and Portney (2011)
How to select Outcome Measures

- Psychometrics (validity, reliability, responsiveness, floor and ceiling effects)
- Patient goals and characteristics
- Clinician experience
- Generic vs Disease specific measures
- Facility requirements
- Facility constraints/clinical environment
- Setting (acute, in-patient rehab, SNF, home care, outpatient)
- EDGE recommendations for OM use
- ICF model

Potter et al. (2011)

EDGE: CORE SETS

OM recommendations made for acute, in-patient, and outpatient, and based on clinical utility and good test psychometrics:

4= highly recommended; the outcome measure has excellent psychometric properties and clinical utility
3= recommended; the outcome measure has good psychometric properties and good clinical utility
2= reasonable to use but limited study in target group
1= not recommended; the outcome measure has poor psychometric properties and/or poor clinical utility

Core sets developed for: Stroke, MS, TBI, SCI, PD and Vestibular

http://www.neuropt.org/professional-resources/neurology-section-outcome-measures-recommendations

NOTE: Information is embedded within rehabmeasures.org and the direct link to EDGE can be found by clicking on the Links tab.
### Recommendations for patients with stroke:

**Highly recommended measures:**

- 6 minute walk
- 10 meter walk
- Berg Balance Scale
- FIM*
- Functional Reach
- Goal Attainment Scale
- Motor Activity Log
- Postural Assessment Scale for Stroke Patients
- Stroke Impact Scale†
- Timed Up and Go

**Recommended measures:**

- 5 time sit to stand
- 9 hole peg test
- Action Research Arm Test
- Activities-Specific Balance Confidence Scale
- Arm Motor Ability Test
- Assessment of Life Habits
- Box & Blocks test
- Chedoke-McMaster Stroke Assessment
- Dynamic Gait Index
- Dynamometry
- EuroQOL
- Falls Efficacy Scale*
- Fugl-Meyer Assessment of Motor Performance
- Functional Ambulation Categories*
- Modified Rankin Scale
- NIH Stroke Scale
- Rivermead Motor Assessment
- Stroke Adapted SIP-30†
- Stroke Rehabilitation
- Assessment of Movement
- Tardieu Spasticity Scale (Modified Tardieu)
- Trunk Impairment Scale
- Wolf Motor Function Test

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* = inpatient rehab only
† = outpatient rehab only

*Task force Co-chairs: Jane Sullivan, PT, DHS, Genevieve Pinto-Zipp, PT, EdD. Members: Beth Crowner, PT, DPT, NCS, Patty Kluding, PT, PhD, Diane Nichols, PT, NCS, Dorian Rose, PT, PhD, Rie Yoshida, PT, DPT*
ICF to Guide OM selection

Adapted from: Sullivan et al. (2011)

**Health Condition**
(stroke, PD, MS, SCI, TBI, vestibular...)

1. **Body Functions & Body Structure**
   - Motor control, sensation, tone, cognition/communication, vertigo
   - All clinical settings

2. **Activities**
   - Bed mobility, transitions, locomotion, gait, arm function, functional balance
   - All clinical settings

3. **Participation**
   - Family, social and employment roles
   - Most appropriate in outpt when patient is community living

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**Clinical Scenario for PD**

**History:** Mrs Smith is a 65yo ♀ with 8 year history of PD seen in outpt setting
- pt. c/o recent onset of falls with FOF, and daytime fatigue
- pt reports that she no longer likes to drive and relies on husband for transportation needs
- pt denies freezing of gait

**Systems Review:**
- BP sitting: 125/78, standing: 116/72, HR 72
- Pt A and O x 4 but frequently repeats self during examination
- Gross ROM deficits noted in Sh flex, elbow extension and knee extension, bilateral UE resting tremor noted
- Micrographia noted on paperwork
- Gait: short shuffling steps with decreased arm swing, mild flexed posture, independent without device but bradykinetic
- Transfers and bed mobility: independent but bradykinetic and posterior LOB noted with STS
- Balance: +ve pull test
ICF and PD EDGE: Highly Recommended OMs

**Health Condition**
Parkinson’s Disease

1. **Body Functions & Body Structure**
   - MDS-UPDRS – part 1 and 3, MOCA, H&Y, PD fatigue scale, FOG questionnaire

2. **Activities**
   - 10m walk, 6min, FGA, Mini BESTest, 5xSTS, 9 hole peg, MDS-UPDRS – part 2, TUG-cog, ABC scale

3. **Participation**
   - PDQ-8 or PDQ-39

**Direct:**
- Tremor,
- Bradykinesia,
- rigidity/flexed posture

**Indirect:**
- decreased ROM/flexibility/fatigue

**Body Functions & Body Structure**
- Direct: Tremor, Bradykinesia, rigidity/flexed posture
- Indirect: decreased ROM/flexibility/fatigue

**Activities**
- Bradykinetic gait and transfers, +ve pull test, new onset of falls, micrography

**Participation**
- Decreased socialization from not driving

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**The Activities-specific Balance Confidence (ABC) Scale**

For each of the following activities, please indicate your level of self-confidence by choosing a corresponding number from the following rating scale:

0% 10 20 30 40 50 60 (70) 80 90 100%

= completely confident

= no confidence

“How confident are you that you will not lose your balance or become unsteady when you...

1. ...walk around the house? 90 %
2. ...walk up or down stairs? 100 %
3. ...bend over and pick up a slipper from the front of a closet floor 80 %
4. ...reach for a small can off a shelf at eye level? 100 %
5. ...stand on your tiptoes and reach for something above your head? 50 %
6. ...stand on a chair and reach for something? 80 %
7. ...sweep the floor? 100 %
8. ...walk outside the house to a car parked in the driveway? 90 %
9. ...get into or out of a car? 90 %
10. ...walk across a parking lot to the mall? 70 %
11. ...walk up or down a ramp? 100 %
12. ...walk in a crowded mall where people rapidly walk past you? 50 %
13. ...are bumped into by people as you walk through the mall? 30 %
14. ...step onto or off an escalator while you are holding onto a railing? 80 %
15. ...step onto or off an escalator while holding onto parcels such that you cannot hold onto the railing? 50 %
16. ...walk outside on icy sidewalks? 10 %
Due to having Parkinson’s disease, how often during the last month have you...

<table>
<thead>
<tr>
<th>Question</th>
<th>Never</th>
<th>Occasionally</th>
<th>Sometimes</th>
<th>Other</th>
<th>Always or cannot do it at all</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Had difficulty doing the leisure activity which you would like to do?</td>
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<td>2. Had difficulty looking after your home, e.g. DIY, housework, cooking?</td>
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<td>3. Had difficulty carrying bags of shopping?</td>
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<td>4. Had problems walking half a mile?</td>
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<td>5. Had problems walking 100 yards?</td>
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<td>6. Had problems getting around the house as easily as you would like?</td>
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<td>7. Had difficulty getting around in public?</td>
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<td>8. Needed someone else to accompany you when you went out?</td>
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<td>9. Felt lighter or worried about falling over in public?</td>
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<tr>
<td>10. Been confused at the house more than you would like?</td>
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<td>11. Had difficulty reading yourself?</td>
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<td>12. Had difficulty dressing yourself?</td>
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<tr>
<td>13. Had problems tying up your shoe laces?</td>
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</tbody>
</table>

Please check that you have ticked one box for each question before going on to the next page.

Page 3 of 12

Questionnaire for patient completion.
<table>
<thead>
<tr>
<th>PDQ – 39 Domain</th>
<th>H &amp; Y stage 3 norms</th>
<th>Mrs. Smith exam findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mobility</td>
<td>49.8 %</td>
<td>42.5 %</td>
</tr>
<tr>
<td>ADL</td>
<td>49.8 %</td>
<td>29 %</td>
</tr>
<tr>
<td>Emotions</td>
<td>33.9 %</td>
<td>90 %</td>
</tr>
<tr>
<td>Stigma</td>
<td>29.6 %</td>
<td>25 %</td>
</tr>
<tr>
<td>Social</td>
<td>17.3 %</td>
<td>8.3 %</td>
</tr>
<tr>
<td>Cognitions</td>
<td>37.2 %</td>
<td>6.3 %</td>
</tr>
<tr>
<td>Communication</td>
<td>34.1 %</td>
<td>25 %</td>
</tr>
<tr>
<td>Body Pain</td>
<td>41.7 %</td>
<td>0 %</td>
</tr>
<tr>
<td><strong>Total Score</strong></td>
<td><strong>36.5 %</strong></td>
<td><strong>28.3 %</strong></td>
</tr>
</tbody>
</table>
Analyze OM findings to develop a POC and write goals

From ABC
- Step/stair training
- Dynamic balance: reaching, rising on toes, stepping over and onto boxes
- Reactive postural control/perturbation training
- Walking through busy clinic areas/dual tasking

**GOAL:** In 4 weeks patient will demonstrate a > 13% improvement on the ABC scale to demonstrate a real change in her balance confidence and reduce fall risk.

From PD-Q 39
- Refer back to physician/neuropsychologist for depression, anxiety and memory concerns
- Perform the MOCA
- Refer to local support group

References and Resources

- Rehabmeasures.org (has a ‘Links’ tab to take you to EDGE, PTNow, and other population specific resources)