Outcome measurement in the process of prosthetic care

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Measurement of Outcome

- Health condition
  - Body functions and Structures
  - Environmental Factors
  - Activities
  - Personal Factors
  - Participation
Introduction

Outcome measurement:
* Quality of life
* Degree of prosthetic (hand) function
* Satisfaction with prosthesis

GOOD Psychometric properties
Introduction

* Generic

* Pathology specific:
  → Lower limb amputation
  → Upper limb amputation
Body Function + Structure – Impairment

* Amputation level
* Dimensions (length, circumferences)
* Shape
* Skin + scar
* Firmness
Body Function + Structure – Impairment

* ROM
* Muscle strength
* Pain:
  → Stump
  → Phantom
Activities & Participation

Lower limb:
* Balance
* Standing
* Stand up
* Walking
* Jumping
* Running

Upper limb:
* Lifting and caring objects
* Fine hand use
* Hand and arm use
* ADL
* Domestic life
Balance – Berg Balance Scale
Generic Mobility – LL

* Timed “up & go” test
Generic Mobility – LL

* 2, 6 minutes walking test
* 10 m walking test
Mobility – amputee specific – LL

* Amputee Mobility Predictor with Prosthesis – AMPPro (Gailey 2002)


## LCI

### Maximum 42 points

<table>
<thead>
<tr>
<th></th>
<th>NO</th>
<th>YES, IF</th>
<th>YES, IF SOMEONE</th>
<th>YES ALONE</th>
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</thead>
<tbody>
<tr>
<td>a) Get up from a chair</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
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<tr>
<td>b) Pick up an object from the floor when you are standing up with your prosthesis</td>
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<td>c) Get up from the floor (eg. if you fell)</td>
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<td>d) Walk in the house</td>
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<td>e) Walk outside on even ground</td>
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<td>f) Walk outside on uneven ground (eg. grass, gravel, slope)</td>
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<td>g) Walk outside in inclement weather (eg. snow, rain, ice)</td>
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<tr>
<td>h) Go up the stairs with a hand-rail</td>
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<tr>
<td>i) Go down the stairs with a hand-rail</td>
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<tr>
<td>j) Step up a sidewalk curb</td>
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<td></td>
</tr>
<tr>
<td>k) Step down a sidewalk curb</td>
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<tr>
<td>l) Go up a few steps (stairs) without a hand-rail</td>
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<tr>
<td>m) Go down a few steps (stairs) without a hand-rail</td>
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<tr>
<td>n) Walk while carrying an object</td>
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</table>
Locomotor Capability Index

Good:
* Internal consistency
* Test-retest reliability
* Construct validity

Function – LL amputee specific

* Amputee Activity Score – AAS (Panesar 2001)

* Functional Measure for Amputees – FMA (Callaghan 2002)

* Hougton scale (Miller 2001)

Hougton scale

* 4 items
* 4 point ordinal scale (score 1 – 12)
* Good content and face validity, poor to good construct validity
* Some responsivness to change
* Good test-retest reliability
* Adequate internal consitency

Activities and participation – UL

* Clinical tests
  ✓ Children
* Questionnaires
  ✓ Adults
  ➔ Generic
  ➔ Amputee - specific
Tests for children – UL

* University of New Brunswick – UNB (Sanderson 1985)
  * 14-item developmentally based observational test (Thornby 1992)
  * 10-item observational test (Eldestein 1993)
* Assessment of Capacity for Myoelectric Control – ACMC (Hermansson 2005)
UNB test

* Good inter-rater reliability

* Moderate construct validity

Sanderson Er, Scott RN. Fredericton, NB: UNB 1985
* Griping

* Holding

* Releasing

* Manipulating

ACMC test

* Moderate to good inter-rater reliability for experienced raters
* Good construct validity
* Moderate discriminant validity

Questionnaires for children – UL

* Child Amputee Prosthetic Project – Prosthesis Satisfaction Inventory:
  → CAPP-PSI (Pruitt 1997)
  → CAPP-FSIF (Pruitt 1998)
  → CAPP-PSIT (Pruitt 1999)

* Prosthetic Upper extremity Functional Index – PUFII (Wright 2000)
PUFI

* Computer based questionnaires
* Younger children 3 – 6 years
  → 26 activities
* Older children ≥ 7 years
  → 38 activities
  → 14 same in both

Activity: 1

Do up the zipper of a coat or jacket

B. How does your child usually do the activity?

- both arms together with the prosthesis used actively
- both arms together with the prosthesis used passively
- with assistance of residual limb
- with non-prosthetic hand alone
- with some help from another person
- don’t know / not sure (please click in the box below and describe briefly)

[Blank box]
Part II Frequency and % Scores Report

Frequency and % Scores

Client: sample, young  
Client Number: 23465  
Assessment Date: 12/19/01

Does the client do the activity?
- A. Yes 92%
- B. cannot do 8%

Number of N/A: 0

How does the client usually do the activity?
- A. actively 23%
- B. passively 36%
- C. residual limb 0%
- D. one-handed 15%
- E. some help 15%
- F. cannot do 8%

How well does the client do the activity with the prosthesis?
- A. no difficulty 42%
- B. some difficulty 31%
- C. great difficulty 15%
- D. some help 4%
- E. cannot do 8%

Total score = 74.0 %
PUFI

* fair to good reliability\(^1\)
* lower inter rater reliability\(^1\)
* acceptable validity\(^2\)

Tests for adults – UL

* Southampton Hand Assessment Procedure – SHAP

SHAP test

* Good inter-rater reliability
* Good test-retest reliability
* Good discriminant validity

Questionnaires for adults – UL

* ABILHAND ¹, ²
* OPUS Upper Extremity Functional Status – OPUS- UEFS³

Questionnaires for adults

* **ABILHAND:**
  → 46 items
  → 5-point rating scale

* **OPUS-UEFS:**
  → 23 items
  → 5-point rating scale
  → Use of prosthesis
Quality of Life

* Generic:
  - SF-36
  - Sickness Impact profile – SIP

* Amputee specific:
  - Trinity Amputation and Prosthesis Experience Scale – TAPES
Patients satisfaction

Demet: Disabil Rehabil 2003
Assessment of prosthesis

* Prosthesis Evaluation Questionnaire – PEQ (Legro 1998)

* Quebec User Evaluation of Satisfaction with Assistive Technology – QUEST (Routhier 2001):

→ First part - personal and environmental factors

→ Second part – the importance that the individual attribute to each of the variables
Prosthetic function

* Maximal Force
* Maximal Velocity
* ROM
* Box and block
Discussion

* Generic outcome measures – comparison between subjects with different problems
* Specific measure – insight on the effect of the prosthetic device on subject’s functional status
**Conclusion**

* Measure at several levels
* Questionnaires are quick
* Tests give more information
* No universal test
Further reading


Thank you!