



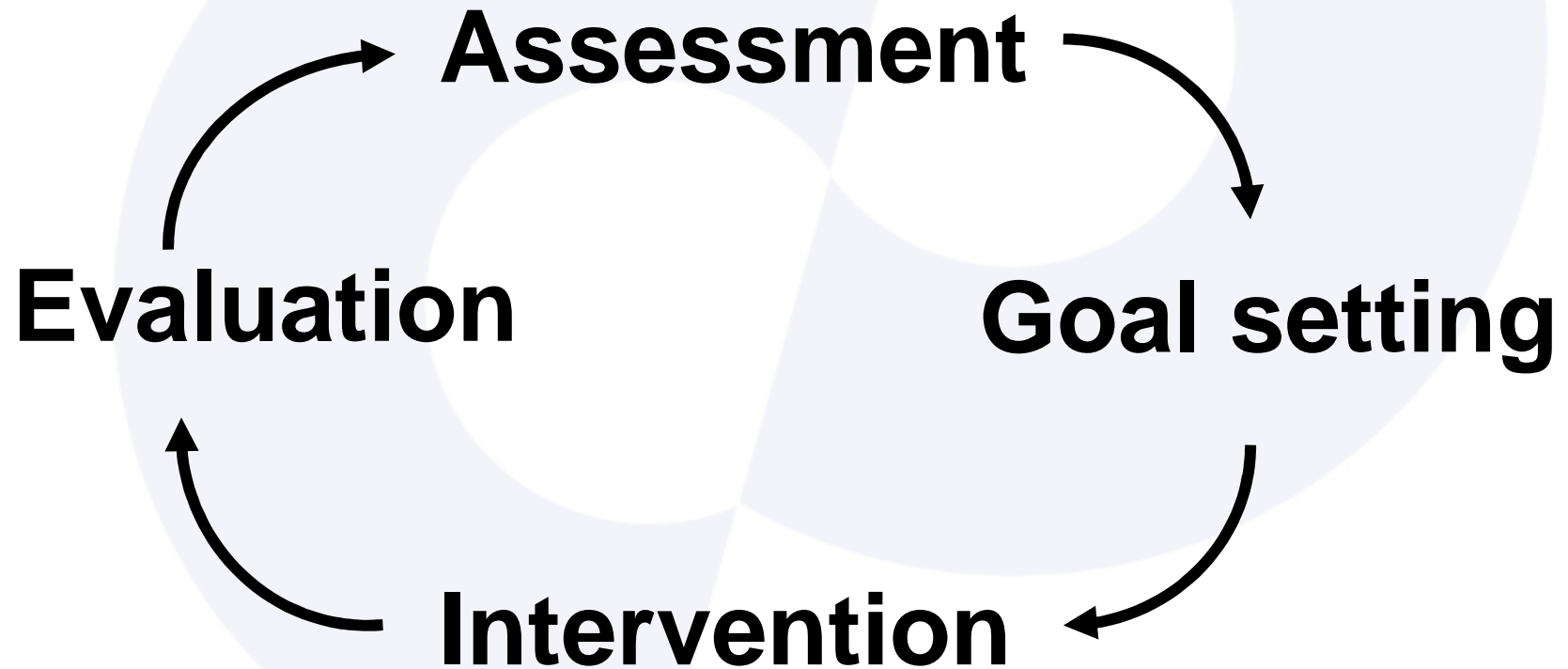
University Rehabilitation Institute Republic of Slovenia

Outcome measurement in the process of prosthetic care

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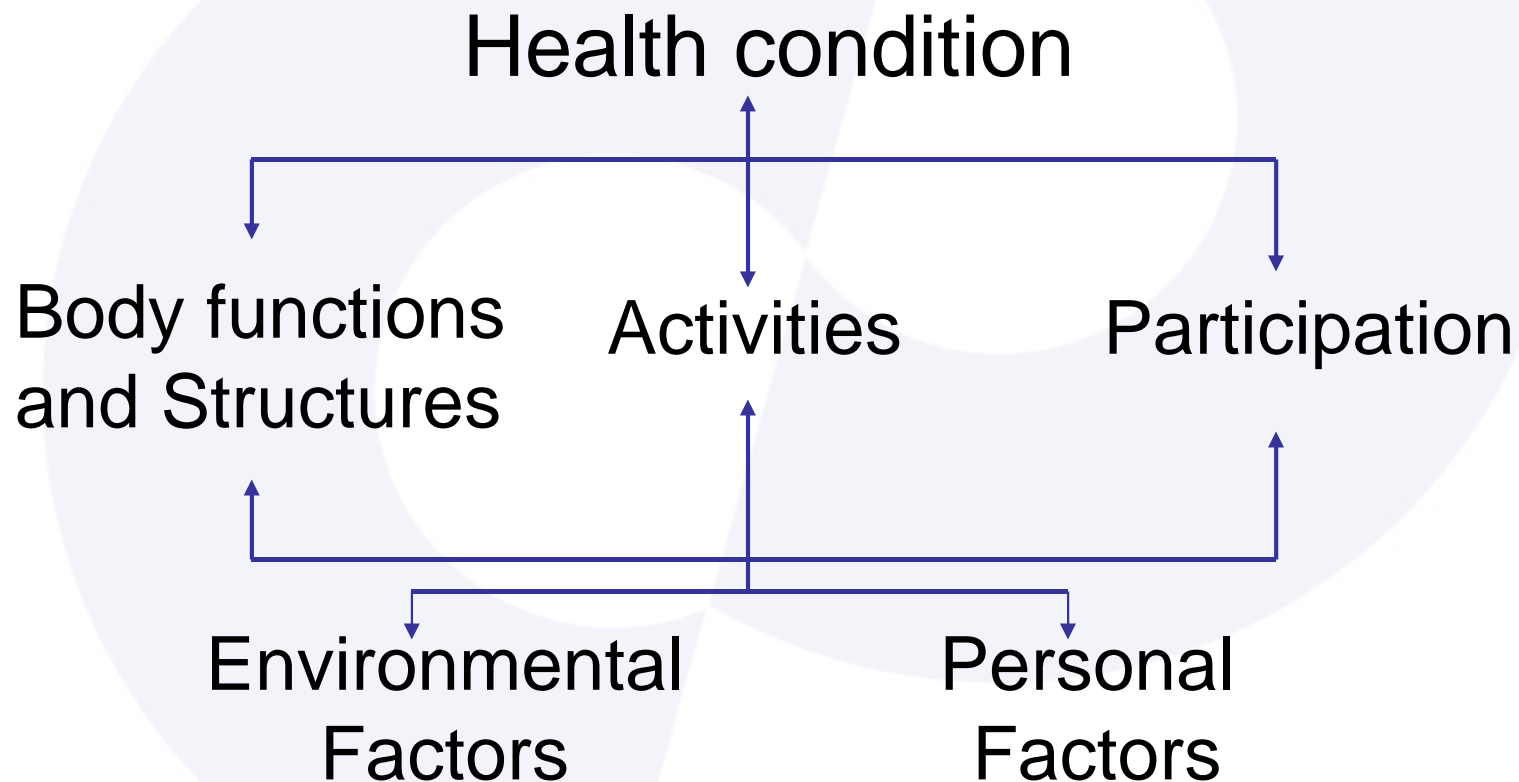


Introduction





Measurement of Outcome





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



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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)
- * Locomotor Capability Index – LCI (Gauthier-Gagnon 1998, Franchignoni 2004)

Gailey RS et al. Arch Phys Med Rehabil 2002; 83: 912 – 8.

Gauthier-Gagnon C et al. J Rehabil Outcomes Measurement 1998; 2: 40 – 6.

Franchignoni F et al. Arch Phys Med Rehabil 2004; 85: 743 – 8.

LCI

Maximum
42 points

	NO	YES, IF SOMEONE HELPS ME	YES, IF SOMEONE IS NEAR ME	YES ALONE
a) Get up from a chair	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b) Pick up an object from the floor when you are standing up with your prosthesis	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c) Get up from the floor (eg. if you fell)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d) Walk in the house	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e) Walk outside on even ground	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f) Walk outside on uneven ground (eg. grass, gravel, slope)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g) Walk outside in inclement weather (eg. snow, rain, ice)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
h) Go up the stairs <u>with</u> a hand-rail	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
i) Go down the stairs <u>with</u> a hand-rail	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
j) Step up a sidewalk curb	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
k) Step down a sidewalk curb	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
l) Go up a few steps (stairs) <u>without</u> a hand-rail	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
m) Go down a few steps (stairs) <u>without</u> a hand-rail	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
n) Walk while carrying an object	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



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)
- * Houghton scale (Miller 2001)

Panesar BS et al. Clin Rehabil 2001; 15: 157 – 71.

Callaghan BG et al. Prosthet Orthot Int 2002; 26: 113 – 9.

Miller WC et al. Arch Phys Med Rehabil 2001; 82: 1432 – 40.

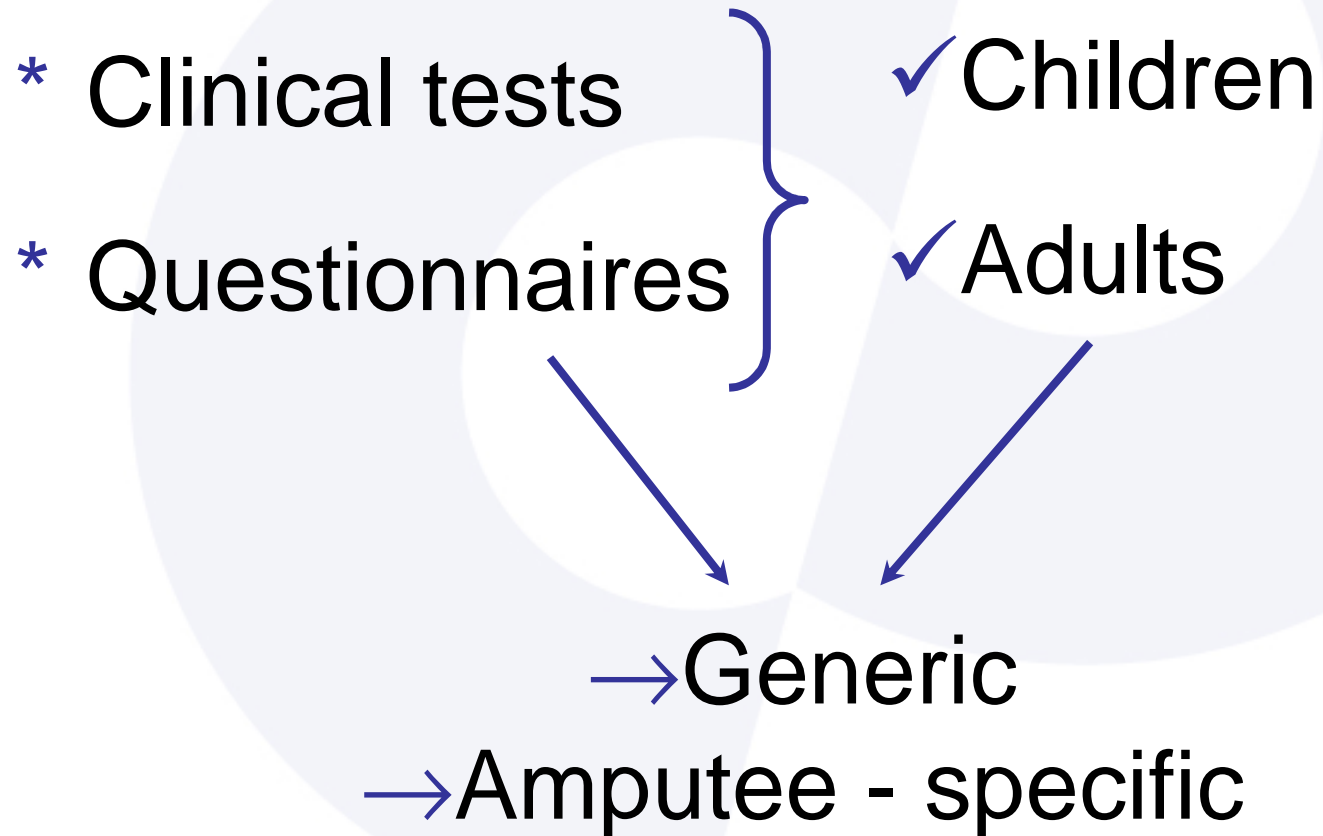


Houghton scale

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



Activities and participation – UL





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 – APMC (Hermansson 2005)



UNB test

- * Good inter-rater reliability
- * Moderate construct validity

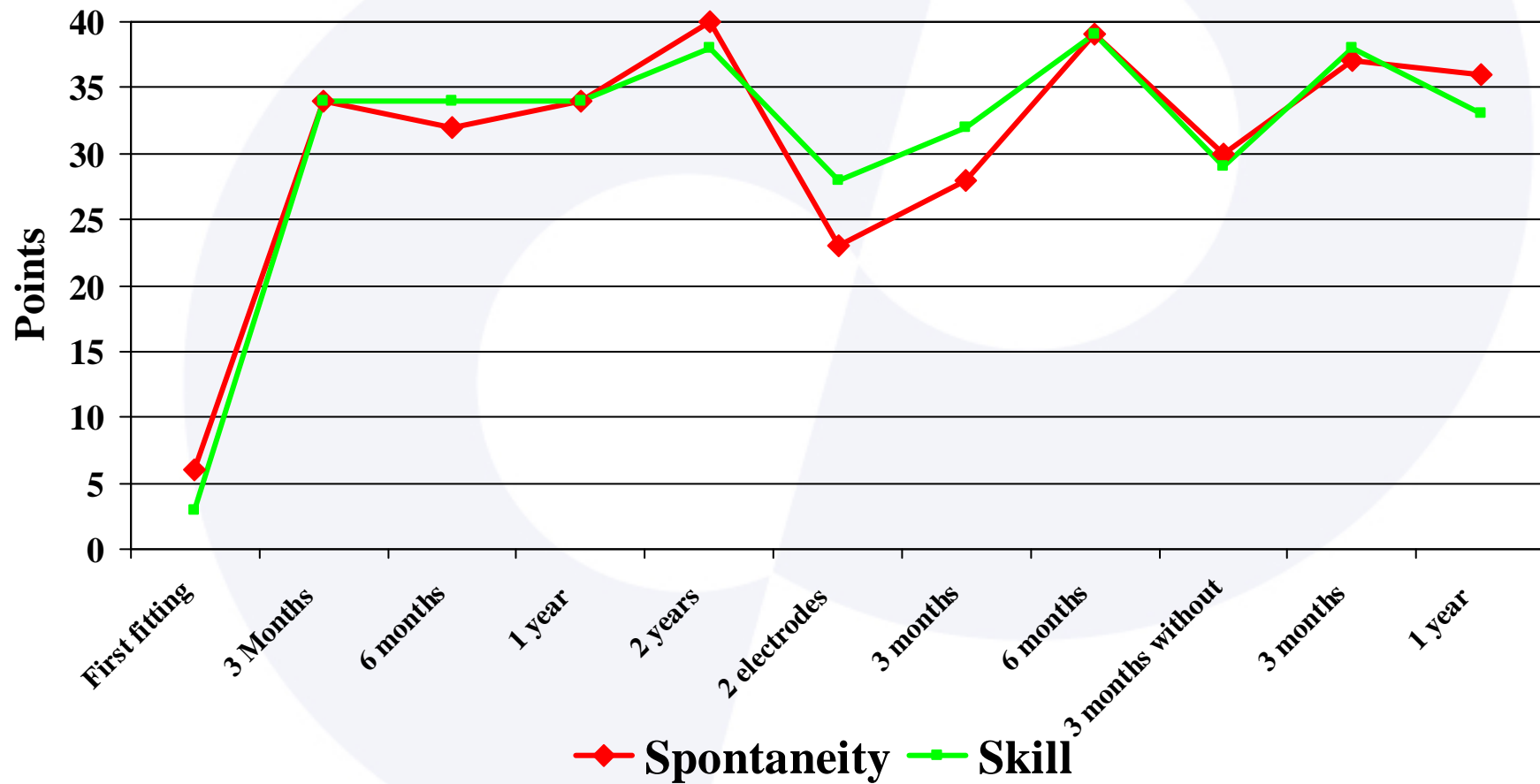
Sanderson Er, Scott RN. Fredericton, NB: UNB 1985

Ballance R er al. Can J Occup ther 1989;56:132-37.

Burger H et al. Disabil rehabil 2004;26:911-6.



UNB





ACMC

- * Griping
- * Holding
- * Releasing
- * Manipulating

Hermansson LM et al.
J Rehabil Med 2005;
37: 166-71.

ACMC ocenjevalni list

Ime pacienta in datum rojstva: _____ Spol: moški ženska

Prirojena odsotnost Pridobljena odsotnost Stran, višina: _____

Trajanje uporabe proteze: > 8 ur/dan 4-8 ur/dan, 5-7 dni/t = < 4 ure/dan, 1-7 dni/t

več ur na teden ali mesec ne uporablja

Aktivnost med ocenjevanjem: _____

Datum ocenjevanja: _____ Ocenjevalec: _____

Prijemanje		Spuščanje	
1	... s podporo	16	... s podporo
2	... brez podpore, grobi prijem	17	... brez podpore
3	Natančen prijem brez podpore	18	Prilagajanje širine odpiranja
4	Prilagajanje moči prijema	19	... v različnih položajih
5	... v različnih položajih	20	Časovna usklajenost
6	Časovna usklajenost	21	Koordinacija obeh rok
7	Koordinacija obeh rok med prijemanjem	22	... brez vidne povratne informacije
8	... brez vidne povratne informacije		
9	Prilagajanje moči prijema, brez vidne povratne informacije		
Držanje		Ponavljajoč se prijem	
10	... s podporo	23	Ponavljajoč se prijem in izpuščanje
11	... brez podpore	24	Ponavljajoč se prijem in izpuščanje brez vidne povratne informacije
12	... krhkih predmetov		
13	... v gibanju		4-točkovna lestvica: 3 – Zelo sposoben 2 – Sposoben 1 – Delno sposoben 0 – Ni sposoben
14	... brez vidne povratne informacije		
15	... v gibanju brez vidne povratne informacije		Opomba: za natančne kriterije glej Priložnik za ocenjevanje



ACMC test

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

Hermasson LM et al. J Rehabil Med 2005;37:166-71.

Hermasson LM et al. J Rehabil Med 2006;38:118-23.

Lindner HY et al. J Rehabil Med 2009;41:467-74.



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



PUFI

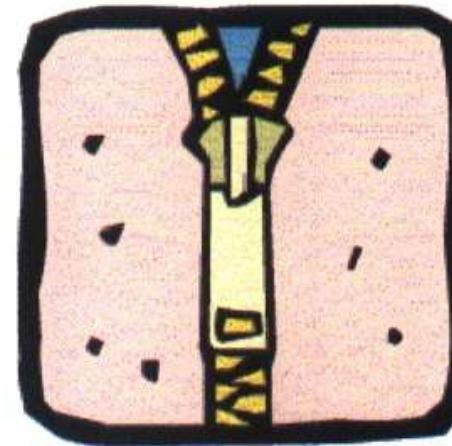


Activity: 1

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)



Auto Advance

Comments

Complete Later

< Back

Next >



PUFI

Part II Frequency and % Scores Report

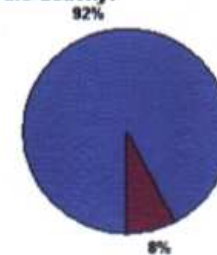
Frequency and % Scores

Client: sample, young

Client Number: 23465

Assessment Date: 12/19/01

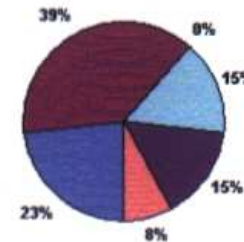
Does the client do the activity?



■ A. Yes 92%
■ B. cannot do 8%

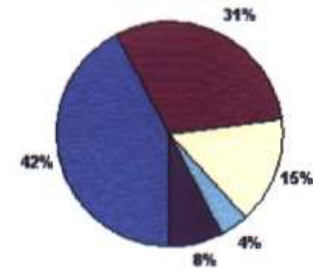
Number of N/A's: 0

How does the client usually do the activity?



■ A. actively 23%
■ B. passively 38%
□ 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 reliability¹
- * lower inter rater reliability¹
- * acceptable validity²

1 - Wright V F et al. J Hand Therapy 2001, 14: 1491-1504.

2 - Wright V F et al. Arch Phys Med Rehabil 2003; 83: 518-527.



Tests for adults – UL

- * Southampton Hand Assessment Procedure – SHAP



SHAP test

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

Light CM et al. Arch Phys Med Rehabil 2002;83:776-83.



Questionnaires for adults – UL

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

1 – Penta M et al. Arch Phys Med Rehabil 1998;79:1038-42.

2 – Burer H et al. Disabil Rehabil 2009 in print.

3 – Burger H et al. J Rehabil Med 2008;40 (5).



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

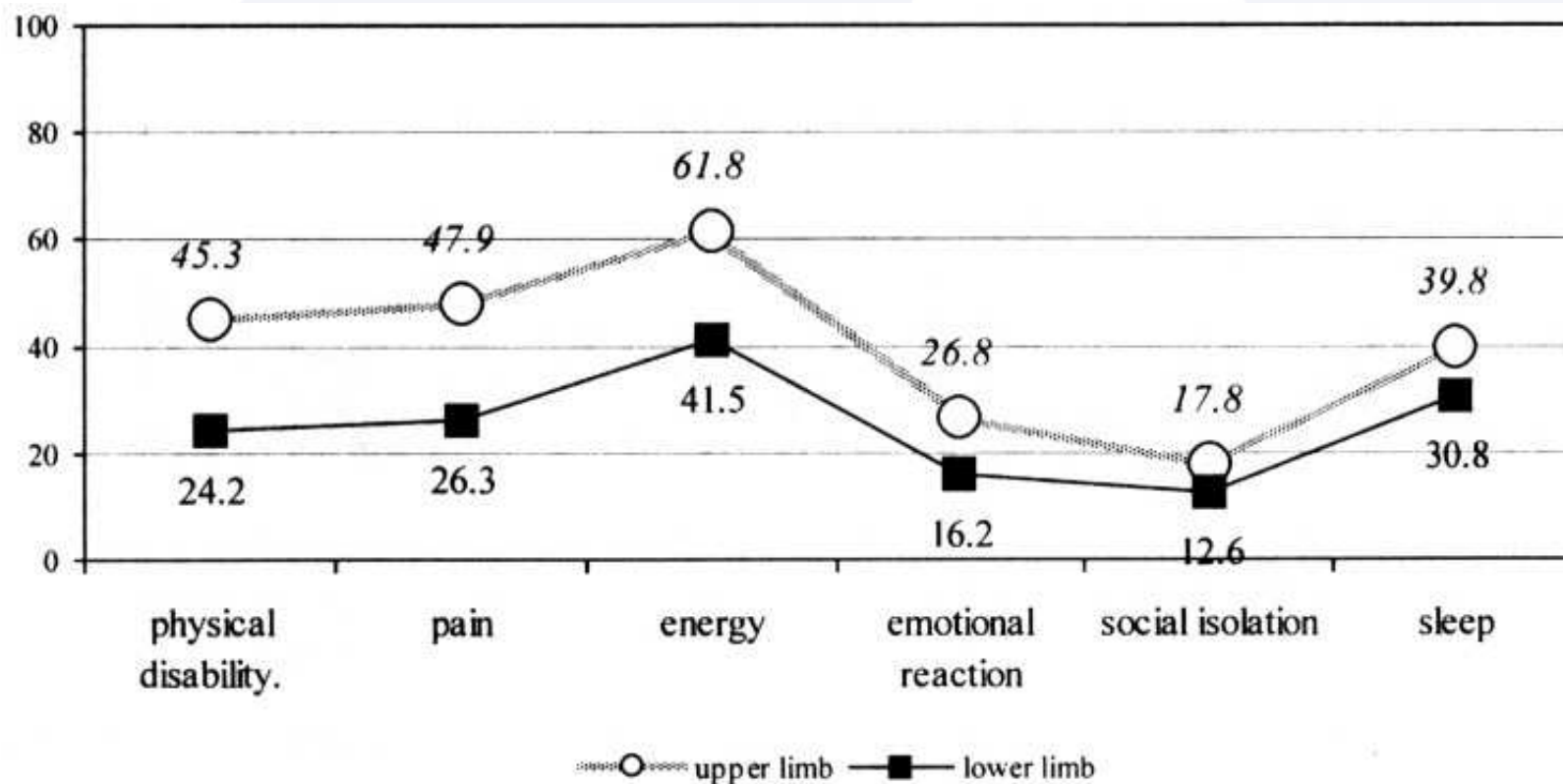
→ Sickness Impact profile – SIP

* Amputee specific:

→ Trinity Amputation and Prosthesis Experience Scale – TAPES



Patients satisfaction





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

- * Proceedings Outcome measures in Lower Limb Prosthetics. J Prosthet Orthot 2005; 6.
- * Proceedings Upper Limb prosthetic Outcome measures. J Prosthet Orthot 2009; 9.



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Thank you!