Functional assessment in Rehabilitation Medicine

Christoph Gutenbrunner
Overview

- Introduction
- Assessment of functioning along ICF chapters
  - Body functions
  - Activities
  - Participation
  - Environmental factors
  - Personal factors
- Complex assessment tools
  - Principles
  - Linking to ICF
- Assessment of quality of life (?)
- Summary
Introduction
Introduction

• **Diagnostic in Physical and Rehabilitation Medicine:**
  ◦ diagnosing pathology
  ◦ assess functioning

• “**Functioning**”: dimensions defined in ICF (*body functions and structures, activities, participation, contextual factors*)

• **Purposes:**
  ◦ Assignment (*validity*)
  ◦ Follow-up (*sensitivity to change*)

• **Additional aspect**: assessment of health related quality of life
  (*performance, perceived quality of life*)
ICF based strategies

Health condition (disorder or disease)

Body Functions and Structures

Activities

Participation

Environmental Factors

Personal Factors
Example: Application of the ICF-model

**Osteoarthritis or Rheumatoid Arthritis**

**Functions:**
- Pain
- Reduced ROM
- Muscle weakness
- Disturbed coordination
- Sleep disturbances
- Reduced energy and drive

**Activities:**
- Mobility: walking, standing etc.
- Use of public transportation
- Grasping, handling objects
- ADL-functions: washing oneself, putting on clothes etc.

**Participation:**
- Vocational performance
- Family relationships
- Recreation and leisure
- Social life
- Political activities
- Religious activities

**Environmental factors:**
- Working place
- Private houses
- Transportation system
- Family and friends
- Health system and insurances
- Societal attitudes

**Personal factors:**
- Health behaviour
- Coping, Sense of Coherence
- Co-morbidities
- Age
- Gender
Assessment of functioning along ICF chapters
ICF based strategies

Health condition (disorder or disease)

Body Functions and Structures

Activities

Participation

Environmental Factors

Personal Factors
ICF based strategies

Health condition (disorder or disease)

Body Functions and Structures

Activities

Participation

Environmental Factors

Personal Factors
Example: Application of the ICF-model

Osteoarthritis or Rheumatoid Arthritis

Assessments

Functions:
- Pain
- Reduced ROM
- Muscle strength
- Disturbances in daily living
- Sleep disturbances
- Reduced energy and drive
  - VAS on pain
  - ROM-measurement
  - Isokinetic testing

Activities:
- Mobility: walking, standing etc.
- use of public transport
- Grasping, handling objects
- ADL-functions: washing oneself, putting on clothes etc.
  - Testing coordination
  - Gait analysis
  - ADL-assessment

Participation:
- Vocational performance
- Family relationships
- Recreation
- Social life
- Political activities
- Religious activities
  - Vocational performance testing
  - QOL-scores

Environmental factors:
- Working place
- private houses
- Transportation system
- Family and friends
- Health system and insurances
- Societal attitudes
  - Taking the history
  - Analysis of infrastructure
  - Analysis of social system

Personal factors:
- Health behaviour
- Coping, Sense of Coherence
- Co-morbidities
- Age
- Gender
  - Assessment of coping
  - Medical assessment
  - Epidemiology
Body functions
Body functions

• **Dimensions** (*examples*):
  - range of motion
  - muscle power
  - pain thresholds, actual pain

• **Assessment methods and standardized tools**:
  - clinical investigation
  - isometric or isokinetic muscle power testing
  - algometry (*pressure, heat, cold*)

• **Indications**:
  - diagnosis if disease
  - assignment for treatments
  - follow-up
Body functions (examples)
Activities
Activities

• **Dimensions (examples):**
  - mobility
  - coordination
  - activities of daily living

• **Assessment methods and standardized tools:**
  - standardised laboratory tests (*e.g.* occupational therapy test, *timed up-and-go-test*)
  - assessment questionnaires (*mobility scores etc.*)

• **Indications:**
  - diagnosis of performance
  - assignment for treatments
  - follow-up
Activities (examples)
Participation
Participation

• **Dimensions** (*examples*):
  ◦ participation in social activities
  ◦ employment
  ◦ religion and politics

• **Assessment methods**:
  ◦ taking the history (*reflecting the persons live plan*)
  ◦ days on sick list
  ◦ lack of standardized questionnaires (*interindividual and intercultural differences*)

• **Indications**:
  ◦ assignment for rehabilitation interventions
  ◦ follow-up and evaluation of rehabilitation
**Participation (example)**

![Bar chart showing days on sick-list before and after rehabilitation for different categories of diagnoses.](chart.png)

- Days on sick-list before rehabilitation:
  - Other diagnoses: 760 days
  - Rehabilitation diagnosis: 1560 days
  - All diagnoses: 2320 days

- Days on sick-list after rehabilitation:
  - Other diagnoses: 667 days
  - Rehabilitation diagnosis: 1121 days
  - All diagnoses: 1788 days

- Reduction in days:
  - Other diagnoses: -28%
  - Rehabilitation diagnosis: -23%
  - All diagnoses

\[ n=53 \]

Gutenbrunner & Schwarze, 1st BNF-PRM, Stockholm 2010
Environmental factors
Environmental factors

• **Dimensions** *(examples)*:
  - social environment
  - built environment, supportive technology
  - facilitators and barriers!

• **Assessment methods**:
  - taking the history *(reflecting the persons live plan)*
  - site visits *(rarely done)*
  - lack of standardized questionnaires *(what is relevant, large differences)*

• **Indications**:
  - assignment for rehabilitation interventions
  - prognostification
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<thead>
<tr>
<th>ID number:</th>
<th>Long term goal:</th>
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<tbody>
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<td>Program goal:</td>
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<td>October 13th 1981</td>
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<td>Diagnosis:</td>
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<td>ICD10: G82.4 Spastic paraplegia, SCI ASIA A, Th8</td>
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</tbody>
</table>

**Patients Perspective**

**Body-Structures/Functions**

- My bowel and bladder do not work anymore
- To balance my body is really difficult
- My bodyweight loss bothers me
- I am not able to sense my body anymore
- I have pain in my back
- I have spasticity in my legs
- My blood pressure decreases very often
- I have to sleep on my back, that bothers me

**Activities & Participation**

- I am not able to walk anymore
- To transfer myself is quiet difficult
- To move the wheelchair uphill and overcoming barriers is a problem
- I am not able to take a shower by myself
- To dress the lower extremity is impossible, the T-Shirt, I slowly get under control
- I am able to catheterize myself, but I need support to purge the bowel
- I used to work as a mover
- It is important for me to meet my friends

**Health Professional Perspective**

<table>
<thead>
<tr>
<th>Environmental factors</th>
<th>Personal factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>The compression hosery helps a little bit</td>
<td>My willpower is extremely strong</td>
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<tr>
<td>The support of my parents and friends is a very big help for me</td>
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<tr>
<td>The flat is not wheelchair accessible</td>
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</tbody>
</table>

Stucki et al.: ICF workshop: Rehab cycle (2009)
Personal factors
Personal factors

• **Dimensions** *(examples):*
  ◦ age, gender, body shape, nutritional status
  ◦ coping strategies
  ◦ resistance and motivation

• **Assessment methods:**
  ◦ basic data sets
  ◦ taking the history
  ◦ (neuro-)psychological testing
  ◦ lack of agreed models *(discrimination issue)*

• **Indications:**
  ◦ assignment for rehabilitation interventions
  ◦ prognostification
Personal factors (examples, draft of DGSPM)

- **Chapter 1**: Basic characteristics of a person (age, gender, ethnicity, other genetic factors)
- **Chapter 2**: Physical factors (dimension of physics, other physical factors)
- **Chapter 3**: Mental factors (extraversion, emotional factors, reliability, openness, affability, self-confidence, optimism, factors of intelligence, factors of cognition, factors of mnesis)
- **Chapter 4**: Attitudes, basic competencies, habits (philosophy, life satisfaction, health attitudes, attitudes towards interventions and technical aids, work attitude, societal attitudes, attitudes towards support, social competence, method competence, self competence, action competence, media competence, dietary habits, use of stimulants, movement habits, recreational habits, sexual habits, communication habits, hygiene habits, habits to handle assets)
- **Chapter 5**: Life situation, socio-economic factors (inclusion in family and society, residence, employment, financial situation, socio-economic status, cultural status, integration in societal groups, language communication, education)
- **Chapter 6**: Other health factors
Complex assessment tools
Principles
Complex assessment tools

• **Types:**
  - checklists & questionnaires
  - self assessments & external *(expert performed)* assessment
  - disease-specific & disease-independent *(functional oriented)*

• **Characteristics:**
  - mostly covering more than one ICF-chapter
  - mostly quantitative scores

• **To be known:**
  - model behind
  - statistical characteristics *(validity, reliability, sensitivity)*
  - what are the questions *(do my patients understand ?)*
Linking to ICF
Global Goal:  

Service-Programme-Goal:  
Cycle goal 1:  
Cycle goal 2:  
Cycle goal 3:  

<table>
<thead>
<tr>
<th>ICF categories</th>
<th>ICF Qualifier</th>
<th>problem</th>
<th>Goal Relation</th>
<th>Goal value</th>
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<td>b280 Sensation of pain</td>
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<td>b440 Respiration functions</td>
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<td>b525 Defecation functions</td>
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<td>b620 Urination functions</td>
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<td>b735 Muscle tone functions</td>
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<td>b810 Protective functions of the skin</td>
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<td>s610 Structure of the urinary system</td>
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<td>d445 Hand and arm use</td>
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<td>d450 Walking</td>
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<td>d510 Washing oneself</td>
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<td>d530 Toileting</td>
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<td>e340 Personal care providers and personal assistants</td>
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<td>e355 Health professionals</td>
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facilitator  barrier

4+  3+  2+  1+  0  1  2  3  4

Stucki et al.: ICF workshop: Rehab cycle (2009)
## Linking to ICF

<table>
<thead>
<tr>
<th></th>
<th>Acute hospital n (%)</th>
<th>Early rehabilitation n (%)</th>
<th>Difference n (%)</th>
<th>95%-KI of % Difference</th>
<th>N (categories at second level)</th>
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<td><strong>Body functions</strong></td>
<td>17 (14,9)</td>
<td>23 (20,2)</td>
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<td>-15,1; 4,7</td>
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<td><strong>Body structures</strong></td>
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<td><strong>sum</strong></td>
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</table>

* Significant differences (p < 0,05); KI = Konfidence interval

Linking to ICF

• Check included ICF chapters and domains:
  ◦ qualitative approach checking chapters the questions refer to
  ◦ graphical picture

• Systematic linking tools:
  ◦ systematic approach to analyse domains on first, second and third level
  ◦ comparison between assessment questionaires
Example: Barthel index

- **Type**: health condition independent external assessment
- **Settings of use**:
  - acute care
  - acute (*early*) rehabilitation
  - geriatrics
- **Dimensions**:
  - eating
  - transfer
  - washing, toileting, bathing/taking shower
  - standing up/walking/driving wheelchair, climbing stairs
  - dressing
  - and others
Linking to the ICF-model: Bartehl Index
Example: Barthel index

Evaluation of effects of acute rehab in Hannover Medical School (*unpublished*)

- **Peripathetic Team**: Mean treatment duration: 16.6 +/- 14.2 days
- **Acute Rehab Unit**: Mean treatment duration: 23.6 +/- 14.6 days

Acute Rehab Barthel-Index

- Station 31c, n=16

<table>
<thead>
<tr>
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<th>Admission</th>
<th>Discharge</th>
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<td>Peripathetic Team</td>
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<td><img src="chart2.png" alt="Graph" /></td>
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<tr>
<td>Acute Rehab Unit</td>
<td><img src="chart3.png" alt="Graph" /></td>
<td><img src="chart4.png" alt="Graph" /></td>
</tr>
</tbody>
</table>

* = p<0.05
*** = p<0.001 (t-Test)
Example: DASH

- **Name**: Disability of the Arm, Shoulder and Hand Questionnaire
- **Type**: organ specific self assessment
- **Setting of use**:
  - Orthopaedic surgery, trauma surgery
  - Rehabilitation
  - Therapy evaluation
- **Dimensions**:
  - Complaints from locomotor system
  - Pain
  - Day-to-day activities
  - Social involvement
Linking to the ICF-model: DASH

Health condition (disorder or disease)

6 Items
Body Functions and Structures

17 Items
Activities

1 Item
Participation

Environmental Factors

Personal Factors
Example: DASH

RCT on effects of splints in epicondylopathy (Fink et al. 2001)
## Systematic linking (example)

### Table 5. General Health Status Instruments – frequencies showing how often the *body-function* categories were addressed in the different instruments

<table>
<thead>
<tr>
<th>ICF Category</th>
<th>QI-I Spitzer</th>
<th>WHOQOL-CHEF</th>
<th>WHODASII</th>
<th>NHP</th>
<th>SF-36</th>
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</table>

### Table 7. General Health Status Instruments – frequencies showing how often the *environmental-factors* categories were addressed in the different instruments

<table>
<thead>
<tr>
<th>ICF Category</th>
<th>QI-I Spitzer</th>
<th>WHOQOL-CHEF</th>
<th>WHODASII</th>
<th>NHP</th>
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<td>e115 Products and technology for personal use in daily living</td>
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<td>e155 Design, construction and building products and technology of buildings for private use</td>
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<td>e310 Immediate family</td>
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Functional assessment in Rehabilitation Medicine
Christoph Gutenbrunner
Baltic Association of Rehabilitation
Tallinn, September 17th, 2010

Hannover Medical School
Assessment of quality of life (?)
Quality of life assessment (examples)

<table>
<thead>
<tr>
<th>TABLE 2. The HAQ, MHAQ, and RA-HAQ questionnaires item sets (44).</th>
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<td><strong>HAQ</strong></td>
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Is this quality of life? What persons feel quality of life is? How can we measure subjective perceived quality of life?

Barat M, Franchignoni F: Assessment in PRM. Maugery Foundation 2004
Summary
Summary

• Assessment in all dimensions of ICF (body functions and structures, activities, participation, contextual factors)

• Tools:
  ◦ Clinical and laboratory testing
  ◦ Checklists and questionnaires
  ◦ Individual patient interviews (taking the history)

• Statistical quality criteria (validity, reliability and reliability)

• Linking to ICF chapters and dimension

• Further development and research needed (esp. in participation and contextual factors)

Thank you for your attention