

How to apply the International Classification of Functioning, Disability and Health (ICF) for rehabilitation management in clinical practice

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Rehabilitation aims to enable people experiencing or likely to experience disability to achieve and maintain optimal functioning. Consequently, the assessment of functioning is the starting point of a patient and goal oriented rehabilitation process. Within the International Classification of Functioning, Disability and Health (ICF) rehabilitation practitioners can rely for the first on a worldwide accepted model providing a universal language for the description and classification of functioning. To take advantage of the ICF in rehabilitation management there is a need to develop appropriate ICF Tools for clinical practice. Such ICF Tools, integrating the model and the classification of the ICF, have to be integrated in a problem solving approach provided by the Rehab-Cycle. ICF Tools have been developed for the use in the different steps of the Rehab-Cycle. Existing ICF Core Sets in combination with the use of ICF Qualifiers were the basis for this development. In clinical practice, these ICF Tools allow the description of a functioning state, the illustration of the patient's experience of functioning and the relation between rehabilitation goals and appropriate intervention targets, an overview over required resources to improve specific aspects of human functioning and finally, the changes in functioning states following rehabilitative interventions. The ICF Tools support a common understanding of functioning and the communication among team members when used in multidisciplinary rehabilitation. The development of electronic documentation systems, the assignment of standardized instruments to ICF categories and the operationalization of the ICF Qualifiers can contribute to further improvements of ICF based rehabilitation management in the future.

KEY WORDS: Rehabilitation, trends - Disability evaluation - Clinical protocols.

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Rehabilitation aims to enable people with health conditions experiencing or likely to experience disability to achieve and maintain optimal functioning in interaction with the environment.¹ It achieves its goal by applying and integrating approaches to optimize a person's capacity, approaches which build on and strengthen the resources of the person, which provide a facilitating environment, and which develop performance in the interaction with the environment.¹

Rehabilitation is a relevant health strategy over the course of a health condition, along the continuum of care ranging from the acute hospital to rehabilitation facilities and the community. It is also a relevant strategy across sectors.¹ Accordingly, a wide range of health and other professionals are potentially involved in rehabilitation care and service provision.

At the core of rehabilitation care provision are the evolving problems and needs of individuals in relation to functioning. Functioning is the starting point of a patient and goal oriented, evidence-based and iterative rehabilitation process.² Consequently, models and classifications of functioning shared by professionals are essential for rehabilitation management in practice.

Rehabilitation has over the years embraced evolving models and classifications of disability including the International Classification of Impairment, Disability and Handicap³ and the Nagi model.⁴ With the approval of the International Classification of Functioning, Disability and Health (ICF) by the world health assembly in 2001,⁵ we now can rely for the first on a universally accepted conceptual model. The ICF is increasingly gaining worldwide acceptance by particularly providing a universal language for functioning and disability.⁶ There have been attempts to apply it in the context of rehabilitation management where it is thus increasingly used by health professions.⁷⁻⁹

In this paper, a problem solving approach for rehabilitation management that integrates the universal model of functioning and disability and its classification, the ICF, is described. It is based on the rehabilitation cycle also called Rehab-CYCLE and integrates a number of ICF tools addressing the need for a common and shared taxonomy.^{10, 11}

The specific aims are: 1) to introduce the ICF; 2) and ICF tools by demonstrating how to integrate them in the Rehab-CYCLE; and 3) to discuss challenges in relation to the measurement of ICF categories.

The International Classification of Functioning Disability and Health (ICF)

The ICF is based on the integrative model of functioning, disability and health. The components of this model are defined in short as follows: 1) body functions are physiological and psychological functions of the body; 2) body structures are the anatomic parts of the body; 3) activities refer to the execution of tasks or actions by individuals; 4) participation implies the involvement in a life situation; 5) environmental factors are the physical, social and attitudinal situations in which people live and 6) personal factors are the particular background of individuals' life and living situation and comprise features that are not part of a health condition.

Within this model, the human (and individual) experience of functioning is not considered as the consequence of a disease, but the result of the interaction between a health condition and both personal attributes and environmental influences (contextual factors).⁶ The impact of these contextual factors is important, since they can act as facilitators or barriers for functioning.

From the comprehensive view of the model, a person's level of functioning is complex with multiple determinants and interactions having effects on many levels and involving different dimensions.¹² The model of functioning, disability and health is a useful framework for understanding such interactions among variables of functioning.²

The components of the model, except the personal factors, are classified to provide a standardized and common understanding and description of health and health-related states.⁵ Each component contains chapters and categories which are organized in different levels of specification as illustrated in the following example:

Chapter	b2	Sensory functions and pain
Second level	b280	Sensation of pain
Third level	b2801	Pain in body part
Fourth level	b28013	Pain in back

The hierarchic structure of the classification allows either a general or a very detailed description using second, third and fourth level categories. Nevertheless, the exhaustive and comprehensive volume of the whole classification is not practicable in clinical practice or research, unless it is transformed into practice-friendly tools.¹³

To facilitate a systematic and comprehensive description of functioning and the use of the ICF in clinical practice and research, ICF Core Sets have been developed. ICF Core Sets are generally-agreed-on lists of ICF categories, relevant for specific diseases or for health-care contexts, which can be used in clinical studies and health statistics (brief ICF Core Sets) or to guide multidisciplinary assessments (Comprehensive ICF Core Sets).¹⁴ ICF Core Sets contain as few as possible but as much as necessary ICF categories to describe the prototypical spectrum of problems in functioning and health of patients with a specific condition.¹⁵ For clinical practice and research they list the ICF categories which should be measured, nevertheless they provide no information about how to measure them.⁶

Different types of ICF Core Sets already exist: that for people experiencing an acute episode and that for people suffering from a chronic condition. For acute episodes ICF Core Sets for cardiopulmonary, musculoskeletal and neurological conditions were developed for the treatment in acute hospitals and early postacute rehabilitation facilities supplemented with an ICF Core Set for geriatric patients.^{16, 17} For

already 15 chronic conditions, ICF Core Sets have been developed for the use in the postacute and chronic stage of a disease and in rehabilitation and community healthcare contexts.¹⁴ Hence, in clinical practice ICF Core Sets can be used along the continuum of care and over the course of a health condition.

In rehabilitation management ICF Core Sets serve as a guide to comprehensively assess and describe functioning. To quantify the extent of a problem, facilitator or barrier in the different ICF categories of ICF Core Sets the ICF also comprises ICF Qualifiers. A problem may mean an impairment, limitation or restriction, which can be qualified from 0 (NO problem: 0-4%), 1 (MILD problem: 5-24%), 2 (MODERATE problem: 25-49%), 3 (SEVERE problem: 50-95%) to 4 (COMPLETE problem: 96-100%). Environmental factors are quantified with a negative and positive scale that denotes the extent to which an environmental factor acts as barrier or a facilitator:⁵

0 - NO barrier	+0 - NO facilitator
1 - MILD barrier	+1 - MILD facilitator
2 - MODERATE barrier	+2 - MODERATE facilitator
3 - SEVERE barrier	+3 - SUBSTANTIAL facilitator
4 - COMPLETE barrier	+4 - COMPLETE facilitator

Integration of ICF tools into the Rehab-CYCLE

The Rehab-CYCLE, as a problem solving approach for ICF-based rehabilitation management, facilitates the structuring, organization and documentation of the rehabilitation process. It enables all professional involved in the care for a determined patient to coordinate their actions. The four key elements of this iterative process include 1) assessment, 2) assignment, 3) intervention and finally 4) evaluation. ICF tools can be applied in each of these steps as illustrated in Figure 1.

In the following the utilization of all developed ICF tools will be described within a case example of a 19-year-old man, suffering from complete spinal cord injury at the level of the third thoracic vertebra (ASIA A, Th3) in consequence of a skiing accident three months following the onset of disease.

Assessment

The aim of the assessment is to understand a person's functioning and to identify the needs to be addressed with a rehabilitative intervention. The assess-

ment, therefore, involves the following three steps: 1) description of patient's problems and resources; 2) setting of mutually agreed goals; 3) and determination of intervention targets. An ICF-based assessment can be performed based on the ICF Core Sets, the ICF Categorical Profile and the ICF Assessment Sheet.

The description of patient's problems and resources requires a functioning state. A functioning state pictures the extent of limitations in functioning at a certain time-point and from both, the patient's and health professional's perspective. Information from the patient's perspective is gathered directly from the patient. The values of the health professional's perspective based on clinical examinations and maybe laboratory and technical investigations performed by the multidisciplinary team. The description of the environmental and personal factors provides information about their positive or negative impact on the functioning state. In a multidisciplinary and systematically approach professionals generally describe at least all ICF categories from a brief ICF Core Set and use the corresponding comprehensive ICF Core Set as a pool from which additional relevant ICF categories can be chosen for their assessment. ICF categories from further ICF Core Sets may be added if necessary, *e.g.* in the presence of comorbidities. In the assessment the experts may distribute the responsibility for the description of specific ICF categories among each other but each expert will additionally consider all aspects of functioning maintaining a holistic view. To facilitate the description of problems in functioning, health professionals have to allocate suitable measurements to the specific ICF categories. All ICF categories have to be rated within the ICF Qualifiers based on the information from patient information, clinical examination and all other investigations.

The description of the functioning state and the following decision on the rehabilitation goals and determination of intervention targets can be supported by the use of the ICF Tools ICF Categorical Profile and the ICF Assessment Sheet.

THE ICF CATEGORICAL PROFILE

The ICF Categorical Profile is an illustration of the functioning state of a patient at the time of assessment (Figure 2). The basis for the creation of an ICF Categorical Profile is the combined use of an ICF Core Set and the rating of each contained ICF category with the ICF Qualifiers. If no ICF Core Set exists for the

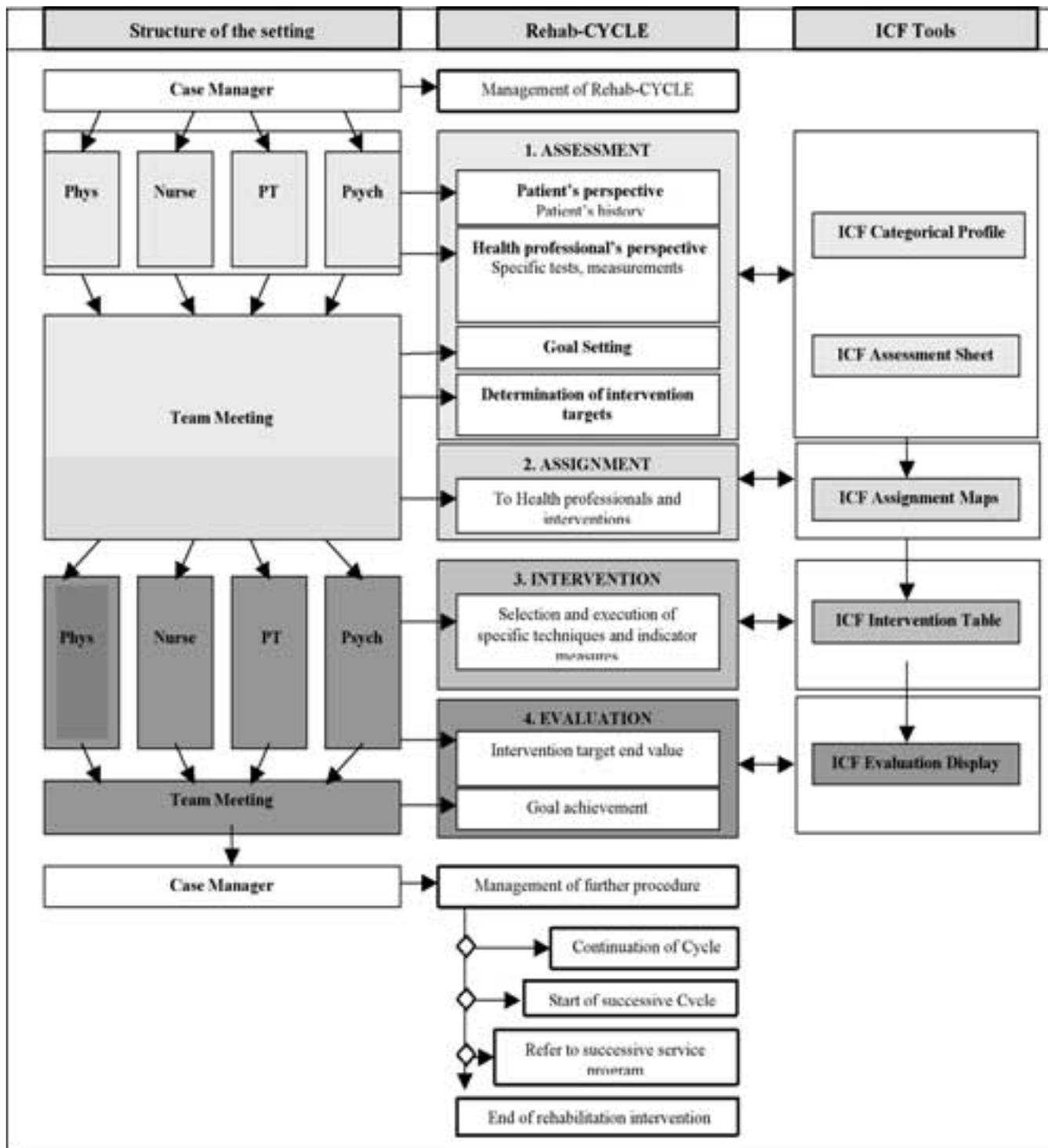


Figure 1.—ICF-based rehabilitation management. Phys: physician; PT: physiotherapist; Psych: psychologist.

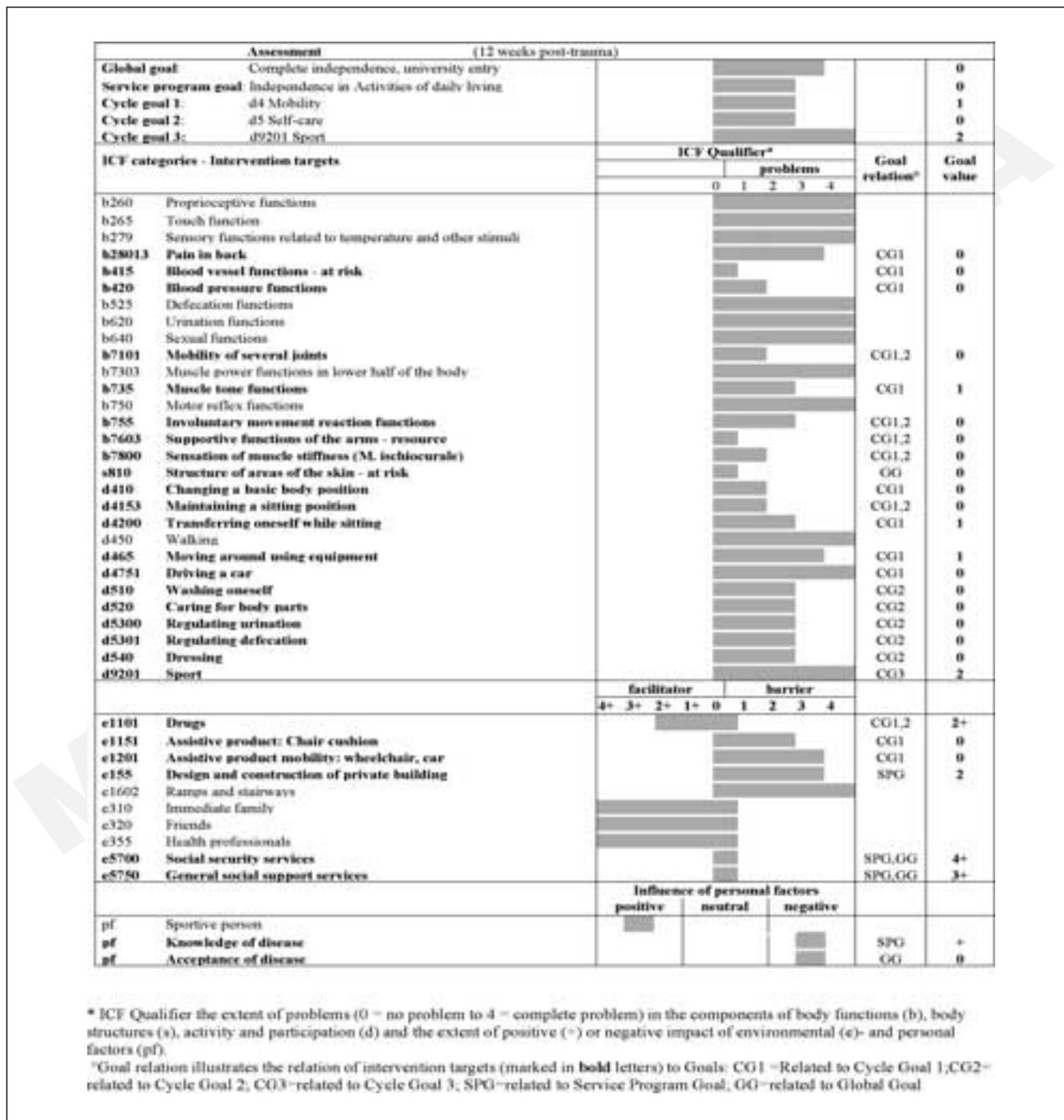


Figure 2.—ICF-Categorical Profile (extraction): illustrates the aspects of the functioning state which are relevant for this patient (Spinal Cord Injury, ASIA A Th 3). *ICF Qualifier the extent of problems (0=NO problem to 4=COMPLETE problem) in the components of body functions (b), body structures (s), activity and participation (d) and the extent of positive (+) or negative impact of environmental (e)- and personal factors (pf). °Goal relation illustrates the relation of intervention targets (marked in bold letters) to Goals: CG1: related to cycle goal 1; CG2: related to cycle goal 2; CG3: related to cycle goal 3; SPG: related to service program goal; GG: related to global goal.

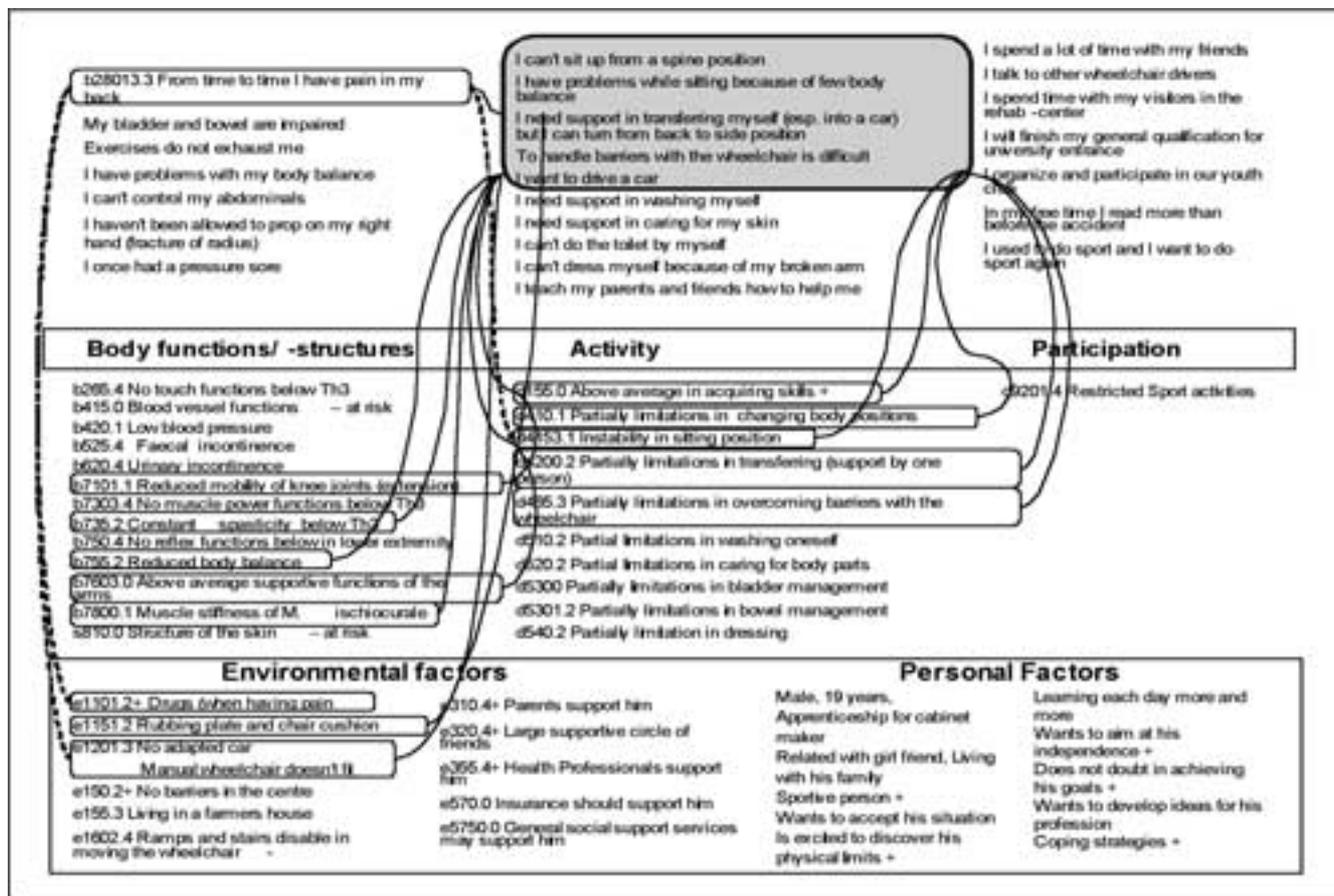


Figure 3.—Assessment Sheet: illustrates the aspects of functioning from both the patient's and health professional's perspective. Aspects from health professional's perspective are described using ICF codes (including ICF Qualifier behind the dot) and technical language. Cycle goal "d4 Mobility" (including different aspects of mobility) is marked in the upper part of the sheet; categories, which are related to the cycle goal and relevant for interventions (intervention targets) are linked with the goal (spinal cord injury, ASIA A Th 3, 12 weeks after trauma).

treated health condition, the ICF Categorical Profile is composed of those ICF categories which are relevant for the description of the actual functioning state of the patient (Figure 2).

In the case example, complete problems (ICF qualifier 4) were rated amongst others in the ICF categories "b260 Proprioceptive functions", "b265 Touch functions" and "b270 Sensory functions related to temperature and other stimuli", mild problems (ICF qualifier 1) were rated for example in the ICF categories "b420 Blood pressure functions" and "d410 Changing basic body positions".

Additionally or alternatively to the ICF Categorical Profile the assessment results can be entered into the ICF Assessment Sheet.

THE ICF ASSESSMENT SHEET

The ICF Assessment Sheet provides, like the ICF Categorical Profile, a comprehensive overview of the patient's functioning by presenting the assessment results in all components of human functioning. However, in contrast to the ICF Categorical Profile, the ICF Assessment Sheet illustrates the patient's and health professional's perspective reflecting also the performance (patient's perspective) in the lower part and the capacity (health professional's perspective) in the upper part (Figure 3). After the identification of the patient's problems and needs, those aspects which are relevant for the description of functioning from both perspectives are transferred to the correspond-

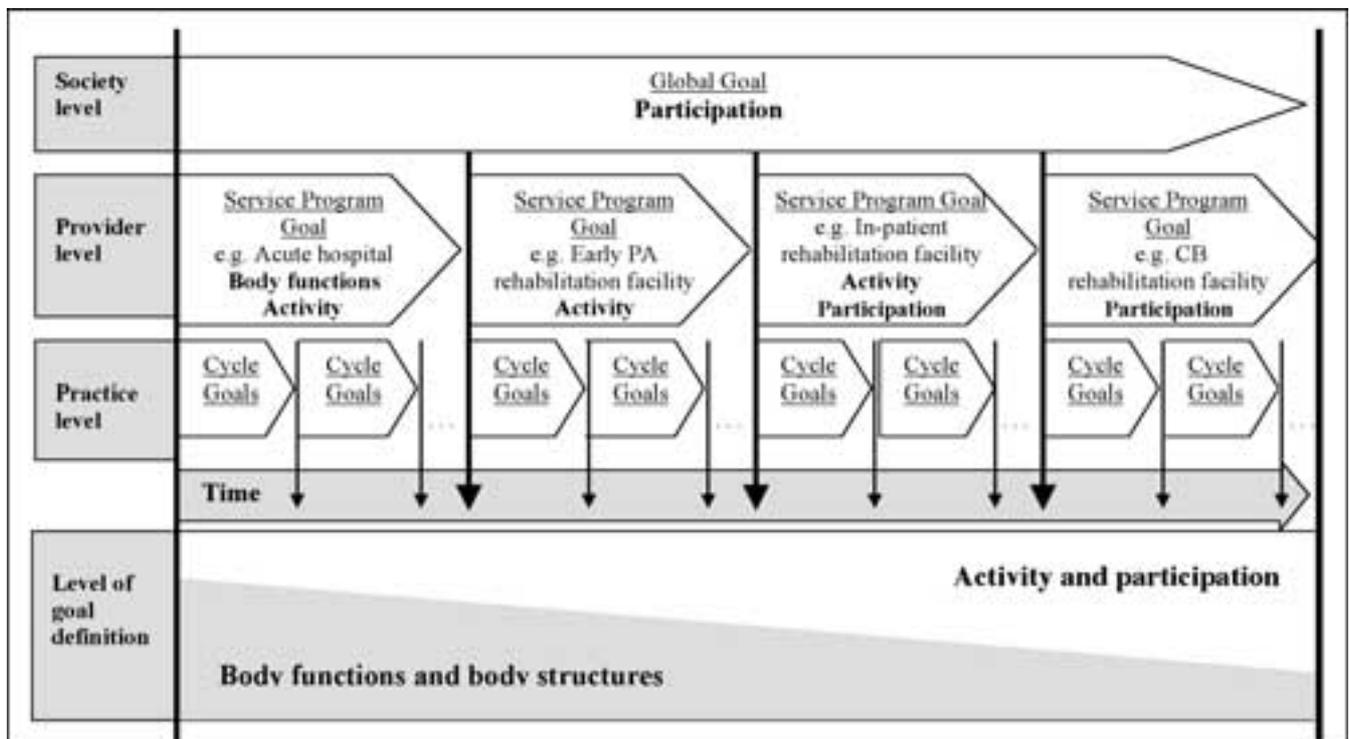


Figure 4.—Goal setting over the course of rehabilitation after an acute episode. PA: postacute; CB: community-based.

ing areas. The patient's words are used in the upper part of the sheet to reflect the patient's experience of functioning. All those relevant results from health-professionals investigations are transferred to the lower part of the sheet. The corresponding technical language from clinical tests or the standardized language of the ICF can thereby be used. For the latter the original technical terminology has to be translated/"linked" to the ICF. Already established linking rules can extremely facilitate this process.¹⁸

The case example reflects that the same problems were considered by both, the patient and the health professionals. However, they do it in a slightly different way. For example "My bladder and bowel are impaired" by the patient and "b525 fecal incontinence" and "b620 urinary incontinence". ICF category "b420 blood pressure" was not considered by the patient.

Based on the description of the functioning state individual goals are defined. Goal setting is a shared process between the team and the individual. Patient's goals have to be detected during the assessment processes. In terms of the ICF, goals are defined within the components of functioning and in a hierarchic structure

according to the time-course of the rehabilitation process. The hierarchic structure of goals, namely global-, service-program- and cycle goal, is illustrated in Figure 2. Global goals usually target on the achievement of optimal participation in the society in relation to optimal functioning. They refer to the endpoint of rehabilitation and are usually only achieved by the implementation of different programs by different providers. Service-program goals refer to the endpoints of specific programs, respectively. To achieve service-program goals, cycles with their corresponding cycle goals are set. Cycle goals are achieved within a short-term cycle by rehabilitation practitioners. Several cycles might be necessary to achieve a service-program goal. Depending on the stage of a health condition and the course of rehabilitation, the service-program- and cycle goals are defined in the components of body functions, body structures, activity and/or participation. Once, cycle goals have been determined, related relevant intervention targets have to be defined (Figure 4).

The determination of relevant intervention targets is performed in three steps. First, all aspects or ICF categories which have a positive (resource) or negative

(problem) impact on the defined cycle goal have to be identified. Secondly, from those, only the modifiable ICF categories are chosen. Finally, only those which are supposed to influence the cycle goal in the actual situation are selected as relevant intervention targets.

Both, the ICF Categorical Profile and the ICF Assessment Sheet facilitate the identification and depiction of rehabilitation goals and related intervention targets.

In the ICF Categorical Profile, goals from all hierarchic levels are inserted above the list of the ICF categories. Intervention targets related to the cycle goal are identified from the list of ICF categories and marked in the column "Goal relation" using a code which reflects the relation to the goals. Goal values for each intervention target can be added in the right column using the ICF qualifiers (Figure 2).

In the case example, the ICF category "d520 Caring for body parts" was identified as a relevant intervention target related to the Cycle goal "independence in self-care". The extent of the problem should be reduced from a value 2 in the ICF qualifier to the goal value of zero.

In the ICF Assessment Sheet cycle goals and related intervention targets can also be highlighted. Cycle goals are usually marked in the patient's perspective section to highlight the common goal definition among patient and rehabilitation team. The related intervention targets are almost always marked in the health professional's part and in the part containing the contextual factors. The relation between the cycle goal and the intervention target is illustrated by a connecting line (Figure 3). At least the goals and intervention targets should be linked to ICF categories. For each cycle goal a separate ICF Assessment Sheet can be created. The results of the specific tests should be documented in a separate document.

In the case example the cycle goal "Mobility" (gathering different aspects of mobility named by the patient) is marked. Several intervention targets, e.g. "b7101 mobility of several joints", "b735 muscle tone functions", "b755 involuntary movement reaction functions", etc. were identified and marked in the lower section of the ICF Assessment Sheet.

Both, the ICF Categorical Profile and the ICF Assessment Sheet serve as tools for the further steps of the Rehab-CYCLE. While the ICF Categorical Profile provides a clear overview of the functioning state in all relevant aspects of functioning and the interacting environmental and personal factors, the ICF

Assessment Sheet support the patient's perspective of functioning and the illustration of the relation between Cycle Goals and intervention targets. However, the presentation of one or both ICF tools in the team meeting will provide well arranged and comprehensive information for team decisions.

Assignment

The assignment describes the allocation of relevant intervention targets to specific interventions and subsequently to responsible health professionals. Likewise, the intervention target can initially be assigned to the respective health professionals, which are responsible to perform suitable interventions. ICF Assignment Maps provide lists of interventions targets and related appropriate interventions to facilitate the assignment.

ICF ASSIGNMENT MAPS

An ICF Assignment Map contains a list of appropriate interventions which are allocated to a specific ICF category (Figure 5). These maps can help to choose proper interventions for specific problems, especially for health professionals with only little clinical experience. The chosen interventions are also assigned to different professions, whereby different team members can use the same interventions. Some teams will assign the intervention targets first to the professions which afterwards will choose the type of intervention. One intervention target may be assigned to different health professionals implementing different or the same interventions. An evidence based approach may support the creation of ICF Assignment Maps.

Intervention

The individual team member selects the suitable intervention techniques to improve intervention targets in the step of the intervention. An evidence-based and hypothesis-driven approach may facilitate this process. Additionally, the individual team member will select suitable instruments (specific tests, examinations or sometimes only observation for specific intervention targets) for the initial assessment, the measurement of the progress and the final evaluation. Furthermore, the pursued goal value for each intervention target has to be defined either by the scale of the instruments or by an ICF Qualifier. Before

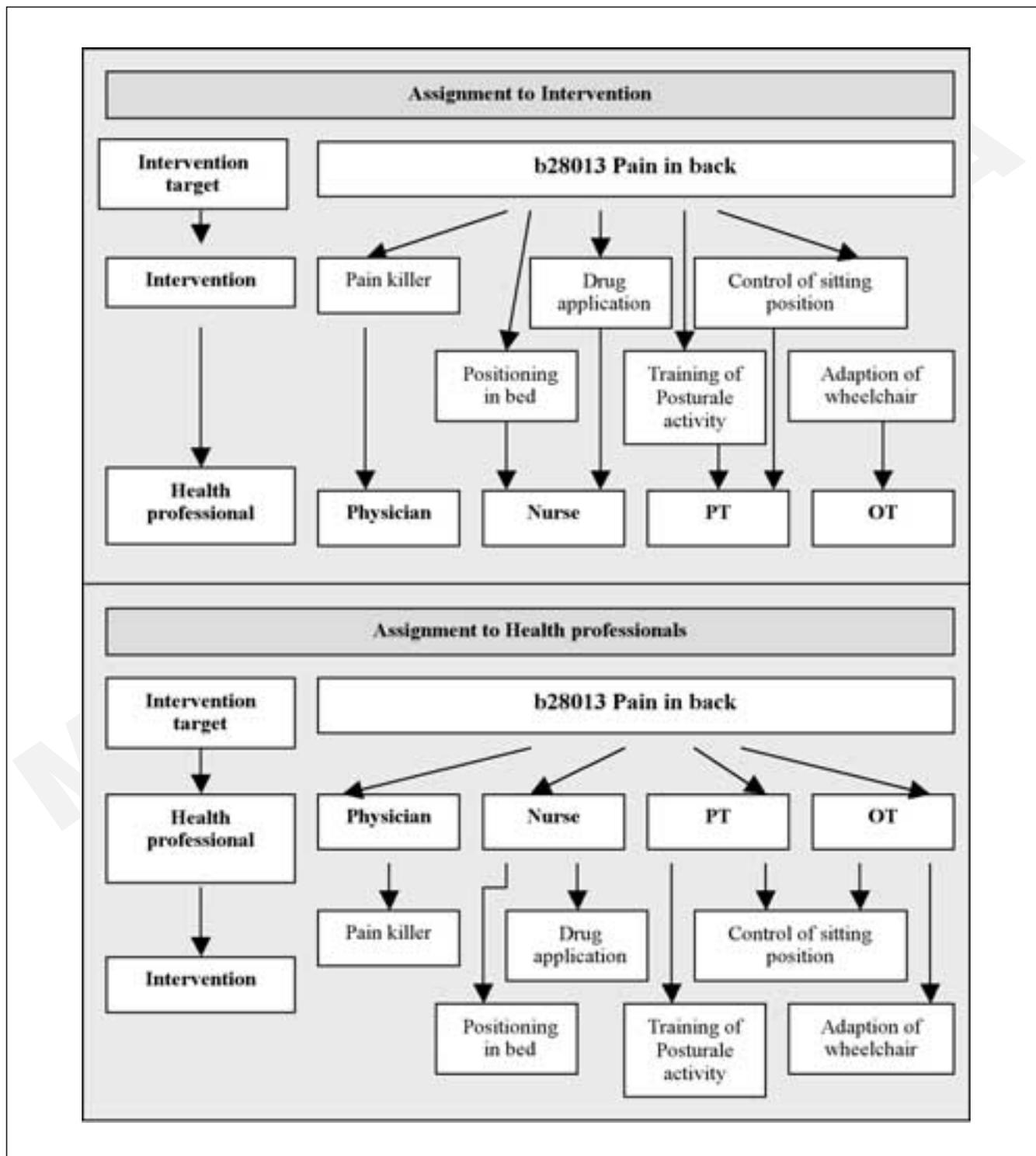


Figure 5.—ICF Assignment Maps.

TABLE I.—*Intervention table: illustrates the documentation of the process from assessment to evaluation (spinal cord injury, ASIA A Th 3).*

Intervention target	Intervention	Phys	Nurse	PT/ Spo	OT	Psych	SW	Arch	First value	Goal value	End value
<i>Body functions/structures</i>											
b28013 Pain in the back	Body posture training	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	3	0	1
	Adaptation of wheelchair	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
	Control of sitting position	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
	Medication	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
b415 Blood vessel functions - at risk	Compression hosery, drugs	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0	0	0
b420 Blood pressure function	Compression hosery	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1	0	0
b7101 Mobility of several joints	Passive movement	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1	0	1
b755 Involuntary movement functions	Body balance-training	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	2	0	0
b7800 Sensation of muscle stiffness	Detonisation, Stretching	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1	0	0
s810 Structure of the skin - at risk	Daily inspection	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0	0	0
<i>Activities and Participation</i>											
d410 Changing basic body positions	Sit-up-training	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1	0	0
d4153 Maintaining in a sitting position	Body balance training	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1	0	0
d4200 Transferring oneself while sitting	Transfer-training	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	2	1	1
d465 Moving around with wheelchair	Wheelchair-training outdoor	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	3	1	2
d510 Washing oneself	Assistance/instruction	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	2	0	0
d520 Caring for body parts	Assistance/instruction	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	2	0	1
d5300 Regulating urination	Assistance/instruction	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	2	0	0
d5301 Regulating defecation	Assistance/instruction	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	2	0	0
d540 Dressing	Assistance/instruction	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	2	0	0
d9201 Sport	Exercising different sports	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	4	2	2
<i>EF</i>											
e1151 Assistive products: chair cushion	Control of chair cushion	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	-2	0	0
e1201 Assistive products for personal mobility: wheelchair and adapted car	Testing of different wheelchairs, reconstruction of car	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	-3	-2	-2
e155 Design, construction and building products and technology of building or private use: farmer house	Planning and reconstruction of private building	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	-3	-2	-2
e5700 Social security services	Clarification, organization of payments	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	0	4+	2+				
<i>PF</i>											
Knowledge of disease	Teaching, consulting and lectures	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	-	+	+				
Acceptance/coping of disease	Behavioral training approaches	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	-	0	+

Phys: physician; PT: physiotherapist; Spo: sport therapist; Psych: psychologist; SW: social worker; Arch: architect (Spinal Cord Injury, ASIA A Th 3, 12 weeks after trauma).

treatment, the frequency and intensity of the intervention are determined. The results of the initial assessment and the general functioning state of the patient have to be considered in this process. To enable an evaluation of the effectiveness of the interventions a proper documentation is necessary. To provide an ICF based overview of the steps of assignment and intervention the ICF Intervention Table was created.

ICF INTERVENTION TABLE

The ICF Intervention Table contains all information from assignment to evaluation which is important for

the whole team and the rehabilitation process (Table I). All determined intervention targets can be filled in the ICF Intervention Table in the left column. This information can be transferred from the ICF Categorical Profile and/or the ICF Assessment Sheet into here. The assigned interventions and health professionals are recorded in the second and third column. Values, documenting the course of the cycle (first-, goal- and evaluation values) are documented in this table by means of the ICF Qualifiers by each responsible health professional. The specific results of the instruments or tests used may be also documented.

In the case example presented here, several interventions were chosen to treat the intervention target “b28013 pain in back”. They were assigned to different health professionals. While the Occupational therapist adapted the wheelchair, the physical therapist targeted to improve the body posture. The nurse and the occupational therapist shared the same interventions namely, the instruction of techniques for dressing and assistance by their use to improve the ICF category “d540 dressing”.

The ICF Intervention Table provides the relevant information of the course of the active treatment. Once, one Rehab-CYCLE is finished, the rehabilitation process has to be evaluated.

Evaluation

The evaluation of the intervention targets reflects the effectiveness of the performed rehabilitative interventions. Therefore, short before the end of the corresponding Rehab-CYCLE each health professional has to perform the evaluation of the intervention targets, using previously selected instrument. The end value is documented using the ICF Qualifiers. The documentation of these values helps to obtain a comprehensive overview of the course of the Rehab-CYCLE and facilitates the team discussion at the end of a Rehab-CYCLE. In this team discussion, the course and results of the rehabilitation cycle will be evaluated and based on this the further procedure is decided. If the desired result was not achieved within the time-period of the actual cycle, it will probably be decided to continue the same cycle. The decision can also be the start of a successive cycle, the refer of the patient to a successive service program or the end of the rehabilitation intervention. The ICF Evaluation Display provides a helpful ICF Tool for the documentation and the discussion of goal achievement and the decision on the further steps.

ICF EVALUATION DISPLAY

The ICF Evaluation Display (Figure 6) is based on the ICF Categorical Profile. In comparison to the ICF Categorical Profile the ICF Evaluation Display embraces merely those ICF categories which were determined to be goals and intervention targets. The display is enlarged with the illustration of the evaluation of the corresponding ICF categories and a column for goal achievement. Thus, the ICF Evaluation

Display pictures at a glance the changes in the functioning state after one treatment cycle and can serve as basis for team discussion.

In the case example several goals could be achieved, e.g. in the ICF categories “b735 muscle tone functions” and “d5300 regulating urination”. Other goals with respect to ICF categories like “b28013 pain in back” and “d520 caring for body parts” could not be achieved.

Discussion

With the approval of the ICF in 2001 by the World Health Assembly all member states are asked to implement the ICF in different fields of health services and research. This paper shows how the ICF and ICF Tools used in combination with the Rehab-CYCLE can facilitate and improve a multidisciplinary, patient-oriented and ICF based rehabilitation management. Although examples of how to apply the ICF in rehabilitation practice already exist,^{7, 10, 19} this is the first time that the implementation of different ICF Tools in the different steps of the rehabilitation management is described.

The use of ICF Core Sets provides the comprehensive description of a patient's functioning state. Since an ICF Core Set lists all relevant categories which should be measured in specific conditions its use in the multidisciplinary assessments protects (especially inexperienced) health professionals to miss important aspects of functioning (add reference). The use of the ICF Core Sets structures the assessment and offers the opportunity to distribute responsibilities among the team members by distributing the assessment of specific ICF categories to the appropriate team members. Thus, each profession can identify their own role by determining which team member will take the lead on which aspect of functioning.²⁰ Also a role overlap and redundant examinations and interrogations can be reduced within this approach and avoid inconvenience for the patient.¹⁹

Rating ICF categories with the ICF Qualifiers supports standardization and the understanding of functioning in the multidisciplinary assessment. Presenting the extent of problems and resources with the use of ICF Qualifiers enables all team members to judge the extent of problems, facilitators or barriers even in areas of functioning where experts are not specialists.

The ICF Categorical Profile and the ICF Assessment Sheet facilitate the description of a patient's function-

Assessment (12 weeks post-trauma)					Evaluation (16 weeks post-trauma)							
Global goal:	Complete independence, university entry				0	not evaluated yet						
Service program goal:	Independence in Activities of daily living				0	not evaluated yet						
Cycle goal 1:	d4 Mobility				1	✓						
Cycle goal 2:	d5 Self-care				0	✓						
Cycle goal 3:	e9201 Sport				2	✓						
ICF categories - Intervention targets	ICF Qualifier*				Goal re-lation*	Goal value	ICF Qualifier*				Goal achieve-	
	problems						problems					
	0	1	2	3	4		0	1	2	3	4	
b28013 Pain in back	[bar]				CG1	0	[bar]				-	
b415 Blood vessel functions - at risk	[bar]				GG	0	[bar]				✓	
b420 Blood pressure functions	[bar]				CG1	0	[bar]				✓	
b7101 Mobility of several joints	[bar]				CG1.2	0	[bar]				-	
b735 Muscle tone functions	[bar]				CG1	1	[bar]				✓	
b755 Involuntary movement reaction functions	[bar]				CG1.2	0	[bar]				✓	
b7603 Supportive functions of the arms - resource	[bar]				CG1.2	0	[bar]				✓	
b7800 Sensation of muscle stiffness (M. ischiocrurale)	[bar]				1,2	0	[bar]				✓	
s810 Structure of areas of the skin - at risk	[bar]				GG	0	[bar]				✓	
d410 Changing a basic body position	[bar]				CG1	0	[bar]				✓	
d4153 Maintaining a sitting position	[bar]				1,2	0	[bar]				✓	
d4200 Transferring oneself while sitting	[bar]				CG1	1	[bar]				✓	
d465 Moving around using equipment	[bar]				CG1	1	[bar]				-	
d4751 Driving a car	[bar]				CG1	0	[bar]				✓	
d510 Washing oneself	[bar]				CG2	0	[bar]				✓	
d520 Caring for body parts	[bar]				CG2	0	[bar]				-	
d5300 Regulating urination	[bar]				CG2	0	[bar]				✓	
d5301 Regulating defecation	[bar]				CG2	0	[bar]				✓	
d540 Dressing	[bar]				CG2	0	[bar]				✓	
e9201 Sport	[bar]				CG3	2	[bar]				✓	
	facilitator barrier						facilitator barrier					
	4+	3+	2+	1+	0	1	2	3	4			
e1101 Drugs	[bar]				CG1.2	2+	[bar]				✓	
e1151 Assistive product: Chair cushion	[bar]				CG1	0	[bar]				✓	
e1201 Assistive product mobility: wheelchair, car	[bar]				CG1	0	[bar]				✓	
e155 Design and construction of private building	[bar]				SPG	2	[bar]				✓	
e3700 Social security services	[bar]				SPG,GG	4+	[bar]				-	
e3750 General social support services	[bar]				SPG,GG	3+	[bar]				-	
	influence of personal factors						influence of personal factors					
	positive neutral negative						positive neutral negative					
pf Knowledge of disease	[bar]				SPG	2+	[bar]				✓	
pf Acceptance of disease	[bar]				GG	0	[bar]				✓	

Figure 6.—ICF Evaluation Display: illustrates the change of the functioning state over the course of one rehab-cycle. CG1:related to cycle goal 1;CG2: related to cycle goal 2; CG3: related to cycle goal 3; SPG: related to service program goal; GG: related to global goal; *ICF Qualifier the extent of problems (0=NO problem to 4=COMPLETE problem) in the components of body functions (b), body structures (s), activity and participation (d) and the extent of positive (+) or negative impact of environmental (e)- and personal factors (pf) (Spinal Cord Injury, ASIA A Th 3, 12 and 16 weeks after trauma).

ing state. Since the description of a functioning state can be very complex in many health conditions and clinical situations taking into account a multitude of limitations in all aspects of functioning and the interacting contextual factors, multidisciplinary team work with comprehensive expertise in varying areas of functioning is required to perform a functioning state.¹⁹ ICF Assessment Sheet and ICF Categorical Profile provide a common language and structured documentation form which can be used commonly across disciplines for the description of a functioning state.

Moreover, the ICF Assessment Sheet supports the detection of the important patient's perspective. The integration of the patient's perspective is essential because care providers are often faced with the patient's subjective experience of functioning and the corresponding negative and positive feelings.²¹ Also, certain experiences of functioning such as specific symp-

oms (e.g. pain, fatigue) or the lived experience in participation rely primarily on patient information. Thus, the integration of this information in the ICF Assessment Sheet contributes to active the involvement of the patient in the health care process.¹⁰

The illustration of both perspectives also allows the illustration of capacity and performance in the components of activity and participation. The comparison of both may support a more patient-oriented rehabilitation management by focusing on the patient's experience and needs and identifying relevant differences in capacity and performance. Since the rehabilitative strategy aims to develop performance in the interaction with the environment¹ health professionals should consider the individual performance of tasks and compare it to the measured capacity as basis for the goal-setting process.

The understanding of a patient's functioning state

is the basis to perform successful goal setting. The illustration of all components of functioning in the ICF Assessment Sheet and the ICF Categorical Profile facilitate goal-setting on the different levels of functioning. Hence, mutually agreed goals can be defined using these ICF Tools. The definition of goals helps to increase team collaboration and to act in a coordinated and consistent way.^{22, 23} Moreover, the ICF Assessment Sheet clearly illustrates the patient's perspective and thus, can be used for common goal setting facilitating health professionals to focus on the patient's interests,²² increasing the patient's abilities to be engaged in meaningful activities²⁴ and also their motivation.²⁵ To identify patient's goals the individual should be actively involved. Goals should be agreed among all involved persons, the individual, his family, care providers and the rehabilitation team.^{26, 27} The presentation of defined goals in the ICF Assessment Sheet and ICF Categorical Profile may strengthen a goal-directed rehabilitation and thus, even may improve the outcomes of clinical interventions.²⁸ However, goal-setting includes a definition of goal values to facilitate the evaluation of goal achievement. Since the ICF Categorical Profile allows the documentation of goal values, it supports this important step in rehabilitation management.

ICF Assignment Maps can help to organize the choice and assignment of appropriate interventions to health professionals. A routine assignment supports team efficiency by considering existing resources of the team in treatment planning and helps to ensure that each team member is aware of each others treatments and interventions.¹⁹ Assignment maps offer combinations of intervention targets, described within ICF categories, and interventions. This may help, especially inexperienced team members, to plan their treatment procedures. An evidenced based approach, integrating best research evidence with clinical expertise and patient values may help to identify appropriate interventions.²⁹ Combining this approach with a hypothesis-oriented team approach following the clinical reasoning concept^{30, 31} may also optimize this process.

The ICF Intervention Table was created to document the process from assignment and intervention to evaluation of goal values for the determined intervention targets during one single rehabilitative cycle. Only information, important for all team members is presented in this table. Additional information, like choice of intervention technique, frequency and intensity of interventions has to be documented by each team

member separately. This helps the team to focus on the most important information. In addition, such an overview pictures the patient's needs related to his problems in functioning, the required resources of the team and the course of the rehabilitation process. Furthermore, the ICF Intervention Table increases transparency of the rehabilitation processes.

The ICF Evaluation Display pictures clearly the changes of the functioning state after one treatment cycle in all treated ICF categories and personal factors. Beside this, the evaluation of the goal-achievement facilitates team discussion about the definition of goal values. The evaluation of the changes in the functioning state and the goal achievement are important outcome measures in clinical practice to demonstrate effectiveness of services.³² Hence, the ICF Evaluation Display provides a very well arranged overview of this evaluation and supports team discussion.

Limitations

The presented ICF Tools are developed to facilitate a patient-oriented, comprehensive and multidisciplinary ICF-based rehabilitation management. However, some limitations exist at this stage of development: 1) documentation is often time consuming and often has a negative effect on team member's satisfaction.³³ The presented ICF Tools require also time resources. The development of an ICF based electronic documentation system could facilitate the implementation of ICF Tools in clinical practice. Beside this it may also allow the collection of comparable data to contribute to future research in the area of human functioning;^{34, 35} 2) the comparison of data prerequisites the measurement of specific ICF categories based on standardized instruments. There are already specific and psychometric sound instruments or tests for some ICF categories, however, not for all of them. Hence, the mapping of standardized tests to specific ICF categories is needed to facilitate standardized measurement of different areas of functioning in the future; 3) the use of the ICF qualifiers is not operationalized yet. First steps have been performed to create ICF category interval scales^{36, 37} or to validate the use of the rating scale of the ICF qualifiers directly instead of specific test or examinations (*e.g.* if no test exists).³⁸ However, further research in this area is necessary; 4) further research is also necessary to achieve more evidence-based information about adequate interventions for the treatment of specific ICF categories in specific

health conditions. The application of the ICF Assignment Maps would thereby be facilitated.

Conclusions

While future research will be necessary to contribute to the optimization of the implementation of ICF tools in clinical practice, this paper shows how rehabilitation practitioners can already take advantage of their use in the rehabilitation management.

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