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ICF Case Studies

Translating Interventions into Real-life Gains – a Rehab-Cycle Approach

Independence

Case Study 02



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Preface

Functioning is a central dimension in persons experiencing or likely to experience disability. Accordingly, concepts, classifications and measurements of functioning and health are key to clinical practice, research and teaching. Within this context, the approval of the **International Classification of Functioning, Disability and Health (ICF)** by the World Health Assembly in May 2001 is considered a landmark event.

To illustrate the use of the ICF in rehabilitation practice **Swiss Paraplegic Research (SPF)** together with **Swiss Paraplegic Centre (SPZ)**, one of Europe's leading (acute and rehabilitation) centres for paraplegia and spinal cord injury (SCI), performed a series of case studies. Conducting ICF-based case studies was one approach to address SPF's aim to contribute to optimal functioning, social integration, health and quality of life for persons with SCI through clinical and community-oriented research. The ICF-based case studies project began in October 2006.

In this project, persons of different age groups and gender and who are living with SCI of varying etiology and levels of severity, were accompanied during their rehabilitation at SPZ. The rehabilitation process is then described using the Rehab-Cycle® and the corresponding ICF-based documentation tools. Since persons with SCI are faced with a number of physical, psychological and social challenges, the case studies aimed to cover a broad spectrum of these challenges. With this in mind, each case study highlighted a specific theme of SCI rehabilitation.

A booklet is published for each case study conducted. To better understand the case studies described in these booklets, find below some basic information about SCI, the ICF, ICF Core Sets, the Rehab-Cycle® and the ICF-based documentation tools.

Spinal Cord Injury (SCI)

Spinal cord injury (SCI) is an injury of the spinal cord that results in a temporary or permanent change in motor, sensory, or autonomic functions of the injured person's body. The spinal cord is divided into four sections which can be further subdivided into individual segments:

- 8 cervical segments (C1 to C8)
- 12 thoracic segments (T1 to T12)
- 5 lumbar segments (L1 to L5)
- 5 sacral segments (S1 to S5)

The damage of the spinal cord is called lesion. Important functions such as mobility (motor functions) or sensation (sensory functions) fail below the lesion. To help determine future rehabilitation and recovery needs, the extent of a SCI in terms of sensory and motor functions is described using the American Spinal Injury Association (ASIA) impairment scale.

International Classification of Functioning, Disability and Health (ICF)

The ICF is a classification of the **World Health Organization (WHO)** based on the integrative bio-psycho-social model of functioning, disability and health. Functioning and disability reflect the human experience related to the body functions, body structures, and activities and participation. It is viewed in terms of its dynamic interaction with a health condition, personal and environmental factors.

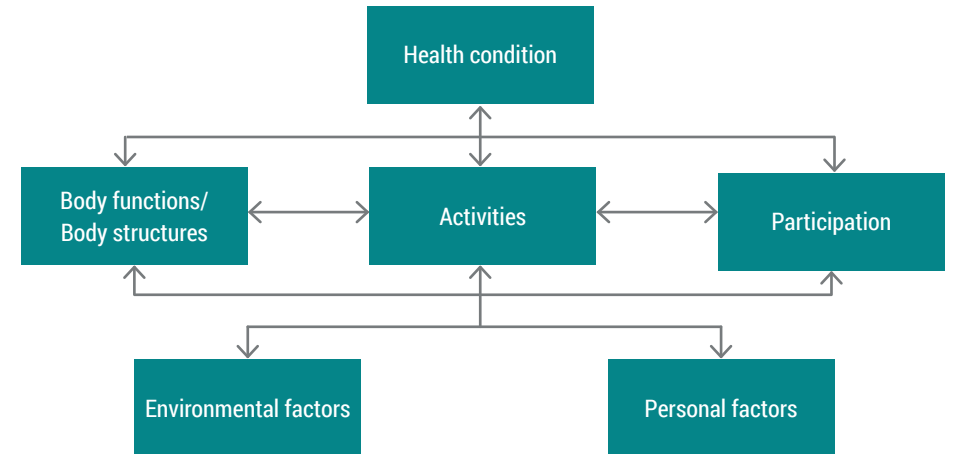


Figure 1: Bio-psycho-social model of functioning, disability and health

The ICF classification corresponds to the components of the model. Within each component, there is an exhaustive list of categories that serve as the units of the classification. ICF categories are denoted by unique alphanumeric codes and are hierarchically organized in chapter, second, third and fourth levels. When going from the chapter level to the fourth level, the category's definition becomes more detailed.

The classification also comprises so-called ICF qualifiers, which quantify the extent of a problem experienced by a person in a specific ICF category. Since environmental factors can also be facilitators, the ICF qualifier for facilitators are indicated with a plus sign.

Generic Scale of ICF Qualifiers	
0	NO problem (none, absent, negligible,...) 0-4%
1	MILD problem (slight, low,...) 5-24%
2	MODERATE problem (medium, fair,...) 25-49%
3	SEVERE problem (high, extreme,...) 50-95%
4	COMPLETE problem (total,...) 96-100%
8	not specified (used when there is insufficient information to quantify the extent of the problem)
9	not applicable (used to indicate when a category does not apply to a particular person)

ICF Core Sets

To facilitate the use of the ICF in clinical practice, it is essential to have ICF-based tools that could be integrated into the existing processes. The first step toward providing ICF-based tools for clinical practice was the development of ICF Core Sets. ICF Core Sets are shortlists of ICF categories that are considered to be most relevant for describing persons with a specific health condition or in a particular setting. In a rehabilitation setting an ICF Core Set can help guide the rehabilitation management process. ICF Core Sets have been developed for several health conditions e.g. for spinal cord injury, health condition groups e.g. for neurological conditions and for various settings. ICF Core Sets can serve as a basis when using the **ICF-based documentation tools** that follow the **Rehab-Cycle®**.

Rehab-Cycle® and corresponding ICF-based documentation tools

The Rehab-Cycle® is one approach that reflects the structured processes inherent in multidisciplinary rehabilitation management. The Rehab-Cycle® consists of an assessment phase, assignment phase, intervention phase and evaluation phase. An ICF-based documentation tool has been developed to guide each of the Rehab-Cycle® phases: the ICF Assessment Sheet, the ICF Categorical Profile, ICF Intervention Table and ICF Evaluation Display. These tools can help a multidisciplinary rehabilitation team to better understand the role of functioning within the rehabilitation process and to more comprehensively describe a person's functioning - hence support ICF-based rehabilitation management.

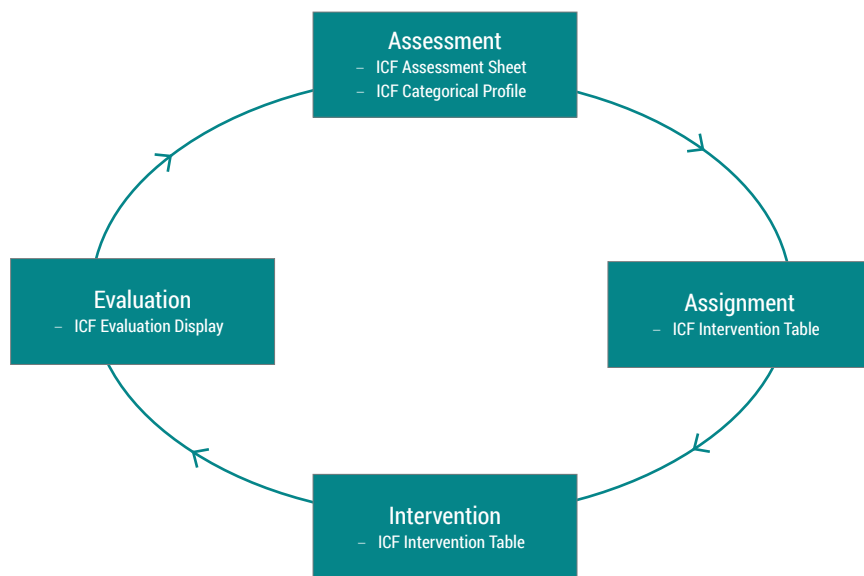


Figure 2: Rehab-Cycle®

You can find more detailed information about SCI, the ICF, ICF Core Sets, the Rehab-Cycle® and the ICF-based documentation tools on the website www.icf-casestudies.org.

Literature

- **American Spinal Injury Association.** Worksheet International standards for neurological classification of spinal cord injury (ISNCSCI); Revised version 02/13 http://www.asia-spinalinjury.org/elearning/ASIA_ISCOS_high.pdf. [Internet] Available from <http://www.asia-spinalinjury.org/elearning/ISNCSCI.php>. Accessed November 2014
- **Cieza A, Kirchberger I, Biering-Sørensen F, Baumberger M, Charlifue S, Post MW, Campbell R, Kovindha A, Ring H, Sinnott A, Kostanjsek N, Stucki G.** ICF Core Sets for individuals with spinal cord injury in the long-term context. *Spinal Cord.* 2010; 48(4): 305-312.
- **Chin LS, Mesfin FB, Dawodu ST.** Spinal cord injuries: Practice essentials, background, anatomy, pathophysiology, etiology, epidemiology, prognosis, patient education. 7 [Internet] July 2014. Available from: <http://www.emedicine.com/pmr/topic182.htm>. Accessed November 2014.
- **Ewert, T, Grill E, Bartholomeyczik S, Finger M, Mokrusch T, Kostanjsek N, Stucki G.** ICF Core Set for patients with neurological conditions in the acute hospital. *Disability and Rehabilitation.* 2005; 27(7/8): 367-374.
- **Kirchberger I, Cieza A, Biering-Sørensen F, Baumberger M, Charlifue S, Post MW, Campbell R, Kovindha A, Ring H, Sinnott A, Kostanjsek N, Stucki G.** ICF Core Sets for individuals with spinal cord injury in the early post-acute context. *Spinal Cord.* 2010; 48(4): 297-304.
- **Paraforum.** SCI as health condition. [Internet] December 2013. Available from: <https://www.paraforum.ch/article/sci/?group=36>. Accessed November 2014.
- **Rauch A, Cieza A, Stucki G.** How to apply the International Classification of Functioning, Disability and Health (ICF) for rehabilitation management in clinical practice. *Eur J Phys Rehabil Med* 2008; 44: 329-342.
- **Selb M, Escorpizo R, Kostanjsek N, Stucki G, Ustun B, Cieza A.** A guide on how to develop an international classification of functioning, disability and health core set. *Eur J Phys Rehabil Med* 2014.
- **Shepherd Center.** Understanding spinal cord injury: What you should know about spinal cord injury and recovery. 2014. [Internet] Available from: www.spinalinjury101.org/details/levels-of-injury. Accessed November 2014.
- **Stier-Jarmer M, Grill E, Ewert T, Bartholomeyczik S, Finger M, Mokrusch T, Kostanjsek N, Stucki G.** ICF Core Set for patients with neurological conditions in early post-acute rehabilitation facilities. *Disability and Rehabilitation.* 2005; 27(7/8): 389-396.
- **World Health Organization.** International Classification of Functioning, Disability and Health, Geneva, World Health Organization; 2001.

General Introduction



Sporting accidents are a frequent cause of **traumatic spinal cord injuries (SCI)**, and a common subset of these SCI are those resulting from skiing and snowboarding. The devastating injuries that are associated with such recreational sports often affect young men under thirty.

Snowboarders, for example, are at particular risk of SCI and have higher rates of such injuries when compared to skiers, especially intermediate and expert boarders involved in jumping.^{1,2,3,4,5} Additionally, the prevalence of SCI within this

group has been increasing in accordance with the rising popularity of the sport.^{1,4,5} While sporting accidents are one example of the sudden and unanticipated events that can result in SCI, they affect a largely young and healthy population.

Box 1 | Epidemiology of Traumatic SCI

Spinal cord injuries can be the result of either non-traumatic or traumatic events. Historically, most common causes of SCI involve trauma.⁶ A traumatic SCI results from a blow to the spine that fractures or compresses the vertebrae or other penetration of the spinal cord. Following the trauma, additional damage can occur due to hemorrhaging, swelling or inflammation.⁷

In the United States, 40.4% of all SCIs are a result of motor vehicle accidents; 27.9% are a result of falls (primarily in persons over 45 years); 15% are a result of violence, particularly in urban areas; and 8% of SCIs occur due to sporting injuries, with diving being the riskiest of sports in this regard.⁸ However, skiing and snowboarding also pose a risk of SCI. One Canadian

study found an incidence of 0.01 and 0.04 per 1000 skier and snowboarder days, respectively.⁸ Another study places the rate of SCI amongst ski and snowboard injuries between 1% and 13%.³

When young athletes such as snowboarders are suddenly struck by traumatic SCI, they face a drastic change in their independence and autonomy - from being a healthy individual, often able to function at the extremes of physical agility and endurance, to a person unable to perform basic physical activities and, in the initial phases of post-SCI rehabilitation, wholly dependent upon others. Thus, gaining full independence after SCI is often viewed as essential to reaching a self-directed and autonomous life.

(Re-)gaining independence is a process that is closely related to the level of the person's SCI, that is, different levels of injury result in different limitations on functioning. This resulting range of functioning in each person corresponds to different degrees of dependency.⁹

“Rehabilitation management should not simply consider the limitations in functioning, but also take into account each person's specific resources...”

However, the extent of independence that can be (re-)gained by a person with SCI is not solely dependent on the level of injury and its respective limitations; each person also brings a range of resources that he/she can use toward (re-)gaining independence in various areas of functioning. These resources include contextual factors such as education and social support, or the person's intrinsic qualities such as health, age or other motivational, cognitive, emotional and behavioural resources.^{10,11}

Therefore, a **person's resources** (sometimes referred to as individual coping mechanisms), together with his or her intrinsic goals, provide a key link to functional **independence** that health care professionals should support and encourage. Rehabilitation management should not simply consider the limitations in functioning, but also take into account each person's specific resources, factoring in multiple bio-psycho-social variables when considering treatment and rehabilitative programs.¹¹

“Gaining full independence after SCI is often viewed as essential to reaching a self-directed and autonomous life...”

Box 2 | The Resource-Oriented Approach

A resource-oriented approach can be found in the concept of salutogenesis (from the Latin *salus*, meaning health, and *genesis*, meaning origin). This concept focuses on health and well-being rather than on the factors that cause disease. The term was first used by Aaron Antonovsky and may be differentiated from a deficit-oriented or pathogenetic approach, which focuses on the factors of disease or disability.^{12,13}

A key factor in salutogenesis is a person's sense of coherence, described by Antonovsky as "a global orientation that expresses the extent to which one has a pervasive, enduring though dynamic feeling of confidence that one's internal and external environments are predictable

and that there is a high probability that things will work out as well as can reasonably be expected."¹² There are three common factors found among healthy individuals that also come into play under challenging circumstances.^{14,15}

Control an individual can influence and manage the course of events.

Commitment an individual finds a sense in, and curiosity for, meaningfulness in life and the world.

Challenge an individual's understanding that it is normal and beneficial for life to change.

This case study of Michael, a young person with SCI, illustrates the salutogenic approach well, including the influence of the aforementioned factors on Michael's rehabilitation. Michael's case shows how his intrinsic resources and coping

strategies were able to be harnessed in the face of various challenges living with SCI, and to what extent these resources facilitated the rehabilitation process and his efforts toward achieving his goal of greater independence.

Michael's Story



University was at the forefront of Michael's thoughts as he worked to complete his final weeks of apprenticeship as a cabinet-maker. He had always understood the importance of achieving goals: Finish the apprenticeship, then move on to the **next challenge**.

"When I think about my situation now, I have this very strong feeling that I simply have to look forward. I'm not the kind of person who has ever had any doubts about myself or what I do. I just accept my new situation and look forward. I won't fall into the trap of self-pity. I will definitely gain my independence. It's a goal, it's my goal and I will continue to work towards it."

Michael 2007

At 19, there was plenty of time to explore and focus his mind and energy on longer term prospects. His plans after cabinet-making settled on preparations for the university entrance qualifications. But Michael was not simply career-focused; he had an extensive circle of friends, was in a committed relationship with his girlfriend and had always thrived in his many social activities. He was extremely athletic, enthusiastically diving into all varieties of sports, from climbing to hockey, from running to snowboarding.

It was snowboarding that threw a wrench into his plans. Michael was an experienced snowboarder with years of practice under his belt. As is often the case, it is frequently the more experienced athletes who suffer the most serious injuries. One winter afternoon while snowboarding, Michael slipped on a patch of ice that sent him crashing down an embankment. He tumbled into a streambed below where he lay injured until his friends discovered him a short time later.

Shaken But Undeterred

Michael's fall left him with a traumatic spinal cord injury (SCI) (ASIA A at the level of T3) and a broken arm. Emergency vertebral surgery was performed following his admission to the hospital, stabilizing the fracture. His arm was in a cast for six weeks and immobilized; immobilization was important for his rehabilitation. Michael's impairment was complete, leaving him with no motor or sensory function from mid-trunk down. As a result of his arm cast, rehabilitation in the initial months following the surgery was limited.

The accident left Michael temporarily shaken, but undeterred. Michael knew and felt intrinsically what he needed to accomplish in the face of this life-altering event – his **independence**.

"From the start, Michael really only needed psychological education and information on SCI. In general, he's a quiet person and very realistic. He seems to accept his condition quite well and also knows what he wants."

Michael's psychologist

"Michael knew and felt intrinsically what he now needed to accomplish in the face of this life-altering event – his independence."

Michael's initial treatment proceeded with no complications. However it was not until his arm had healed three months after the accident that a new Rehab-Cycle® could begin that focused on his much desired independence. As the process began, Michael was still quite dependent on others to undertake most daily activities such as transferring and washing himself. It was clear to Michael's rehabilitation team that Michael possessed many personal resources that could be harnessed to achieve his goal of greater independence. His clarity and intrinsic drive were evident in his life prior to the accident – in both his sporting activities and in setting realistic life goals for himself. Considering this major shift in Michael's life and health – from the peak of physical fitness to the challenges of paraplegia – Michael's resources and attributes would have to be refocused, not diminished.

His long-term goal i.e. to study at university remained on the horizon and facilitated his efforts to regain his independence. The rehabilitation team throughout the rehabilitation process would help support and enhance Michael's efforts.

Assessment



From Michael's perspective i.e. "the patient perspective", many of his needs were activity-based and logically centred around his wish to become independent again. Michael felt there were numerous activities he would like to work on, such as being able to sit up alone, balancing himself, moving about in a wheelchair or washing and caring for himself.

The Patient and Health Professional Perspectives

While limitations in these areas were normal for his injury level, Michael understood that they undermined his ability to act and live on his own. Clearly, these limitations greatly contrasted to his previous state and athletic physical abilities. These problems were further compounded by his broken arm, a condition that led to a delay in the rehabilitation necessary to increase his independence. His body function problems were within the normal range of expectations for his condition. Notable was Michael's perspective on his participation in social and community life; it underscored Michael's forward-thinking attitude and drive towards addressing his new limitations. It also served as a source of his available and potential resources. For instance, his desire to attend university, participate in sports and

socialize were important underlying motivational factors.

Michael's perspective on all aspects of his functioning are outlined in table 1, the **ICF Assessment Sheet**, a comprehensive overview of the a person's functioning state by presenting the assessment results in all the components of functioning, environmental and personal factors with input from both the health professional and the person/patient. See "Table 1: ICF Assessment Sheet" on page 24 at the end of this booklet. The ICF Assessment Sheet can help his rehabilitation team to understand his functioning better and to identify the needs to be addressed in Michael's rehabilitation.

From the perspective of the rehabilitation team, there were a number of elements in each of the groupings seen on table 1 that were considered by the team to be of particular importance for Michael to move forward in the Rehab-Cycle®. Of special relevance were his environmental and personal factors, many of which acted as resources and facilitators for his rehabilitation. It was obvious to the rehabilitation team that Michael possessed quite a number of facilitating factors across different functioning components that could contribute to realistic goal-setting. These included, for instance, his living situation, coping strategies, motivation, athleticism, overall fitness and support of family and friends:

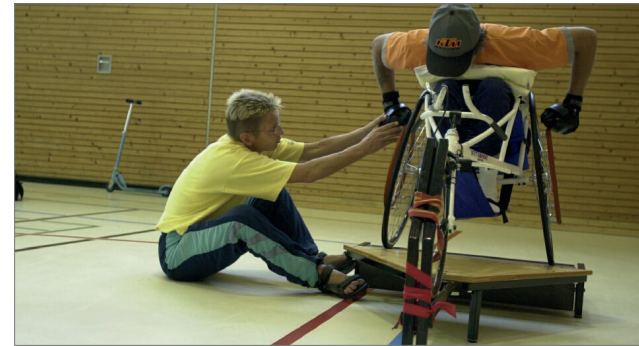
– With regard to personal factors, Michael's desire for independence and learning as well as his goal-oriented thinking and recognition of his limits all helped to inform and direct the rehabilitation goal-setting process. Additionally, his age and athleticism were important factors as well.

– In terms of functioning, Michael had an above-average ability to acquire new skills and exceptional movement above the level of T3.
– Also aspects of his environment, both physical (i.e. manual wheelchair, wheelchair-accessible health centre and health insurance coverage) and social (i.e. support from his parents, girlfriend, extended circle of friends and health professionals), facilitated the rehabilitation process.

It was understood that these **resources and environmental factors** could be harnessed by both Michael and his rehabilitation team, and that these factors would frame Michael's rehabilitation.

For the final part of the assessment, the results of the clinical tests and examinations were matched with the corresponding values of the International Classification of Functioning, Disability and Health (ICF) qualifiers in order to generate an ICF functioning profile.

Goal-setting and Determination of Intervention Targets



Generating an ICF functioning profile i.e. **ICF Categorical Profile** enabled Michael and his rehabilitation team to visualize his functioning status at the time of assessment. Michael's functioning status was assessed 12 weeks following the accident and included all of those ICF categories that were relevant for describing his functioning and intervention planning. This profile could later be used as a reference for outcome evaluations.

“These past weeks have not been easy for me, I need help to do almost everything. It's hard to describe, but it's like I've somehow lost my body and now I need to find it, to re-learn how to do simple things. What I really want is to be able to go through my day without help from others.”

Michael

Independence as a Goal

In creating an individualized ICF Categorical Profile Michael and his rehabilitation team were able to set global as well as more specific, short-term goals that were informed to a large extent by the resources he brought with him. See “Table 2: ICF

Categorical Profile” on page 26 at the end of this booklet. This is reflected in both Michael's statements as well as in the information indicated on table 1 ICF Assessment Sheet.

“What I really want is to be able to go through my day without help from others.”

Constituting a subjective assessment of a person's perceived needs and derived from discussions and interactions with the person, the "patient perspective" generally plays a significant role in setting goals. This was also the case with Michael.

Given his personality, wishes and intrinsic life goals, the rehabilitation team decided that setting a **global goal** of full independence along

Determination of Intervention Targets

Once these cycle goals were defined by the team, the process moved on to the determination of the appropriate intervention targets for each cycle goal. Intervention targets are those ICF categories that correspond to specific goals and that will be addressed with interventions in the rehabilitation program.

In Michael's case, the cycle goal of 'independence in self-care' incorporated targets focusing on balance, washing, bladder and bowel management,

with university entry was in Michael's case quite realistic. Consequently, the team and Michael defined a **service-program goal** as 'Independence in activities of daily living (ADLs)'. To achieve the service-program goal, a series of shorter-term **cycle goals** were set; these focused on self-care and mobility and were to be addressed over a period of six months. Sport was defined as a cycle goal as well to reflect Michael's wish to participate again in sports.

muscle stiffness, and knee mobility. The cycle goal 'independence in mobility' consisted of targets relating to back pain, limitations in changing body position and transferring, balance, and overcoming barriers with a wheelchair. Furthermore, the cycle goal 'sport' corresponded directly with the target sport and also with involuntary movement reaction. These intervention targets were then addressed in the next phase of the Rehab-Cycle® i.e. the intervention phase.

Assignment and Intervention



Interventions corresponding to each of the targets were assigned to the appropriate members of Michael's rehabilitation team. In addition to the physician, nurse, physical therapist, occupational therapist, psychologist, social worker and architectural expert who make up the standard rehabilitation team, a sports therapist was welcomed to the team to focus on Michael's athletic activities. The roles and distribution of resources within the multidisciplinary team can be seen on Michael's ICF Intervention Table.

The **ICF Intervention Table** provides a comprehensive overview of all the intervention targets, the interventions themselves and the corresponding rehabilitation team member(s) who is (are) assigned to address each intervention target. See "Table 3: ICF Intervention Table" on page 28 at the end of this booklet.

The initial intervention phase lasted three months. An assessment was undertaken after four weeks into the intervention phase to determine Michael's progress.

"Independence in self-care incorporated targets focusing on balance, washing, bladder and bowel management, muscle stiffness, and knee mobility."

Evaluation

At 16 weeks following the accident (i.e. one month after the interventions started), an evaluation of Michael's progress was performed. The results are illustrated in the **ICF Evaluation Display**, an overview of the results of the first and of the final assessment of the intervention targets identified in the assessment phase of the Rehab-Cycle®. It also shows whether the goals as defined by a goal value or ICF qualifier were achieved.

See "Table 4: ICF Evaluation Display" on page 30 at the end of this booklet. In Michael's case, most of the interventions met their targets within the expected timeframe. In terms of body functions and structure, Michael's muscle stiffness had decreased, and the structure of areas of his skin continued to pose no problem. He also made rapid progress in his activities; he was better able to maintain a sitting position and transfer himself, wash, dress and regulate his urination and defecation.

Michael was also able to begin exploring options for sports open to him, and started making some progress playing basketball. Psychologically, his acceptance and knowledge of his disease improved. About Michael's overall attitude and progress, his psychologist noted:

"Michael is a very special young man who has quite a sophisticated attitude toward his actual life situation. This is not common in persons of his age and it enables him to handle this difficult situation in a realistic and determined way. He knows what he wants and is always testing his physical limits to improve his functioning. At the moment he is retreating a little from his social environment.

This is typical behaviour just before discharge when a patient realizes all the challenges he will soon confront in the home environment. But Michael has a very good prognosis for becoming an independent, integrated and self-determined individual with a positive life satisfaction."

However a few intervention targets were not achieved (despite some progress in these targets). These included back pain, joint mobility, moving around in the wheelchair and caring for his body.

The following explanations offer some insight:

- **Back pain:** Despite continuation of back pain the degree of pain improved with the amount of training and acclimitization to the wheelchair.
- **Joint mobility:** The target for knee joint extension was not met; however, no additional functional problems resulted, and work on joint mobility continued.
- **Moving around with the wheelchair:** Steps proved particularly difficult for Michael. Though there was some improvement, more intensive practice was needed. Michael benefited from his lack of fear in maneuvering the wheelchair – a personal resource not noted in the initial assessment.

– **Caring for body:** Michael was able to perform this, but didn't feel confident enough in his abilities and still wanted his nurses to check him.

The fact that these intervention targets were not met was not considered by the rehabilitation

team as a threat to meeting the cycle goals. Given Michael's overall achievements, the rehabilitation team fully expected improvements in these targets in the subsequent rehabilitation phase, not least because of the strong resources Michael brought into the rehabilitation process.

Discussion



Improvement in functioning is not only a result of reducing disease-specific problems and symptoms, but also of strengthening general resources. This is part of a salutogenic approach, focusing on the factors that contribute to an individual's health.^{12,13,14,15} These resources must be assessed, and when appropriate, taken into consideration in rehabilitation management. In most cases, the person engaged in rehabilitation possesses valuable resources that can help him or her overcome challenges associated with SCI.^{10,11,16}

Such resources may include **personal attributes** and aspects such as **coping strategies and environmental factors**. The resources that each person brings into rehabilitation will vary, but each will have certain strengths that can be applied to reduce or alleviate problems he or she faces. Many of these resources reflect the complete background of the person's life and living situation.^{16,17}

The resources can be identified during the assessment phase from the perspective of both the person undergoing rehabilitation as well as

from the rehabilitation team. These resources may then be supported or enhanced by the team through specific interventions. In Michael's case, aspects of his person, personality and environment helped to inform his own goals and the goals set by his rehabilitation team. This in turn **positively impacted his progress** in achieving these goals. Michael's own intrinsic wishes – to attend university, play sports and engage in social activities – were very clear to him from the start, serving as both a coping strategy and an important motivating factor.

“Michael's own hopes and intentions for the future also had a positive impact on his progress...”

Knowing this helped Michael and his rehabilitation team to define Michael's global goal of 'complete independence and university entry'. This global goal was not only desirable for Michael, but also realistic. Michael's own hopes and intentions for the future also had a positive impact on the progress in his service-program goal that focused on 'independence in the activities of daily living'.

Many of Michael's resources contributed to the success in achieving these goals. Above-average skill acquisition, his young age, athleticism (and competitiveness by default) and physical fitness, a large and supportive social network, health

insurance and financial support all helped Michael to reach most of his intervention targets.

A person's resources matter in the rehabilitation process. They help to inform goal-setting and facilitate the person's progress in moving towards functional independence. Thus, in the assessment phase of the Rehab-Cycle® consideration should be given to the resources available to the person engaged in rehabilitation. Such resources have great potential to positively affect goal-setting, intervention planning and implementation - with the hope that this leads to a person's increased **independence and subsequent autonomy and self-determination**.

Annex

- Table 1: ICF Assessment Sheet
- Table 2: ICF Categorical Profile
- Table 3: ICF Intervention Table
- Table 4: ICF Evaluation Display
- Literature
- Questions

Table 1: ICF Assessment Sheet

ICF Assessment Sheet	
<p>Health Professional Perspective</p> <p>Body Functions & Structures</p> <ul style="list-style-type: none"> - No touch functions below T3 - Low blood pressure - Blood vessel functions - at risk - Fecal incontinence - Reduced mobility of knee joints (extension) - No muscle power functions below T3 - Constant spasticity below T3 - No reflex functions below in lower extremity - Reduced body balance - No voluntary movement functions below T3 - Above average movements functions below T3 - Above average movement functions above T3 - Muscle stiffness of hamstring muscles - Structure of the skin - at risk 	<p>Activities & Participation</p> <ul style="list-style-type: none"> - From time to time I have pain in my back - My bladder and bowel are impaired - Exercises do not exhaust me - I have problems with my body balance - I can't control my abdominals - I haven't been allowed to prop on my right hand (fracture of radius) - I once had a pressure sore - I can't sit up from a lying position - I have problems while sitting because of little body balance
<p>Patient Perspective</p> <ul style="list-style-type: none"> - I need support in transferring myself (esp. into a car) but I can turn from back to side position - Handling barriers with the wheelchair is difficult - I want to drive a car - I need support in washing myself - I need support in caring for my skin - I can't use the toilet by myself - I can't dress myself because of my broken arm - I teach my parents and friends how to help me - I spend a lot of time with my friends - I talk to other wheelchair drivers - I spend time with my visitors in the rehab-centre - I will finish my general qualification for university entrance - I organize and participate in our youth club - In my free time I read more than before the accident - I used to do sports and I want to do sports again 	<ul style="list-style-type: none"> - Above average in acquiring skills - Partial limitations in changing body positions - Instability in sitting position - Partial limitations in transferring (support by one person) - Complete limitation in overcoming barriers with the wheelchair - Partial limitations in washing oneself - Partial limitations in caring for body parts - Complete limitations in bowel management - Complete limitations in bladder management - Partial limitations in dressing - Restricted sport activities
<p>Environmental Factors</p> <ul style="list-style-type: none"> - Medication (when in pain) - Need for an adapted car - Living in a farmer's house - No barriers in the centre - Ramps and stairs disable in moving the wheelchair - Large circle of friends - Parents support him - Friends support him - Health professionals support him - Insurance should support him - Manual wheelchair - Rubbing plate and chair cushion 	<p>Personal Factors</p> <ul style="list-style-type: none"> - Male, 19 years old - Apprenticeship as a cabinetmaker - Has a girlfriend - Living with his family - Sportive person - Wants to accept his situation - Is excited to discover his physical limits

Table 2: ICF Categorical Profile

ICF Categorical Profile											
Assessment											
ICF categories		ICF Qualifier				Goal Relation		Goal value			
		problem									
		0	1	2	3	4					
Global Goal: University entrance, complete independence											0
Service-Program-Goal: Independence in ADLs											0
Cycle goal 1: Independence in mobility											1
Cycle goal 2: Independence in self-care											0
Cycle goal 3: Sport											2
b265	Touch functions										-
b28013	Pain in back										1
b525	Defecation functions										-
b620	Urination functions										-
b7101	Mobility of several joints										1,2
b7303	Muscle power functions in lower half of the body										-
b735	Muscle tone functions										1,2
b750	Motor reflex functions										-
b755	Involuntary movement reaction functions										1,2,3
b7800	Sensation of muscle stiffness										1,2
s810	Structure of areas of the skin										G
d155	Acquiring skills										-
d410	Changing basic body positions										1
d4153	Maintaining a sitting positions										1,2
d4200	Transferring oneself while sitting										1
d465	Moving around using equipment										1
d510	Washing oneself										2
d520	Caring for body parts										2
d5300	Regulating urination										2
d5301	Regulating defecation										2
d540	Dressing										2
d9201	Sport										3
		facilitator				barrier					
		4+	3+	2+	1+	0	1	2	3	4	
e1101	Drugs										-
e1151	Assistive products...for personal use in daily living										1
e1201	Assistive products...for personal mobility										1
e155	Design, construction...of buildings for private use										G
e1602	Products...of urban land development										-
e310	Immediate family										-
e320	Friends										-
e355	Health professionals										-
e575	General social support services, systems...										G
e580	Health services, systems and policies										G
pf	Knowledge of disease										SP
pf	Sportive person										-
pf	Acceptance of disease										SP
pf	Purposefulness										-
pf	Coping strategies										SP

Table 2: ICF Categorical Profile; ICF Qualifier: rate the extent of problems (0 = no problem to 4 = complete problem) in the components of body functions (b), body structures (s), activities and participation (d) and the extent of positive (+) or negative impact of environmental (e) and personal factors (pf); Goal Relation: 1, 2, 3 refers to Cycle goal 1, 2, 3; SP refers to Service-Program Goal; G refers to the Global Goal; Goal value refers to the ICF qualifier to achieve after an intervention.

Table 3: ICF Intervention Table

ICF Intervention Table													
	Intervention target	Intervention	Doc	Nurse	PT	OT	Psych	SW	Arch	First value	Goal value	Final value	
Body function/-structure	b28013	Pain in back			x					3	0	1	
	b415	Blood vessel functions	Adaptation of wheelchair			x							
			Compression hosiery		x								
	Medication												
				x									
	b7101	Mobility of several joints			x					1	0	1	
	b735	Muscle tone functions		x						2	1	1	
	b755	Involuntary movement reaction functions			x					2	0	0	
	b7603	Supportive functions of the arms			x								
	b7800	Sensation of muscle stiffness	Tension relief exercises, Stretching			x					1	0	0
s810	Structure of areas of the skin	Daily inspection		x						0	0	0	
d410	Changing basic body positions	Sit-up-training			x					1	0	0	
d4153	Maintaining a sitting position	Training of stability while sitting			x					1	0	0	
d4200	Transferring oneself while sitting	Transfer-training			x					2	1	1	
d465	Moving around using equipment	Wheelchair-training outdoor			x					3	1	2	
d510	Washing oneself	Assistance/Instruction		x						2	0	0	
d520	Caring for body parts	Assistance/Instruction		x						2	0	1	
d5300	Regulating urination	Assistance/Instruction		x						2	0	0	
d5301	Regulating defecation	Assistance/Instruction		x						2	0	0	
d540	Dressing	Assistance/Instruction		x		x				2	0	0	
d9201	Sport	Exercising wheelchair sports			x					4	2	2	
Environmental Factors	e1151	Assistive products...for personal use				x				2 (-)	0	0	
	e1201	Assistive products...for personal mobility	Control of wheelchair cushion							1 (+)	2 (+)	2 (+)	
	e155	Design...of buildings for private use	Testing of different wheelchairs, reconstruction of the car			x					3 (-)	2 (-)	2 (-)
			Planning and reconstruction of private building					x			0	4 (+)	2 (+)
	e575	General social support services...	Clarification and organization of payments					x		2 (+)	3 (+)	2 (+)	
	e580	Health services, systems and...	Clarification and organization of payments					x		2 (-)	2 (+)	2 (+)	
	pf	Knowledge of disease	Lectures and individual education		x	x	x	x		2 (-)	2 (+)	2 (+)	
pf	Acceptance of disease	Behavioural approach				x			2 (-)	0	1 (-)		
pf	Coping strategies	Behavioural approach					x		1 (+)	2 (+)	2 (+)		

Table 3: ICF Intervention Table; Doc = Physician; PT = Physical Therapist; OT = Occupational Therapist; Psych = Psychologist; SW = Social Worker; Arch = Architectural expert. The values are rated using ICF qualifiers; ICF Qualifier rate the extent of problems (0 = no problem to 4 = complete problem) in the components of body functions (b), body structures (s), activities and participation (d) and the extent of positive (+) or negative impact (-) of environmental (e) and personal factors (pf). First value refers to the rating at the initial assessment; Goal value refers to the rating to achieve after an intervention; Final value refers to the actual rating at the second assessment or evaluation. In table 2 ICF Categorical Profile b415 Blood vessel functions and b7603 Supportive functions of the arms were not depicted. However, since an intervention was provided addressing these aspects of functioning, they are included here.

Table 4: ICF Evaluation Display

ICF Evaluation Display														
Assessment						Evaluation								
ICF categories	ICF Qualifier	Goal Relation	Goal value	ICF Qualifier				ICF Qualifier				Goal achievement		
				0	1	2	3	4	0	1	2		3	4
Global Goal: University entrance, complete independence			0										not evaluated yet	
Service-Program-Goal: independence in ADLs			0										not evaluated yet	
Cycle goal 1: Independence in mobility			1										+	
Cycle goal 2: Independence in self-care			0										+	
Cycle goal 3: Sport			2										+	
b28013	Pain in back	1	0											-
b7101	Mobility of several joints	1,2	0											-
b735	Muscle tone functions	1,2	1											+
b755	Involuntary movement reaction functions	1,2,3	0											+
b7800	Sensation of muscle stiffness	1,2	0											+
s810	Structure of areas of skin	G	0											+
d410	Changing basic body positions	1	0											+
d4163	Maintaining a body position	1,2	0											+
d4200	Transferring oneself while sitting	1	1											+
d465	Moving around using equipment	1	1											-
d510	Washing oneself	2	0											+
d520	Caring for body parts	2	0											-
d5300	Regulating urination	2	0											+
d5301	Regulating defecation	2	0											+
d540	Dressing	2	0											+
d9201	Sport	3	2											+
e1151	Assistive products...for personal use in daily living	1	0											+
e1201	Assistive products...for personal mobility	1	2+											+
e155	Design, construction ...of buildings for private use	G	2											+
e575	General social support services. systems...	G	4+											-
e580	Health services, systems and policies	G	3+											-
pf	Knowledge of disease	SP	2+											+
pf	Acceptance of disease	SP	0											-
pf	Coping strategies	SP	2+											+

Table 4: ICF Evaluation Display; ICF Qualifier: rate the extent of problems (0 = no problem to 4 = complete problem) in the components of body functions (b), body structures (s), activities and participation (d) and the extent of positive (+) or negative impact of environmental (e) and personal factors (pf); Goal Relation: 1, 2, 3 refers to Cycle goal 1, 2, 3; SP refers to Service-Program goal; G refers to Global goal; Goal value refers to the ICF qualifier to achieve after an intervention; Goal achievement: + means achieved, - means not achieved.

Literature

1. **Chissell HR, Feagin JA, Warne WJ, Lambert KL, King P, Johnson L.** Trends in ski and snowboard injuries. *Sports Med.* 1996; 22: 141-145.
2. **Tarazi F, Dvorak MFS, Wing PC.** Spinal injuries in skiers and snowboarders. *Am J Sports Medicine.* 1999; 27:177-180.
3. **Levy AS, Smith RH.** Neurologic Injuries in skiers and snowboarders. *Semin Neurol.* 2000; 20: 233-245.
4. **Yamakawa H et al.** Spinal injuries in snowboarders: Risk of jumping as an integral part of snowboarding. *J Trauma.* 2001; 50: 1101-1105.
5. **Wakahara K, Matsumoto K, Sumi H, Sumi Y, Shimizu K.** Traumatic spinal cord injuries from snowboarding. *Am Journal Sports Med.* 2006; 34(10): 1670-1674.
6. **Bickenbach J et al.** A global picture of spinal cord injury. In: Bickenbach J, Officer A, Shakespeare T, von Groote P. Eds. *International perspectives on spinal cord injury.* Geneva, Switzerland: World Health Organization; 2013. p 13-22.
7. **Mayo Clinic.** Diseases and conditions: Spinal cord injury. [Internet] October 2014. Available from: <http://www.mayoclinic.org/diseases-conditions/spinal-cord-injury/basics/definition/con-20023837>. Accessed November 2014.
8. **Chin LS, Mesfin FB, Dawodu ST.** Spinal cord injuries: Practice essentials, background, anatomy, pathophysiology, etiology, epidemiology, prognosis, patient education. 7 [Internet] July 2014. Available from: <http://www.emedicine.com/pmr/topic182.htm>. Accessed November 2014
9. **Kirshblum SC, Priebe MM, Ho CH, Scelza WM, Chiodo AE, Wuermser L-A.** Spinal cord injury medicine. 3. rehabilitation phase after acute spinal cord injury. *Arch Phys Med Rehabil.* 2007; 88 (Suppl 1): S62-70.
10. **Galvin LR, Godfrey HPD.** The impact of coping on emotional adjustment to spinal cord injury (SCI): Review of the literature and application of a stress appraisal and coping formulation. *Spinal Cord.* 2001; 39: 615-627.
11. **Stucki G, Cieza A, Melvin J.** The international classification of functioning, disability and health: a unifying model for the conceptual description of the rehabilitation strategy. *J Rehabil Med.* 2007; 39: 279-285.
12. **Antonovsky A.** Health, stress, and coping: New perspectives on mental and physical well-being. San Francisco: Jossey-Bass. 1979.
13. **Antonovsky A.** The salutogenic model as theory to guide health promotion. *Health Promotion International.* 1996; 11(1): 11-18.
14. **Kobasa S, Hilker R, Maddi S.** Who stays healthy under stress? *J Occup Med.* 1979; 21(9): 595-598.
15. **Kent C.** Salutogenesis. Chiropractic Leadership Alliance (CLA) website. [Internet]. October 2002. Available from: <http://www.subluxation.com/salutogenesis/>. Access November 2014.
16. **Peter C, Rauch A, Cieza A, Geyh S.** Stress, internal resources and functioning in a person with spinal cord disease. *NeuroRehabilitation.* 2012; 30(2): 119-130.
17. **Post MW, de Witte LP, van Asbeck FW, van Dijk AJ, Schrijvers AP.** Predictors of health status and life satisfaction in spinal cord injury. *Arch Phys Med Rehabil.* 1998; 79: 395-401.

Questions

- Q1. **What are the most frequent reasons for traumatic SCI?** *(Refer to page 8 for the answer.)*
- Q2. **What is the difference between a resource-oriented and a deficit-oriented approach to rehabilitation?** *(Refer to page 10 for the answer.)*
- Q3. **Considering the resources that Michael brought into the rehabilitation process, what were identified during the assessment phase?** *(Refer to page 14 for the answer.)*
- Q4. **What factors did Michael and his rehabilitation team consider in setting goals?** *(Refer to page 15 for the answer.)*
- Q5. **Which resources facilitated Michael's goal achievement?** *(Refer to page 20 for the answer.)*

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