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ICF Case Studies

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

Bowel and Bladder Management

Case Study 14



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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.

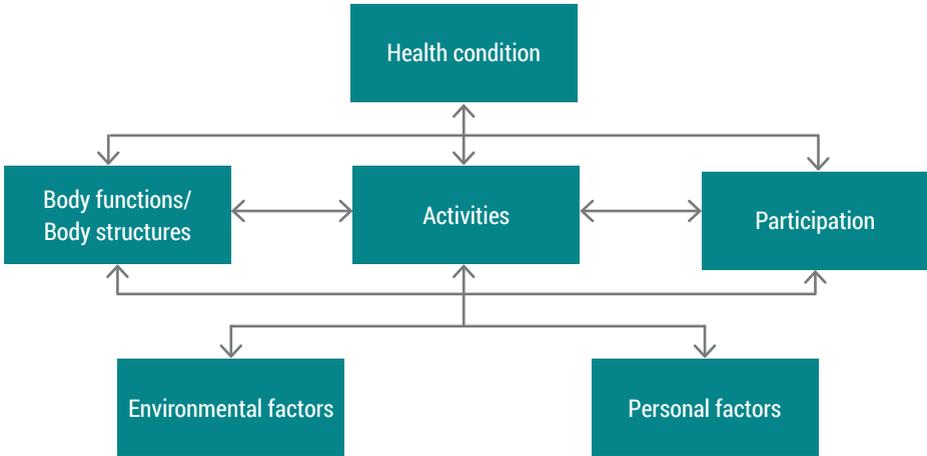


Figure 1: Bio-psycho-social model of functioning, disability and health

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 organised 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.

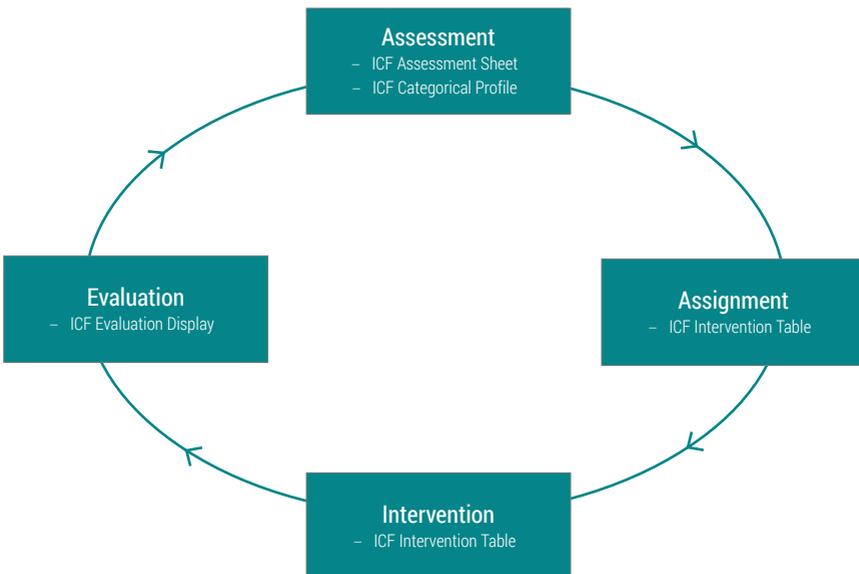


Figure 2: Rehab-Cycle®

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.

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General Introduction



For persons living with a spinal cord injury (SCI) or spinal cord disease (SCD), problems associated with bowel and/or bladder functioning are common and have serious consequences for both health maintenance and participation, and ultimately for quality of life.

At the functioning level, persons with SCI/SCD are often confronted with urinary incontinence i.e. loss of bladder control, and bladder dysfunction e.g. constipation and stool retention. Given that many of the nerves that control the bowel and bladder are located in the lower spine, a SCI/SCD

can directly impact, to varying degrees, a person's ability to urinate and defecate (i.e. discharge of stool) normally.^{1,2,3} **Additionally, persons with SCI/SCD are at increased risk of developing urinary tract infections (UTIs), bladder cancer, bladder and kidney stones, and renal failure.³**

Neurogenic Bowel and Bladder

The terms neurogenic bowel or neurogenic bladder refer to dysfunction in the respective organs following central or peripheral nervous

system injuries. The clinical manifestation of both is largely related to the location of the lesion and the motor neurons involved.^{1,2,3}

Box 1 | Pathophysiology of Neurogenic Bowel and Bladder

Neurogenic Bowel

The function of the bowel is regulated by the autonomic nervous system (or the automatic actions of the body), involving both the parasympathetic and the sympathetic nervous systems. While the parasympathetic nervous system increases peristalsis (i.e. the contraction of the intestinal muscles that propel contents through the digestive tract), stimulates gastrointestinal secretions, relaxes sphincters, and increases intestinal contractions, the sympathetic nervous system decreases peristalsis, limits production of secretions, tightens sphincters, and decreases intestinal contractions. While the parasympathetic actions of the gastrointestinal tract are stimulated by the pelvic nerve that has its origins in the sacral region S2-S4 of the spinal cord (bottom of the spine), sympathetic actions are stimulated by the nerve fibres that originate from the spinal cord region between the thoracic segment T5 and the lumbar segment L2 (area between the back and thigh).^{1,2}

Normal bowel functioning involves a sequence of actions beginning with involuntary activities:

- Contractions of the colon moves stool through the colon to the rectum
- Enlargement of the rectum resulting from the relaxation of the internal anal sphincter muscle
- An urge to defecate then begins
- Simultaneously, a holding reflex occurs, in which an increase in muscle tone of the

external anal sphincter (EAS) muscle halts the discharge of stool

and followed by voluntary actions of relaxing the EAS and contracting the anal muscles to discharge stool.^{1,2}

A person with SCI/SCD may experience different impairments in bowel function depending on the level of the SCI/SCD. In SCI with a lesion above T12 (or above the waist) upper motor neuron syndrome occurs in which the EAS becomes spastic and tightens, voluntary control of the sphincter is lost but reflex activity remains. This can cause constipation and stool retention. In SCI with a lesion below T12 (or below the waist) and where lower motor neurons are affected, the EAS is deprived of nerve impulses resulting in a flaccid (or loose) EAS, and both voluntary and reflex activity are lost. This can lead to bowel incontinence, diarrhoea, as well as constipation.^{1,2,4}

Other complications of neurogenic bowel dysfunction include ulcers, gastroesophageal reflux (return of stomach contents toward the mouth), haemorrhoids, anal lesions, nausea, appetite loss, and autonomic dysreflexia, a condition that generally occurs in SCI with lesions at or above T6 (mid-chest) manifested in high blood pressure, slow heart rate and severe headaches.^{1,2,4,5,6}

Neurogenic Bladder

The function of the bladder is regulated by the interaction between the parasympathetic,

sympathetic and somatic (or voluntary) nervous systems that supply nerve impulses to the lower urinary tract i.e. bladder and urethra. While the parasympathetic system controls the contraction of the bladder and the release of urine from the bladder, the sympathetic system is responsible for storage of urine. The somatic nervous system, with nerves originating from the sacral region of the spinal cord, enables the voluntary regulation of the external urethral sphincter (EUS) i.e. the muscle that controls the exit of urine.^{1,3,7}

Normally, the process of storing urine and emptying the bladder is an unconscious process. When the bladder is full, signals are sent from the mid-brain through the pelvic nerve to the bladder. The bladder contracts and the sphincter at the neck of the bladder relaxes allowing the urine to pass through the urethra. The person voluntarily relaxes the EUS for the final act of urination.^{3,7}

Following a SCI a 2-12 week period of “spinal shock” occurs, during which bodily reflexes do not work at all. During this time the bladder has no contractions, and temporary inability to empty the bladder is common. After recovering from spinal shock, the person with SCI

generally experiences an overactive bladder and urinary incontinence.^{1,3,7}

Like with neurogenic bowel dysfunction, symptoms of neurogenic bladder dysfunction depend upon the location of the lesion. Persons with lesions above the sacral spinal cord region generally experience overactive contractions of the bladder along with intermittent and uncoordinated contractions of the sphincter. Persons with sacral lesions generally experience an absence of bladder contraction. The bladder fills until the sphincter is no longer able to hold up the pressure from the full bladder, and urinary incontinence occurs.^{3,7} Due to the various patterns of bladder dysfunction presented by incomplete SCI, predicting the bladder function of persons with incomplete SCI after spinal shock solely on the lesion level is not possible.⁷

Complications associated with bladder dysfunction include autonomic dysreflexia, UTIs, bladder and kidney stones, swelling of a kidney due to the inability to drain urine from the kidney into the bladder, backward flow of urine from the bladder to the kidneys, and renal failure.^{1,3}

Clinical Interventions to Address Neurogenic Bladder

Treatment for neurogenic bladder aims to normalise bladder functions, prevent secondary conditions, and achieve and maintain urinary continence.

During the acute phase following SCI or onset of bladder dysfunction in SCD, the use of indwelling

catheters (or catheters implanted in the body) is universally expected. However, due to increased risk of UTIs, indwelling catheters should be removed as soon as the person is stabilised.⁷ In addition to indwelling catheters, there are other catheterisation methods. The method of catheterisation should be decided on an individual basis

and in consideration of the person's lesion level, sex, functioning status, finances, preferences and desire for sexual intercourse.¹ For example, intermittent catheterisation, i.e. insertion and removal of a catheter several times a day, may be the ideal option for persons who are able to self-catheterise. For men experiencing an overactive bladder, a condom catheter combined with intermittent catheterisation may be an option for emptying the bladder.^{1,3,4,7}

In addition to catheterisation, pharmacological treatment is also an option, for example to suppress uncontrolled bladder contractions,

increase bladder capacity or firming up the sphincter. A disadvantage of treating with medication is the appearance of possible side effects, such as dry mouth, visual disturbances and constipation.^{1,3,7}

Surgical interventions, such as placement of urethral stents or augmentation cystoplasty, can also be performed to address bladder dysfunction. Urethral stents can be placed in the urethra to open up the blockage of urine caused by a dysfunctioning sphincter. Augmentation cystoplasty is the enlargement of the bladder to increase storage capacity of the bladder.^{1,3,7}

Clinical Interventions to Address Neurogenic Bowel

Treating bowel dysfunction requires careful management to ensure bowel discharge occurs in a timely and predicted manner, to maintain continence, and to avoid constipation^{1,2,6,8} For this purpose, it is essential that the pattern of bowel discharge is charted. A clinical examination can provide information about sphincter tone, presence of haemorrhoids and cuts, and voluntary control of muscle contractions, among other things.^{1,8}

Before a bowel management programme is established, a comprehensive assessment of the following should also be conducted:^{1,2}

- Gastrointestinal history (e.g. presence of inflammatory bowel disease) and history of other health conditions (e.g. diabetes) including medications that may affect bowel management choice
- Dietary habits and preference
- Activity level and lifestyle
- School and work situation
- Ability to perform bowel management activities independently

- Mobility-related aspects of functioning e.g.
 - muscle strength of upper and lower extremities, sitting balance, ability to transfer
- Length of arms, legs, trunk
- Body weight

There are various options of treatment and techniques that can be applied within a bowel management programme. For example, manual evacuation of stool and colon massages may be options for addressing the absence of or insufficient bladder contractions. Medications like stool softeners and bulking agents can be employed to ensure adequate stool consistency and facilitate stool evacuation. Also useful in stool evacuation is finger stimulation of the rectal wall and suppositories. Enemas are used only when medication and suppositories have not been successful in releasing stool blockage in the colon, and surgical interventions are only performed if the conventional approaches have proven unsuccessful. Although no established guidelines are available, adequate fluid intake and a balanced diet are viewed as contributors to successful bowel management.^{1,2,4,6,8}

Impact of Neurogenic Bowel and Bladder on Daily Life

The treatment and management of bowel and bladder dysfunction may impact various aspects of daily life and ultimately quality of life.^{1, 2, 3, 6, 7, 8, 9}

Bowel and bladder management dictates a person's daily routine – the where and when daily activities are performed. Specific management methods have to be performed during certain times of the day or frequently over the course of the day. It can be quite time-consuming. Moreover, the fear of bowel or bladder accidents and not being able to readily access toilet facilities may discourage the persons with SCI/SCD from

going to certain places or participating in social activities – consequently leading to social isolation.^{2, 5, 6, 9}

Persons who experience bowel and bladder dysfunction often sub-consciously develop behaviours that help them cope with their situation, but may eventually have a negative impact on daily life. For example, persons with bladder dysfunction may drink less to reduce filling the bladder. However, insufficient fluid intake may cause dehydration, constipation or other health problems.⁹

“From a rehabilitation perspective, the overarching goal is to achieve optimal functioning of bowel and bladder functioning.”

From a rehabilitation perspective, the overarching goal is to achieve optimal functioning of bowel and bladder functioning. Rehabilitation should be individualised, integrative and multidisciplinary, involving the person with SCI/SCD in the rehabilitation process. Self-management of bowel and bladder is one of the most important issues that are addressed in rehabilitation.^{6, 7, 10}

This case study illustrates the challenges faced by Marco, a person with the SCD Behçet's syndrome, in managing bladder and bowel dysfunction. The case study also highlights the importance of developing an appropriate, person-focused programme for bowel and bladder management as part of the rehabilitation process.

Marco's Story



Marco's story differs from those of many other persons with a spinal cord disorder (SCD). While not unique, it is an unusual case.

At the time the case study was conducted, **Marco was 23 years old, and had worked for some years as an electronic technician.** One winter he took four months off from his full-time job to travel in India and Thailand. The trip was exciting and proceeded without incident. Marco returned feeling invigorated and ready to resume his job.

About four weeks after his return, Marco came down with a sudden fever along with headaches and angina. Without a specific diagnosis Marco was treated with antibiotics, and the symptoms

improved immediately. Another month passed, and a new and strange symptom arose – a twitching and feeling of “pulling” at Marco's left heel. He tried to disregard it for a number of days, and went about his work and life. However, the odd feeling began to expand to pain in his leg, travelling slowly and steadily up his calf. One week later, Marco started to have back pain that extended up to the thoracic area of the spinal cord (mid-back and upper torso). At this point he admitted himself to a nearby hospital. Whatever he had, it was serious and was worsening.

“The odd feeling began to expand to pain in his leg, travelling slowly and steadily up his calf.”

Upon admission to the hospital the doctors found extensive oedema around the thoracic spinal cord, and began treating him with high-dose steroids. Marco's condition nevertheless deteriorated, and one day later progressed to paraplegia with

American Spinal Injury Association (ASIA) Impairment Scale grade A at the level of T10. This meant that **he had loss of sensory and motor functions below the mid-back and abdomen. Marco also developed an inability to empty his bowel and**

bladder. Additionally, the vision in his left eye began to blur due to an inflammation of the pigmented layer of the eye (uveitis) and retina (retinitis).

“At the first hospital I had difficulty understanding or accepting my health condition because of the lack of a clear diagnosis. I didn't know what to expect, and it was very unpleasant having so much uncertainty.”

Marco

Box 2 | Behçet's Syndrome

Named after the Turkish dermatologist who first described the condition, Hulusi Behçet, Behçet's syndrome (or Behçet's disease) is a recurring, inflammatory disease of unknown aetiology (or cause) that affects multiple body systems. The body systems affected may include the eyes, skin, mucous membranes, joints, the gastrointestinal system, the central nervous system, blood vessels and lungs.^{11,12,13}

Behçet's syndrome is uncommon in Europe and North America; it is more prevalent in the region stretching from the Middle East to Far East Asia.^{11,12}

Diagnosing Behçet's syndrome is difficult since there are no specific diagnostic tests or findings of tissue or cell examinations that provide evidence for the disease.^{11,12} The diagnosis of Behçet's syndrome is based on a combination of symptoms following a set of diagnosis criteria; this set of criteria has changed several times since 1946. The most recent set of criteria, the International Criteria for Behçet's Disease (ICBD),^{11,13} follows a point system. According to the

Tests of the serum and other bodily fluids, including for a range of viral and bacterial infections, were negative. While the doctors made no clear diagnosis, they suspected that Marco had developed Behçet's syndrome, although he had not met the strict criteria for a clear diagnosis of Behçet's syndrome. See box 2.

ICBD the presence of the following symptoms receives a certain number of points:

- Painful recurrent ulcers in the mouth (2 points)
- Painful recurrent genital ulcers (2 points)
- Eye lesions and inflammation (2 points)
- Skin lesions (1 point)
- Positive pathergy test i.e. skin prick test that induces inflammation and ulcers (1 point)
- Neurological signs similar to muscular sclerosis (1 point)
- Inflammation and lesions of the veins and arteries (1 point)

In addition to this set of criteria, other symptoms are often present, including gastrointestinal ulcers usually involving the colon, and joint pain and inflammation.^{11,12,13}

There is presently no cure for Behçet's syndrome, and treatment options generally focus on alleviating symptoms through medication (anti-inflammatory and immunosuppressant drugs).^{11,12}

The steroid treatment continued, and Marco showed some improvement – the oedema decreased, some sensitivity was restored, and his overall condition was somewhat better, though still far from normal. However, three weeks later, Marco still had no control over his urination nor bowel movements, requiring catheterisation, colon massage and manual evacuation of the bowel. It was at this point that Marco was transferred to a specialised rehabilitation centre for spinal cord injury (SCI) and spinal cord diseases (SCD) for further medical management and rehabilitation.

At the rehabilitation centre the initial urinary (urethral) catheter was changed into a suprapubic catheter that enters the bladder through the abdomen.

"I really couldn't stand the urinary catheter. It was painful when putting it in, and then it felt like some foreign object inside of me. It was really unpleasant. The suprapubic catheter was even worse. I felt like I had a hole in my stomach, and couldn't bear to look at it."

Marco

Although **the cause of Marco's condition was still not 100% clear**, efforts were made to foster Marco's independence, increase his mobility, and improve his self-care skills. However, his prognosis was far from certain. Despite these efforts, the prognosis – when and to what degree Marco would regain functioning – was unclear.

After six weeks of suprapubic catheterisation, Marco developed a detrusor sphincter dyssynergia i.e. impaired coordination between bladder contraction and sphincter relaxation,¹ requiring a new intervention to manage his urination. **A condom catheter⁴ was fitted to passively collect urine as needed.**

In the first two months at the rehabilitation centre, **Marco regained muscle power in his legs and trunk. Consequently he recovered some ability to move his legs, and was able to eat without resting or holding onto a table or chair for support. He also made great improvements in manoeuvring the wheelchair.** Approximately two months following the onset of the disease, the rehabilitation team decided to conduct a comprehensive assessment of Marco's functioning as the basis for the next phase of rehabilitation.

Assessment

The comprehensive assessment of Marco's functioning took into account the perspective of Marco (patient perspective) as well as his rehabilitation team (health professional perspective). Marco's and the rehabilitation team's perspectives were quite similar. The assessment results were documented in the ICF Assessment Sheet.

The **ICF Assessment Sheet** is one of several documentation sheets that were used to facilitate the rehabilitation process called the RehabCycle®. Marco's ICF Assessment Sheet provided an overview of his functioning state by presenting the assessment results according to the components of the International Classification of Functioning, Disability and Health (ICF)¹⁴ – body functions and structures, activities and participation, environmental and personal factors. See *“Table 1: ICF Assessment Sheet” on page 28 at the end of this booklet.*

With regard to body functions, **the rehabilitation team documented that Marco's defecation and urination functions were completely impaired.** He was unable to control urination; Marco stated that he was able to sense when his bladder was full, but he was unable to urinate. Marco was unable to sense when his bowel was full and was unable to control defecation. The physician on his rehabilitation team diagnosed Marco with a spastic bowel.

In addition to the bowel and bladder dysfunction, Marco also experienced moderate impairment in muscle tone, with spasticity in his legs, and moderate impairment in exercise tolerance functions. His muscle power functions were severely impaired, with complete impairment in the lower extremity and moderate impairment in the trunk.

Joint mobility was mildly impaired. **From admission to the rehabilitation centre up to the assessment, Marco had made gains in motor and sensory functioning.** Consequently, Marco's American Spinal Injury Association (ASIA) score improved from grade A to grade C, meaning that more than half of the key muscles below his spinal cord lesion were able to undergo active movement and had full range of motion in the absence of gravity.

Marco had gained a lot of weight. Since beginning steroid treatment, he had felt the urge to eat more; consequently he rapidly gained 20 kilograms.

The status of Marco's body functions impacted his ability to execute daily activities, specifically those related to mobility and self-care. For example, while Marco required minimal assistance in transferring from wheelchair to toilet or bathtub, getting in and out of a standing position and walking were completely limited. **Marco was independent in showering, dressing and caring for body parts.** However, he had moderate difficulty taking care of skin and teeth as well as looking after his health.

The main limitations observed in self-care was related to toileting – for bladder management Marco was still dependent on the condom catheter. However, he required only minimal assistance

in using the toilet. With regard to bowel management, Marco defecated regularly every other day. However, he needed partial assistance in manually evacuating stool.

Regarding participation in social life, **Marco easily made new acquaintances in the rehabilitation**

centre. He learned to play the guitar in music therapy, which he visited with another rehabilitation patient. He also played the guitar when spending time with his friends. Playing the guitar served many purposes – it was a great way for Marco to relax and it helped him to better deal with worries.

“The main limitations observed in self-care was related to toileting...”

Marco's did have difficulty dealing with stress and with his feelings related to his health condition. His experience of stress – one of his personal factors – was related not only to the impairments of his body functions and his undefined prognosis, but also to his precarious vocational future.

“Stress is really a problem for me... also because I don't know where I will work. And this all has to do with the uncertainties of my health condition. None of the rehabilitation staff, even the doctors, can tell me whether I will always be in a wheelchair. I have a feeling no one knows what to do, so they tell me just to be patient and wait. It's extremely frustrating.”

Marco, at time of assessment

The comprehensive assessment also looked at the environmental factors that had an impact on

Marco's functioning. Facilitating environmental factors included Marco's large circle of friends and a supportive family. The environmental factor that posed a major barrier, specifically to Marco's community integration after rehabilitation, was his wheelchair inaccessible apartment.

In contrast to the uncertainties experienced at admission, the rehabilitation team was more optimistic about Marco's prognosis based on the results of the comprehensive assessment of his functioning. The assessment results offered Marco and the rehabilitation team a foundation for setting rehabilitation goals and determining intervention targets.

Goal-setting/Determination of Intervention Targets

Having a comprehensive overview of Marco's functioning based on the rehabilitation team's assessment and Marco's own statements about his situation helped them to identify mutual goals to reach during rehabilitation as well as specific targets to address with interventions.

The comprehensive overview of Marco's functioning, as documented on the **ICF Assessment**

Sheet, facilitated goal-setting and in determining the intervention targets.

What To Strive For

In Marco's case, he and his rehabilitation team defined 'community reintegration, disease control and prevention of secondary conditions' as the multi-prong long-term **global goal**. In addition, they defined 'independence in daily living' as a **service-program goal** i.e. the more specific goal that they would like to strive for during this Rehab-Cycle®. As smaller, more concrete goals that serve as the "stepping stones" toward reaching the service program goal, Marco and his rehabilitation team defined four **cycle goals**:

- Cycle Goal 1: Independence in mobility
- Cycle Goal 2: Independence in toileting

- Cycle Goal 3: Finding an accessible place of residence
- Cycle Goal 4: Clarification of new occupation

These goals were documented on the **ICF Categorical Profile**, a visual depiction (bar chart) of Marco's functioning status at the time of assessment. The ICF Categorical Profile depicts the extent of the problem Marco was having in various aspects of functioning as represented by relevant categories of the International Classification of Functioning, Disability and Health (ICF)¹⁴. The extent of the problem was rated using ICF qualifiers. See "Table 2: ICF Categorical Profile" on page 30 at the end of this booklet.

What To Target

For the goals set, Marco and his rehabilitation team defined one or more intervention targets. **Intervention targets** were the ICF categories (and personal factors) that corresponded to any of the cycle goals, the service-program goal and/or the global goal Marco and his rehabilitation team set,

and that they intended to address with specific interventions during the intervention phase of the Rehab-Cycle®. The ICF Categorical Profile also showed the ICF qualifier rating (goal value) that Marco and his team planned to reach in the respective ICF category after intervention.

“To facilitate improvements in Marco's ability to manage his bowel and bladder, they also defined environmental factors...”

For example for Marco's cycle goal 2 'independence in toileting', the intervention targets included the body functions b620 Urination functions, b6202 Urinary continence, and b735 Muscle tone functions. Muscle tone functions was related to reducing the bowel spasticity Marco had been experiencing. Logically, they also defined d540 Toileting, d5300 Regulating urination, d5301 Regulating defecation as intervention targets. To facilitate improvements in Marco's ability to manage his bowel and bladder, they also defined environmental factors – e110 Products or substances for personal consumption and e1151 Assistive products and technology for personal

use in daily living. These represented medication/suppositories as well as catheters and an abdominal belt. Last but not least, Marco and his rehabilitation decide to also target the personal factor of Marco's knowledge about his disease and its implications for his self-care. The hope was that the more Marco understood about his disease, the easier it would be for him to manage his bowel and bladder.

Marco's intervention targets were documented on the ICF Intervention Table, a documentation tool that was employed during the intervention phase of the Rehab-Cycle®.

Assignment and Intervention



For each intervention target determined during the assessment phase, appropriate interventions were identified. The intervention targets were also assigned to one or more of Marco's rehabilitation team members.

To facilitate intervention planning, Marco's rehabilitation team employed the **ICF Intervention Table**. The ICF Intervention Table shows Marco's intervention targets, the individual rehabilitation team members, to whom each intervention target was allocated, and the interventions that these team members performed to address the respective intervention target. In addition, the ICF Intervention Table shows the initial ICF qualifier value that was used to rate Marco's functioning status in the respective intervention targets during the assessment phase, the expected value to strive for during the intervention phase, and the actual value given at the final assessment (or evaluation). See "Table 3: ICF Intervention Table" on page 32 at the end of this booklet.

In addition to the regular members of the rehabilitation team, other health professionals were also involved in Marco's rehabilitation. For example, an ophthalmologist from a specialised eye clinic was

called in to conduct regular checks on Marco's vision and to consult regarding medication.

To meet Marco's cycle goal 1 'independence in mobility', Marco and his rehabilitation implemented a variety of interventions. For example, a dietician assisted Marco in reducing and maintaining his weight. Marco's weight gain since beginning steroid treatment hindered his mobility. Thus, losing weight was seen as essential for increasing independence in mobility. Other interventions to meet cycle goal 1 included hippotherapy to reduce spasticity (b735 Muscle tone functions), and body balance training, gait training, and use of the locomat to improve b770 Gait pattern functions. Gait training, use of the locomat, and specific walking training were employed to improve Marco's ability to walk short distances and walking in general. Although the majority of the mobility-related interventions were conducted by the physical therapist and the sports therapist,

some mobility-related interventions were also provided by the occupational therapist e.g. wheelchair technique training, city training and outdoor

training to improve d4602 Moving around outside the home and other buildings.

“Although the majority of the mobility-related interventions were conducted by the physical therapist and the sports therapist, some mobility-related interventions were also provided by the occupational therapist...”

To improve intervention targets related to toileting – Marco’s cycle goal 2 – the physician was responsible, among other things, for the urological examinations, conducting tests to monitor progress and detect potential secondary conditions as soon as possible, prescribing and adjusting the medication, including suppositories, to alleviate the symptoms of bowel and bladder dysfunction as well as for deciding on modes of catheterisation. **The nurse focused on bowel and bladder management**, for example, in instructing Marco on the use of the condom catheter to give him more control and freedom in emptying his bladder, using his fingers to manually evacuate stool, and on colon massage techniques to facilitate bowel movements. Moreover, the nurse was responsible for teaching Marco optimal hygiene.

“When they showed me how to use my fingers remove my stool, I thought, “I don’t want to do this, I can’t.” It was really hard to accept. It’s still unpleasant, but I have to do it anyway... Defecating is really tiring and unpleasant, and can take a very long time, especially when I use suppositories to empty the whole bowel. In the beginning I couldn’t feel anything at all and couldn’t tell when I needed to go or when I was finished. Using suppositories every second day at least gave me the possibility to plan ahead.”

Marco

Marco used a condom catheter until problems increasingly occurred when trying to dislodge the condom catheter. These problems resulted from increased bladder pressure due to detrusor hyperactivity, i.e. uncontrolled bladder contractions.¹ Marco decided against the option of paralytisation (with Botox) plus catheterisation due to the pain caused by the insertion of the catheter into the urethra. Eventually Marco and his rehabilitation team chose the surgical option – placing a stent in the urethra to provide internal support to allow urination to occur more freely by holding the external sphincter open.

To reach cycle goal 3 ‘finding an accessible place of residence’ the occupational therapist assisted Marco with his search for a new and accessible apartment. Before his admission to the rehabilitation centre, Marco shared an apartment with a friend. Unfortunately, the apartment was not wheelchair accessible, thus forcing Marco to find another place of residence. Adapting his old apartment was not cost-effective nor possible.

To help address cycle goal 4 ‘clarification of a new occupation’, vocational counselling was offered to explore possibilities for a new career.

“A number of other interventions were provided to turn existing contextual factors into facilitators.”

A number of other interventions were provided to turn existing contextual factors into facilitators. For example, psychological counselling, Feldenkrais therapy and music therapy were all provided to help Marco develop more effective coping strategies, as well as funnel his personal resources to

deal with his emotions toward his health condition better. Furthermore, Marco's family participated in education and counselling sessions directed at expanding their and Marco's knowledge about his health condition.

Evaluation

Over the course of the Rehab-Cycle® Marco showed continuous improvements, reaching the majority of the goals he and his rehabilitation team had set out to achieve.

Overall, the manifestation of Marco's disease improved greatly and his neuromuscular functioning made gains. Consequently, his American Spinal Injury Association (ASIA) score further improved from grade C at the beginning of the Rehab-Cycle® to grade D at the final assessment. This meant that in addition to having motor functioning below the affected level of the spinal cord

and more than half of key muscles the ability to undergo active movement with full range of motion, these muscle activities were also able to be executed with gravity and with moderate resistance in specific positions. The paraplegia experienced by Marco evolved from complete paraplegia at admission to incomplete paraplegia at the final assessment/evaluation.

“The paraplegia experienced by Marco evolved from complete paraplegia at admission to incomplete paraplegia at the final assessment/evaluation.”

To evaluate the changes in Marco's functioning a final assessment of the intervention targets was performed. The results of the final assessment is illustrated on the **ICF Evaluation Display**, a visual depiction of the results from the first and the final assessment as well as goal achievement. As with Marco's **ICF Categorical Profile**, the ICF Evaluation Display employs bar charts to depict Marco's functioning at two time points – at the first assessment and at the final assessment. The ICF Evaluation Display also shows whether the goals set during the assessment phase were achieved after intervention. It is important to note that the comparison of the first and final ratings only imply that there was a change, not whether the change was due to the interventions conducted. Likewise, goal achievement did not imply that reaching or not reaching the goal was due to interventions. See “Table 4: ICF Evaluation Display” on page 36 at the end of this booklet. **Marco achieved success in reaching cycle goal 1 ‘independence**

in mobility’ and cycle goal 3 ‘finding an accessible place of residence’.

With the assistance of the occupational therapist and some of his friends, Marco secured a new apartment that was also wheelchair accessible. Having a place to live alleviated some of the stress that Marco had been dealing with since the onset of his disease.

At the final assessment, Marco was able to walk short distances with increasing dexterity. Despite continued need to increase muscle power, his muscle power improved in both the lower extremities and the trunk. Further increase in muscle power was expected to alleviate the residual impairments in gait pattern functions. His muscle tone functions improved as well, with fewer involuntary movements and greater control over voluntary movement. Improved mobility enabled Marco to more independently use the

toilet. These improvements were confirmed by Marco's steadily rising Spinal Cord Independence Measure (SCIM) score.¹⁵ Marked by improvements in mobility, bowel sphincter management and use of toilet, his SCIM score increased from 46 to 69 throughout the course of the Rehab-Cycle®. See "Table 5: Spinal Cord Independence Measure (SCIM)" on page 39 at the end of this booklet.

While Marco's bowel functioning had made significant gains, with increased bowel and anal sensitivity and the ability to defecate independently at regular intervals, limited control over defecation in certain situations sometimes led to bowel incontinence.

"Now I can feel in my stomach when I need to go. Then I have about ten minutes to find a bathroom because of incontinence. If I'm out, I really need to rush to find a public toilet. I hope this will improve, but perhaps it will stay this way for the rest of my life."

Marco

Unfortunately, Marco's urinary functioning did not improve at all; the bladder incontinence remained. This was a great disappointment for him. Marco's ability to regulate urination had been hindered by the condom catheter that periodically detached with certain body movements.

"The condom catheter was extremely frustrating. It came off all the time – at night, when I was moving around. I tried for months and it just didn't work. Catheterisation is something I really didn't want to do – it's just too uncomfortable, too painful... and I had to

do it several times a day. So I have chosen the stent in spite of the risks. It really seemed like the best option for me."

Marco's thoughts on treatment options for bladder dysfunction

"It can take up to six months or so until a person's body accepts a stent. There's always a chance that it will be rejected or there will be continuous infections and it will need to be removed, then there are few options left, such as surgically enlarging the bladder and catheterisation."

Marco's doctor post-surgery

With regard to Marco's seeing functions, he continued to experience reduced sight in his left eye due to the inflammation caused by his disease. Despite overall improvement in the manifestations of the disease, inflammation had returned regularly. To tackle inflammation, doctors recommended a stronger anti-inflammatory therapy i.e. anti-TNF-alpha therapy. This therapy was associated with side effects that also required close monitoring. The combination of the anti-inflammatory drug along with the surgically implanted stent put Marco at increased risk for infection. He did develop a chronic urinary tract infection, but unclear when. Thus, it was essential that Marco and the health professionals who continued to be involved in his healthcare carefully monitored possible signs of disease relapse. This meant that Marco had to take on the responsibility for self-care and eye checks seriously. This was especially important after discharge from the rehabilitation centre to the community.

Although not all of the rehabilitation goals set were achieved, Marco was discharged from the rehabilitation centre to his new apartment. To address his remaining needs, including the exploration of a new occupation – one of the rehabilitation goals not reached during the Rehab-Cycle® – an outpatient rehabilitation programme was organised.

Discussion



Having to deal with bowel and bladder problems is difficult for anybody. It is even worse if it becomes chronic. For persons living with a spinal cord injury (SCI) or spinal cord disease (SCD) bowel and bladder dysfunction often becomes the centre of their lives.

For Marco and other persons with SCI/SCD, **living with chronic bowel and bladder dysfunction poses one of the biggest challenges that is related to SCI/SCD.**^{8,10}

"I have no control anymore. It's like being a child again. Beside the medical issues it really affects everything in my life – how I dress, how free I am in public. I am more reserved than before, and have less self-confidence. I don't feel normal. Bowel and bladder dysfunction have been the most negative part of my whole experience with SCD."

Marco's reflections on his bowel and bladder dysfunction

In addition to the other complications and limitations related to SCI/SCD, many of the interventions required for managing bowel and

bladder dysfunction are difficult to accept and uncomfortable, even painful, to perform. In Marco's case, he felt disgusted with having to manually remove stool with his finger, and he experienced discomfort and pain with catheterisation. Moreover, having to deal with bowel and bladder dysfunctions can lower a person's self-confidence.^{9,16}

Beyond clinical interventions to alleviate the symptoms of the dysfunction, education on bowel and bladder management^{5,6,7,10,16} as well as psychological counselling are key aspects of rehabilitation.^{5,10} In Marco's case, in which the prognosis for recovery was uncertain due to the lack of a clear diagnosis, psychological counselling proved to be valuable in helping Marco deal better with the emotions related to his health condition as well as with the stress

he experienced in not knowing when and the possible extent of his recovery. Furthermore, the education that Marco received from various members of his rehabilitation team about his health condition and the implications for self-care helped facilitate his overall improvements in functioning. Specifically, expanded knowledge about his health condition and options for bladder management helped him make an informed decision about the surgical implantation of a stent to relieve urination problems.

Marco's case illustrated the value of a multidisciplinary team approach toward rehabilitation. In addition to the standard team of rehabilitation

specialists that included a rehabilitation physician, nurse, physical therapist/sport therapist and occupational therapist, a number of medical specialists e.g. ophthalmologist and rheumatologist, as well as a dietician, vocational counsellor, music and art therapists, and a social worker were all called in to provide specialised interventions. Having a multidisciplinary rehabilitation team and involving Marco in the whole rehabilitation process helped tailor the rehabilitation programme to his specific needs. A person-tailored approach along with involving the person him or herself are critical for successful bowel and bladder management.^{6,7,10}

“A person-tailored approach along with involving the person him or herself are critical for successful bowel and bladder management.”

Annex

- *Table 1: ICF Assessment Sheet*
- *Table 2: ICF Categorical Profile*
- *Table 3: ICF Intervention Table*
- *Table 4: ICF Evaluation Display*
- *Table 5: Spinal Cord Independence Measure (SCIM)*
- *Literature*
- *Questions*

Table 1: ICF Assessment Sheet

ICF Assessment Sheet	
Patient Perspective	<ul style="list-style-type: none"> - Due to cortisone I lost my sensation of being full, so I ate and ate...and gained 20 kg - No problems with sleeping, except for being waken up - I have a problem with my left eye; I have only 30% vision - I can feel my legs again, but I only feel about half in the hip region between my thighs and belly - I feel when the bladder is full, but I cannot urinate properly; I can't „let it flow“ - I have a spastic bladder - I can fully extend my right leg, but not the left one - The muscles in my torso are weak; they have to be built up - My score on the muscle power test has improved - I have a bit of spasticity in my legs - I have stretch marks under my armpits & on my stomach
Health Professional Perspective	<p style="text-align: center; background-color: #008080; color: white; padding: 5px;">Body Functions & Structures</p> <ul style="list-style-type: none"> - Sleep function – mildly impaired - Touch functions in hip region – mildly impaired - Neuropathological pain in stomach or abdomen – mildly impaired - Exercise tolerance function – moderately impaired - Defecation functions – completely impaired - Weight maintenance function – severely impaired - Urination functions – completely impaired; uses a condom catheter and has a spastic bladder - Mobility of joint functions – mildly impaired - Muscle power functions – severely impaired - Muscle tone functions – moderately impaired - Involuntary movement reaction functions – severely impaired - Control of voluntary movement functions – moderately impaired - Gait pattern functions – completely impaired - Spinal cord and related structures – severely impaired (stretch marks) on his body, needs an abdominal belt – mildly impaired
Activities & Participation	<ul style="list-style-type: none"> - I can hardly stand up; I have to hold onto something, and to get stable I have to overextend my knees - I can maintain a sitting position - I can't join the pedestrian group because I can't walk - I have no problems going over curbs with the wheelchair - It is harder to move around in the wheelchair because of my weight - Riding the escalator with the wheelchair is not possible by myself - I can shower without any assistance - I have no problems with caring for body parts - Toileting is a problem for me - I can eat without any assistance - I have to act quickly when I notice any changes in eyesight in my left eye - I am unsure whether I will be able to go back to my previous occupation - I am learning to play the guitar in music therapy, but at the moment I do not play as often because I am too stressed out <p style="text-align: center; background-color: #008080; color: white; padding: 5px;">Activities & Participation</p> <ul style="list-style-type: none"> - Complete limitations in getting in and out of a standing position - Can maintain a standing position only with a lot of help - Severe difficulty in moving objects with lower extremities - Complete limitations in walking - Complete limitations in moving around outside home/buildings - Mild difficulty in moving around using equipment - Washes, dresses, eats and drinks independently - Mild difficulty in regulating urination - Severe difficulty in regulating defecation - Moderate difficulty in looking after skin or teeth - Severe difficulty in searching for a new apartment; needs help - Needs to find a new job, since doing previous job not feasible - Wants to spend the weekends at home - Plays the guitar (good recreational activity)

Environmental Factors

- Medication is very helpful
- Wheelchair is very helpful
- Home poses a severe barrier, since it is not wheelchair-adapted
- Visits from family provide substantial support
- Visits from friends provide complete support
- Health professionals and their attitude toward working with Marco are substantially supportive
- Clarifications with several institutions have been very helpful

Personal Factors

- 23 years old, Male
- Electronic technician
- Single, but had been living with a friend in an apartment
- Friends are important to him; he makes friends easily
- He has a calm demeanour
- Health professionals find that he is not always motivated for therapy
- Health professionals also find him somewhat elusive, hard to understand the way he thinks and acts
- Not sportive and is not physically fit
- Experiences a high level of stress
- Does not feel comfortable in his own body

Table 2: ICF Categorical Profile

ICF Categorical Profile										
Assessment										
ICF categories	ICF Qualifier					Goal Relation	Goal value			
	0	1	2	3	4					
Global Goal: Community reintegration, disease control and prevention of secondary conditions							1			
Service-Program Goal: Independence in daily living							1			
Cycle Goal 1: Independence in mobility							2			
Cycle Goal 2: Independence in toileting							2			
Cycle Goal 3: Finding an accessible place of residence							1			
Cycle Goal 4: Clarification of new occupation							1			
problem										
b210 Seeing functions										
b280 Sensation of pain						G	1			
b455 Exercise tolerance functions						G	1			
b525 Defecation functions						1	1			
b530 Weight maintenance functions						2	3			
b620 Urination functions						G,1	2			
b6202 Urinary continence						2	3			
b710 Mobility of joint functions						1	0			
b730 Muscle power Functions						1	2			
b7303 Power of muscles in lower half of the body						1	2			
b7305 Power of muscles of the trunk						1	1			
b735 Muscle tone functions						1,2	1			
b755 Involuntary movement reaction functions						1	2			
b760 Control of voluntary movement functions						1	1			

		facilitator				barrier							
		4+	3+	2+	1+	0	1	2	3		4		
b770	Gait pattern functions											1	3
s120	Spinal cord and related structures											1	2
d240	Handling stress and other psychological demands											G	1
d4104	Standing											1	2
d4154	Maintaining a standing position											1	1
d450	Walking											1	3
d4500	Walking short distances											1	3
d4602	Moving around outside the home and other buildings											1	3
d465	Moving around using equipment											1	0
d530	Toileting											2	1
d5300	Regulating urination											2	1
d5301	Regulating defecation											2	1
d570	Looking after one's health											G	1
d610	Acquiring a place to live											3	1
d850	Remunerative employment											4	1
e110	Products or substances for personal consumption		4+										
e1151	Assistive products and technology for personal use in daily living												2
e1201	Assistive products...for personal...mobility ...												G,2
e155	Design, construction...of buildings for private use												1
e310	Immediate family												3
e580	Health services, systems and policies												G
pf	Knowledge of disease and implications for self-care												G
pf	Dealing with emotions related to health situation												G,2
pf	Coping strategies and resources												G

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, 4 refer to Cycle Goal 1, 2, 3, 4; G refers to the Global Goal; Goal value refers to the ICF qualifier to achieve after an intervention. Note: This table only displays an excerpt of the ICF Categorical Profile, that is, only the categories that are associated with a goal and for which a goal value has been identified (i.e. intervention targets).

Table 3: ICF Intervention Table

ICF Intervention Table												
	Intervention target	Intervention	Doc	Nurse	PT	Spo	OT	Psych	Others	First value	Goal value	Final value
Body functions/structures	b210	Seeing functions	x						Ophthalmologist	2	1	2
	b280	Sensation of pain	x							1	1	1
	b455	Exercise tolerance functions			x					2	1	2
	b525	Defecation functions	x							4	3	3
	b530	Weight maintenance functions				x			Dietician	3	2	3
	b620	Urination functions										
	b6202	Urinary continence	x							4	3	4
	b710	Mobility of joint functions			x					1	0	0
	b730	Muscle power functions			x		x			3	2	2
	b7303	Power of muscles in lower half of the body								4	2	2
	b7305	Power of muscles of the trunk								2	1	1
	b735	Muscle tone functions			x					2	1	1
	b755	Involuntary movement reaction functions			x		x			3	2	2
	b760	Control of voluntary movement functions			x					2	1	1
	b770	Gait pattern functions			x					4	3	1
	s120	Spinal cord and related structures		x						Rheumatologist	3	2
d240	Handling stress and other psychological demands							x		2	1	2

	Intervention target	Intervention	Doc	Nurse	PT	Spo	OT	Psych	Others	First value	Goal value	Final value
Environmental factors	e110	Products or substances for personal consumption	x							3+	4+	4+
	e1151	Assistive products and technology for personal use in daily living	x	x						1+	2+	1+
	e1201	Assistive products...for personal...mobility ...			x		x			3+	4+	4+
	e155	Design, construction...of buildings for private use					x			3	2+	3+
	e310	Immediate family		x						3+	3+	3+
	e580	Health services, systems and policies	Clarification/Organisation of payment	x					Social Worker	4+	4+	4+
Personal factors	pf	Knowledge of disease and implications for self-care		x	x					2	2+	0
	pf	Dealing with emotions related to health situation						x		2	2+	0
	pf	Coping strategies and resources							Music Therapist	0	2+	0

Table 3: ICF Intervention Table; Doc = Physician; PT = Physical Therapist; Spo = Sports Therapist; OT = Occupational Therapist; Psych = Psychologist. The first value refers to the rating at the initial assessment, the goal value refers to the rating that should be achieved after the intervention, and the final value refers to the actual rating at the second assessment or evaluation. ICF qualifiers were used to determine these ratings (0 = no problem to 4 = complete problem) in the intervention targets. For the intervention targets representing the environmental and personal factors, the plus sign next to the value indicates a facilitator.

Table 4: ICF Evaluation Display

ICF Evaluation Display												
ICF categories	Assessment				Goal relation	Goal value	ICF Qualifier				Goal achievement	
	Evaluation						ICF Qualifier					
	Not evaluated						problem					
	0	1	2	3	4	0	1	2	3	4		
Global Goal: Community reintegration, disease control and prevention of secondary conditions					1							
Service-Program Goal: Independence in daily living					1							+
Cycle Goal 1: Independence in mobility					2							+
Cycle Goal 2: Independence in toileting					2							-
Cycle Goal 3: Finding an accessible place of residence					1							+
Cycle Goal 4: Clarification of new occupation					1							-
ICF categories	ICF Qualifier				Goal relation	Goal value	ICF Qualifier				Goal achievement	
	problem						problem					
	0	1	2	3	4	0	1	2	3	4		
b210 Seeing functions						6						-
b280 Sensation of pain						6						+
b455 Exercise tolerance functions						1						-
b525 Defecation functions						2						+
b530 Weight maintenance functions						6,1						-
b620 Urination functions						2						-
b6202 Urinary continence						2						-
b710 Mobility of joint functions						1						+
b730 Muscle power Functions						1						+
b7303 Power of muscles in lower half of the body						1						+
b7305 Power of muscles of the trunk						1						+

ICF categories	ICF Qualifier				Goal relation	Goal value	ICF Qualifier				Goal achievement								
	facilitator		barrier				facilitator		barrier										
	4+	3+	2+	1+	0	1	2	3	4	4+	3+	2+	1+	0	1	2	3	4	
e110										2	4+								+
e1151										G,2	2+								-
e1201										1	4+								+
e155										3	2+								+
e310										G	3+								+
e580										G	4+								+
pf										G,2	2+								-
pf										G	2+								-
pf										G	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, 4 refer to Cycle Goal 1, 2, 3, 4; G refers to the Global Goal; Goal value refers to the ICF qualifier to achieve after an intervention; Goal achievement: + means achieved, - means not achieved.

Table 5: Spinal Cord Independence Measure (SCIM)

Spinal Cord Independence Measure (SCIM)				
		1 September	2 December	15 December
Self-Care	Feeding	3	3	3
	Bathing	3	3	3
	Dressing	4	4	4
	Grooming	3	3	3
	Sub-score	13	13	13
Respiration and sphincter management	Respiration	10	10	10
	Sphincter management-bladder	0	0	0
	Sphincter management-bowel	5	8	8
	Use of toilet	1	2	2
	Sub-score	16	20	20
Mobility in room and toilet	Motion in bed and sore prevention	6	6	6
	Transfers: bed-wheelchair	2	2	2
	Transfers: wheelchair-toilet-tub	1	1	2
	Sub-score	9	9	10
Mobility indoors and outdoors	Mobility indoors	2	8	8
	Mobility for moderate distances	2	8	8
	Mobility outdoors	2	5	5
	Stair management	0	3	3
	Transfer: wheelchair-car	2	2	2
	Sub-score	8	26	26
Total score		46	68	69

Table 5: Spinal Cord Independence Measure (SCIM) scores for Marco over the course of the Rehab-Cycle®

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Questions

- Q1. What complications are associated with a neurogenic bowel? *(Refer to page 10 for the answer.)*
- Q2. What is spinal shock, and what happens to a person's bladder functions during this time? *(Refer to page 10 for the answer.)*
- Q3. Name possible treatment options for addressing bowel and bladder dysfunction in spinal cord injury and spinal cord disease. *(Refer to page 10 for the answer.)*
- Q4. What did the comprehensive assessment of Marco's functioning reveal about his bowel and bladder dysfunction and toileting? *(Refer to page 28 for the answer.)*
- Q5. List the intervention targets that were related to Marco's cycle goal of gaining independence in toileting. *(Refer to page 19 for the answer.)*

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