



UEMS PRM Section & Board

Clinical Affairs Committee

New accreditation procedure

Programme N010
PRM programme for patients
with acquired peripheral nerve disorders

Accredited 31/10/2012

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1

I. Identifying data

2

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Hospital (facility)	University Rehabilitation Institute
Address	Linhartova 51
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City	Ljubljana
Country	SLOVENIA

3

4

II. Summary

2 The described programme of in-patient rehabilitation of persons with acquired peripheral
3 nerve disorders in Slovenia is conducted only at the department for rehabilitation of
4 patients after trauma, peripheral nerve disorders and rheumatic diseases at the University
5 Rehabilitation Institute, Republic of Slovenia in Ljubljana (URI-Soča). The department
6 provides rehabilitation for patients with peripheral nerve disorders due to various diseases
7 as well as trauma and their consequences such as flaccid tetraparesis or paraparesis.

8 The goals of rehabilitation are to restore patient's functional independency, to promote
9 (natural) recovery, to prevent secondary complications in early phase of recovery and
10 finally, to help return to her/his home environment.

11 Patients with non-traumatic peripheral nerve disorders are treated at the departments for
12 neurology, neurosurgery, orthopaedics, infectious diseases, internal medicine, oncology
13 and other departments in Slovenian hospitals. Patients after trauma receive their primary
14 care at the closest regional hospital and are, if necessary, transferred within 24 hours to
15 one of the three trauma centres in Slovenia, where they are surgically treated and they
16 benefit from rehabilitation. Patients are admitted to the University Rehabilitation Institute
17 Soča two weeks to several months after disease onset or trauma, depending on their
18 general medical condition. The rehabilitation programme length is 1 to 4 months. Patients
19 are treated by a rehabilitation team and out-patient follow-up is carried out after discharge
20 as long as is necessary. There is direct communication between the acute care
21 departments and the rehabilitation department of URI Soča. The physicians agree on
22 patient's transfer and each patient is entitled to the programme of rehabilitation which has
23 no time limit imposed by the insurance system.

24 Patients are selected for rehabilitation on the basis of admission criteria. The selection of
25 patients for rehabilitation programmes at the University Rehabilitation Institute is done by
26 PRM specialists on the basis of a written proposal by PRM specialists or other specialists
27 in Slovenian hospitals or after an examination at the Outpatient Clinic for peripheral nerve
28 disorders patients at the University Rehabilitation Institute. The department for
29 rehabilitation of patients after trauma, peripheral nerve disorders and rheumatic diseases
30 has 30 beds for inpatient care. It is a part of University Rehabilitation Institute in Ljubljana
31 and is the only such department in Slovenia. About 75 peripheral nerve disorders patients
32 after trauma or disease come yearly for their first admission. There is a large outpatient
33 clinic responsible for the admission and follow-up of peripheral nerve disorders patients.
34 The unit and the Institute are under the authority of the Ministry of Health, Republic of
35 Slovenia and the rehabilitation programme for the patients is paid completely by National
36 Health Insurance. There are 3 full-time PRM specialists, 5 physiotherapists, 3 occupational
37 therapists, 2 university college graduated nurses, 15 nursing staff, one social worker and
38 one psychologist. The multidisciplinary team meets regularly once weekly. There are FIM,
39 FIC, Berg balance scale, COPM and MMT regularly recorded. A clinical pathway will soon
40 be introduced for planning and evaluation of the rehabilitation programme.

III. General bases of the Programme

A. PATHOLOGICAL AND IMPAIRMENT CONSIDERATIONS

1. *Aetiology*

Patients with diseases or injuries of the peripheral nerves are admitted to our ward. The most frequent causes of admission include:

a) Disease: Guillain-Barré syndrome (polyradiculoneuritis), critical illness polyneuropathy/myopathy, cauda equinae syndrome due to lumbar disc herniation and/or spinal stenosis, metabolic or toxic polyneuropathy, infectious diseases affecting nerve roots and/or peripheral nerves

b) Trauma: traffic accidents, high falls, sports-related injuries, with spinal vertebra fracture(s) and consequent nerve root(s) lesions and/or pelvis fracture and sciatic nerve lesion

c) Iatrogenic: Severe peripheral nerve damage due to unavoidable (eg. Oncological surgery, vascular surgery...) or accidental damage during surgical procedures, after systemic (chemotherapy) and/or local treatment (irradiation) of oncologic patients and others.

2. *Natural history and relationship to impairment*

The department admits patients with single or multiple acquired peripheral nerve disorders due to disease or injury. On average, 75 patients come for their first admission yearly. About 70% of admitted patients have peripheral nerve injuries due to disease, and 30% due to trauma.

a) Disease

Guillain-Barré syndrome (GBS) may be described as a collection of clinical syndromes manifested by an acute inflammatory polyradiculoneuropathy with resultant weakness and diminished reflexes. It is a postinfectious immune-mediated disease. Most patients report an infectious illness in the weeks prior to the onset of GBS. The prognosis is usually favourable, as natural recovery due to reinnervation slowly appears. Recovery starts within a few weeks after progression ceases, and clinical improvement can be seen relatively early. However, significant percentages of survivors have persistent motor sequelae. Estimates indicate that 75-85% of patients experience good recovery, 15-20% have moderate residual deficits, and 1-10% are left severely disabled. Even in patients with good recovery, symptoms such as fatigue may persist for long term after the completion of rehabilitation (1, 2)

Critical Illness Polyneuropathy/Myopathy (CIPNM) frequently develops in patients hospitalized in intensive care units. It looks like an acute neuromuscular weakness in patients who have been artificially ventilated for at least one week, especially with sepsis. Pathogenesis of the disease is not yet explained. The clinical features of CIPNM are: i) distally predominant muscle weakness and failure to wean from mechanical ventilation; ii) tetraparesis with prominent muscle wasting of lower extremities and absent or reduced tendon reflexes. Patients achieve independence in their ADL and in walking, although walking devices (walkers or crutches) are usually needed after discharge and wheelchairs are sometimes required for certain period of time (3)

Cauda equinae syndrome consists of symptoms and signs due to compression of two or more nerve roots in the lumbar part of spinal canal. It appears as acute low back pain that can radiate to one or both lower limbs, lower limb muscles weakness, and disturbances in urinary bladder and/or bowel. Sensory symptoms are often present in the saddle region. The condition usually improves significantly with rehabilitation. The underlying cause can be

1 degenerative (progression of spinal stenosis with acute disc herniation), traumatic (lumbar
2 vertebra fracture) or oncologic (primary tumour or more commonly metastasis with
3 destruction of lumbar vertebra) with compression of lumbar and sacral nerve roots. The
4 primary treatment is surgical with decompression and stabilisation of the affected vertebral
5 segment(s). With rehabilitation, lower limbs muscle strength gradually improves, especially in
6 proximal muscle groups (pelvic girdle, hips, and thighs). Recovery is slower in distal muscles
7 (calf, feet) and may remain incomplete. Urinary and bowel symptoms may resolve
8 completely, with total voluntary control over sphincters, no urinary retention and regular
9 bowel emptying. However some patients require long term intermittent catheterisation due to
10 urinary retention and regular laxatives intake. Before discharge, they are trained to perform
11 clean intermittent catheterisation by themselves at home (4).

12 In polyneuropathy due to metabolic causes (as in diabetes or chronic renal failure) or
13 external reasons (chronic alcohol abuse, professional exposure to neurotoxic substances –
14 glues, paints...) the outcome of rehabilitation is less favourable as the damage is usually
15 permanent. In addition, in these cases, many other body structures and functions are
16 affected, limiting the patient's ability to actively participate in rehabilitation. Adaptation to
17 impairments, improvement in remaining body functions and development of compensatory
18 strategies are the main goals in these patients (5).

19 In patients with meningoencephalitis due to viral disease, peripheral nervous system can be
20 affected as a consequence of meningeal inflammation with only mild, non-significant central
21 nerve system damage. Depending on the severity of disease and pattern of nervous system
22 involvement, different clinical pictures can be seen. In contrast with GBS and CIPNM, upper
23 limbs, neck and trunk muscles can be predominantly affected, with relative preservation of
24 lower limb strength. In general, the recovery is slower and the prognosis less favourable.
25 These patients may remain dependent in activities of daily living (ADL) and/or wheelchair
26 dependent.

27 **b) Trauma:**

28 In brachial plexus injuries the prognosis largely depends on the extent and severity of injury.
29 The prognosis is bad in the case of nerve roots avulsion, with the affected upper extremity
30 remaining plegic. There are some attempts from plastic surgeons and neurosurgeons to
31 restore at least minimal function of the affected limb with transfers of remaining functional
32 nerves, but the long term results remain uncertain. In addition, the unbearable neuropathic
33 pain can accompany these disorders and it does not regress after these types of operations.
34 On the other hand, in partial brachial plexus injuries and when the nerve roots are damaged
35 more distally, the prognosis can be better since there is a potential of natural recovery as
36 well as the possibility of surgical repair, if needed. (6)

37 High energy lumbar vertebra injuries (fractures) may cause lumbar and sacral plexus lesions
38 with consequent lower limb(s) paresis with (cauda equinae syndrome) or without urinary
39 bladder and bowel dysfunction (see cauda equinae section above).

40 In pelvis fractures sciatic or femoral nerve may be damaged with consequent lower limb
41 paresis.

42 In general, depending on the underlying cause (or diagnosis) the patients can present diffuse
43 or focal peripheral nerve disorders resulting in flaccid tetraplegia/tetraparesis,
44 paraplegia/paraparesis or monoplegia/monoparesis. Pain (neuropathic and/or nociceptive)
45 can also be an important complaint. Autonomic nervous system may be damaged in severe
46 cases with resultant heart rhythm and blood pressure problems. Emotional and sleep
47 disturbances may appear and need attention and treatment. Food ingestion may be
48 impaired. Urination (neurogenic bladder) and defecation (constipation or chronic diarrhea)
49 problems are often present.

50
51 The prognosis and rehabilitation outcomes depend on the underlying cause and the severity
52 of disease or injury, as well as on co-morbidity and patient's age. Psychological and social
53 issues can also influence the outcome. In tetraparetic and paraparetic patients, the early
54 rehabilitation phase is focused on prevention of complications due to immobility (e.g. deep
55 venous thrombosis, respiratory complications, pressure ulcers) by using the remaining

1 functional ability with additional assistance according to patient's needs. Early mobilization in
 2 wheelchair is usually possible as soon as the patient becomes stable enough. The
 3 improvement enables the patient and rehabilitation team to gradually increase the duration
 4 and intensity of therapeutic programme.
 5
 6

7 Table 1. Impairments in peripheral nerve disorders:
 8

	ICF code	ICF label
Body functions:	b134	Sleep functions
	b152	Emotional functions
	b280-b289	Pain
	b4101	Heart rhythm
	b420	Blood pressure functions
	b445	Respiratory muscle functions
	b455	Exercise tolerance functions
	b510	Ingestion functions
	b525	Defecation functions
	b530	Weight maintenance functions
	b620	Urination functions
	b710	Mobility of joint functions
	b730-b749	Muscle functions
	b810-b849	Functions of the skin
Body structures	s12003	Cauda equinae
	s1201	Spinal nerves
	s140	Structure of sympathetic nervous system
	s150	Structure of parasympathetic nervous system
	s198	Structure of the nervous system, other specified
	s310-s399	Structures involved in voice and speech
	s4303	Muscles of respiration
	s6102	Urinary bladder
	s710-s799	Structures related to movement

9
 10
 11 **3. Medical diagnosis and prognosis**

12 Functional diagnoses in treated patients include: tetraparesis, paraparesis, monoparesis
 13 (ICD10 codes C 72.1, C47.1, C 47.2, G54.1, G54.5, G61, G62, G72.8, G 82.3, G 83.1 – G
 14 83.4, M48.0, M51.1, S14.3, S34.2 - S34.4, S44, S74, S84)

15 Medical diagnoses are listed in section A1 (aetiology)

1 General prognosis and rehabilitation outcomes depend on patient's age and the type and
 2 severity of the underlying disease or injury. In general, significant and clinically important
 3 improvement at the level of body functions and structures, as well as in activity and
 4 participation, is achieved with rehabilitation.

5 At the level of body functions, muscle strength and joint mobility are increased, aerobic
 6 capacity and breathing functions are improved. Bladder and bowel functions are impaired
 7 in cauda equinae syndrome and can improve or even restore completely during
 8 rehabilitation. If neurogenic bladder persists, the problems are managed with intermittent
 9 catheterization.

10 Independent mobility and significant improvement in activities of daily living (independence
 11 if possible) is achieved. Almost all patient gain back their independent walking ability with
 12 or without support (ankle-foot orthoses, walker or crutches), although especially elderly and
 13 those with severe balance problems may need supervision or assistance. Patients with
 14 more severe neurological impairments that do not recover satisfactorily during primary
 15 rehabilitation, but are able to return to their home environment, are readmitted after 4-5
 16 month for additional rehabilitation. During that time natural recovery usually enables
 17 continuation of rehabilitation in which new (higher) goals are set.

18 **4. Treatments**

19 See chapter VII "content of the programme"

20 **B. ACTIVITY LIMITATIONS**

21 Table 2: Activity limitation in peripheral nerve disorders

ICF code	ICF label
d4	All codes from CHAPTER 4 MOBILITY
d5	All codes from CHAPTER 5 SELF-CARE
d620	Acquisition of goods and services
d630	Preparing meals

23 The activities are aimed at promoting the patient's independence, self-care, eating abilities.

24 **C. PARTICIPATION RESTRICTIONS**

25 Table 3: Participation restrictions in peripheral nerve disorders

ICF code	ICF label
d825	Vocational training
d830	Higher education
d845	Acquiring, keeping and terminating a job
d920	Recreation and leisure

27 The activities are aimed at vocational counselling and training, acquiring additional
 28 education, acquiring or keeping a job, preparing for retirement, possibilities of recreation
 29 and leisure activities.

30

D. SOCIAL AND ECONOMIC CONSEQUENCES

1. *Epidemiological data*

URI-Soča offers rehabilitation to patients with peripheral nerve disorders if the impairment causes severe or complete problems in components classified in ICF body (structures and functions and/or activities and participations). According to ICF, severe problem is defined as 50-95% and total problem as 96-100% on the scale of total difficulty. Direct « translation » of these interpretation to function is difficult, but in general patients with FIM grades 2 and 3 are regarded as having severe problem(s)., and those with grade(s) 1 as having complete problem(s) Of course, grades may vary between different activities (daily care, transfer, moving, cognitive part) and patients may only have severe or complete problems in some domains assessed with FIM. Eg : Patient with upper limb(s) impairment may walk without difficulties, but may have severe problems in activities of daily living

The leading cause for peripheral nerve disorders among the patients admitted to our department is Guillain-Barre Syndrome. Exact epidemiological data for Slovenia are not known, but are similar to other western counties (1 – 2/100 000 new cases/year), which gives up to 40 new patients yearly (7).

Epidemiologic data for CIPNM for Slovenia is not known, but the disease occurs in 25-63% in patients who have been on artificial respirator for at least 1 week. In patients with sepsis, this incidence increases to 70-100%. On average, 10 new CIPNM patients are admitted to our department each year. Due to constant development in intensive care treatment, surviving rate improves and more and more of these patients are expected in the following years (3)

Epidemiologic data for brachial plexus injuries are scarce. They are estimated to account for 5% of peripheral nerve injuries. The incidence is around 1% in polytrauma patients, and reaches 5% in motorcycle injuries (8). Brachial plexus injuries are generally caused by motor vehicle accidents in male adults aged 15 to 25 years Narakas set the rule of seven seventies: 70% occur secondary to MVAx; of these 70% involve motorcycles or bicycles. Of cycle riders, 70% have multiple injuries. Overall, 70% have supraclavicular lesions; of those, 70% have at least one root avulsed. At least 70% of patients with a root avulsion also have avulsions of the lower roots (C7, C8, orT1). Of patients with lower root avulsion, nearly 70% will have persistent pain (9).

There are no available epidemiological data for brachial plexus injuries in adults in Slovenia.

The incidence of cauda equinae syndrome in western countries is about 7-15 per 100.000, and is higher in female (10). The epidemiologic data for Slovenia are not available. There are about 10 new patients with cauda equinae syndrome per year admitted to our Institute.

2. *Social data*

There are no data on the number of peripheral nerve disorders patients returning to work.

3. *Economic data*

There was 8.9% of GDP (17.560 EUR per capita or 90% of average in EU) spent in 2010 for health care system in Slovenia. The Health Insurance Institute of Slovenia covers rehabilitation programme for peripheral nerve disorders patients entirely. No patients need to pay for medical treatment, rehabilitation programme or sanitary and technical aids. The duration of rehabilitation program is decided by the team and is not limited by the insurance system.

E. MAIN PRINCIPLES OF YOUR PROGRAMME

- 1
- 2 To assess and identify impairments of patient's body functions and structures (Table 1).
- 3 To establish short-term as well as long-term rehabilitation goals for individual patient.
- 4 To set individually tailored rehabilitation programme according to the goals by the team.
- 5 To perform medical interventions, nursing, physiotherapy, occupational therapy,
- 6 psychological support and social intervention according to the plan.
- 7 To prevent and/or cure all the acute medical complications that may appear.
- 8 To periodically assess the patient's improvement during the rehabilitation and readjust the
- 9 quality and quantity of the programme according to the patient's current capabilities. To set
- 10 new short term goals.
- 11 To educate the patient and his/her family members and encourage their active participation
- 12 in rehabilitation. Promote activities for return to home environment after the completion of
- 13 rehabilitation.
- 14 To evaluate the capacities for returning to job. Evaluate driving capacities. Testing and
- 15 prescribing medical-technical aids.

Iç. Aims and goals of the Programme

A. TARGET POPULATION

1. *Inclusion/exclusion criteria*

a) **Inclusion criteria:**

Patients with peripheral nerve disorders due to injury or disease

Admission criteria for medical rehabilitation programmes:

- Stable cardiovascular, respiratory, orthostatic and neurological conditions
- Ability to participate in the programmes of rehabilitation
- Adequate cognitive functioning and motivation
- Acute treatment of the disease that caused peripheral nerve disorders must be terminated
- Capacity to sit in bed or wheelchair for at least 30 minutes
- The admission is possible only on the basis of previously submitted adequate medical documentation (by e-mail or classic mail) or after examination in our outpatient clinic office.
- . Prior to transfer to our Institute, the patients should be able to breath without assisting devices, need additional oxygen application, cardio-vascular stable have their Cognitive functions should be preserved in order to achieve adequate cooperation in rehabilitation. In patients exposed to risk of hospital acquired multi-resistant bacteria, nose, throat, skin, rectum and wound swabs are required.

b) **Exclusion criteria:**

- Dependence on breathing assisting device or additional oxygen
- Central intravenous path placed with intravenous medicine or food and fluids administration needed.
- Simultaneous acute central neurologic impairment (stroke, traumatic or ischemic brain injury spinal cord impairment (rehabilitation performed at the other departments in URI Soča).

Patients are admitted to rehabilitation as soon as primary treatment in surgical, neurological, internal medicine or oncology department is completed. Prior to transfer to our Institute, the patients should be able to breath without assisting devices, need additional oxygen application, cardio-vascular stable, have their central intravenous path removed and do not need intravenous medicine administration or fluids replacement. Cognitive functions should be preserved in order to achieve adequate cooperation in rehabilitation. In patients exposed to risk of hospital acquired multi-resistant bacteria, nose, throat, skin, rectum and wound swabs are required and may delay admission. If colonisation of these bacteria is present, special accommodation (isolation) is arranged at our ward. Hydrotherapy is not allowed. However the number of these beds is limited to 3 (of total 29). In these patients, therapeutic schedule is adapted in order to avoid their contact with other patients.

1 **2. Referral of patients**

2

Direct access to the PRM programme	No
Referral from general practitioners	Yes
Referral from other specialists	Yes
Referral from specialists in PRM	Yes

3 Before the admission, the majority of peripheral nerve disorders patients are examined by
 4 a PRM specialist and a written proposal is prepared in advance. The patients sent by
 5 general practitioners are examined before the admittance in the outpatient clinic to define
 6 their priority of admittance.

7

8 **3. Stage of recovery**

9

Within two weeks of onset	No
2 weeks to 3 months after onset	Yes
3 months or longer after onset	Yes

10 **B. GOALS OF THE PROGRAMME**

11 **1. In terms of body structure and function**

12

	ICF code	ICF label
Body functions:	b134	Sleep functions
	b152	Emotional functions
	b280-b289	Pain
	b4101	Heart rhythm
	b420	Blood pressure functions
	b445	Respiratory muscle functions
	b455	Exercise tolerance functions
	b510	Ingestion functions
	b525	Defecation functions
	b530	Weight maintenance functions
	b620	Urination functions
	b710	Mobility of joint functions
	b730-b749	Muscle functions
	b810-b849	Functions of the skin
Body structures	s12003	Cauda equinae
	s1201	Spinal nerves

	s140	Structure of sympathetic nervous system
	s150	Structure of parasympathetic nervous system
	s198	Structure of the nervous system, other specified
	s310-s399	Structures involved in voice and speech
	s4303	Muscles of respiration
	s6102	Urinary bladder
	s710-s799	Structures related to movement

1 The programme of rehabilitation is aimed at pain management, stabilization of blood
2 pressure and heart rate, improving respiratory function, establishing proper oral foot intake,
3 management of defecation, urination control, preserving intact skin, establishing
4 independence in activities of daily living, assurance of optimal joint mobility, independent
5 mobility, improving muscle strength, endurance and aerobic capacity. The ICF checklist
6 used empirically in our ward is largely in accordance with checklist for Guillain Barre
7 Syndrome patients as recently published by Khan and associates (11, 12).

8 **2. In terms of activity**

9

ICF code	ICF label
d4	All codes from CHAPTER 4 MOBILITY
d5	All codes from CHAPTER 5 SELF-CARE
d620	Acquisition of goods and services
d630	Preparing meals

10 The programme is aimed at acquisition independent mobility and independency in the
11 activities of daily living as well as possible leisure time activities and participation in social
12 environment after discharge.

13 **3. In terms of participation**

14

ICF code	ICF label
d825	Vocational training
d830	Higher education
d845	Acquiring, keeping and terminating a job
d920	Recreation and leisure

15 The program is aimed at the patient's return to work when indicated or at the vocational
16 training, education or preparation for retirement.

ς. Environment of the programme

A. CLINICAL SETTING

Individual practice or part of a doctor's group practice	No
Individual practice in a private hospital	No
Part of a local (public) hospital	No
Part of a regional hospital (or rehabilitation centre)	No
Part of a university or national hospital	Yes*

* University Rehabilitation Institute is the only national rehabilitation centre in Slovenia and is not a part of any other national hospital.

B. CLINICAL PROGRAMME

Inpatients in beds under PRM responsibility	Yes
Inpatient beds belonging to other departments	No
Day programme (most of the day in outpatient setting, not home)	Yes
Outpatient clinic (assessment and/or treatment, for up to 3 hours/day)	Yes
Community based (in the patient's home or workplace or other relevant community location, e.g. sports centre)	No

The programme included outpatient clinic once a week for assessment and regular follow up. Most patients are admitted and rehabilitated as inpatients, some from Ljubljana region may have day programme.

C. CLINICAL APPROACH

Uniprofessional	No
Multiprofessional	Yes

All patients are treated by a multiprofessional team (MD, PRM specialist, PT, OT, psychologist, social worker, CPO, nurses, speech therapist*).

D. FACILITIES

Does your programme have a designated space for :	
For assessments and consultations?	Yes
For an ambulatory or day care programme?	Yes
For inpatient beds?	Yes
For therapeutic exercises?	Yes
For therapeutic exercises?	Yes
For training in independence and daily living?	Yes
For vocational and/or recreational activities?	Yes

The programme is carried out on the 1st floor of the south wing of the Institute. It has 9 completely accessible rooms.

There are 2 rooms for assessment and consultations with inpatients, and one for outpatients, 2 rooms for physiotherapy, one for occupational therapy, a room for activities of daily living training, for psychologist, a social worker, for team meetings and a dining room. Outpatients are examined in the outpatient ward in the ground floor of the same building.

Indoor swimming pool is located in the ground level in the area between the two main buildings of the Institute and is connected with both parts with wide the indoor corridor. Next door to the pool there is a gym and room with electrotherapy devices, which is also used by our patients.

çI. Safety and patient rights

A. SAFETY

The safety concerns of persons in the unit where the programme takes place, relate to :	
Emergencies (fire, assault, escape)	Yes
Medical emergencies	Yes
Equipment	Yes
Handling of materials	Yes
Transports	Yes
The safety of persons in the programmes of your unit is provided by :	
Written standards from National Safety Bodies	Yes
Written standards from National Medical Bodies	Yes
Unit-specific written rules	Yes
Periodic inspection	
Internal	Yes
External	Yes

Rehabilitation process is reviewed periodically by the medical director of the Clinic during clinical rounds and by the medical director of the University rehabilitation institute during team meetings.

B. PATIENT RIGHTS

Has your programme adopted a formal policy or statement of patients' rights?	Yes
Does this statement specify the influence that the patient should have in the formulation and implementation of the programme?	Yes
Is the statement known to all personnel involved in delivering the programme?	Yes
Is this checked periodically?	Yes
Is the statement made known to and is available to all persons visiting your unit?	Yes

The Act on Patients Rights of the Republic of Slovenia was accepted on 29 January 2008 and has been used in everyday practice from 26 August 2008. The content of the act is available for all patients and employees through the brochures and posters.

1 **C. ADVOCACY**

2

Give at least one example of how your organisation advocates for people your programme deals with:	
Acquaintance of peripheral nerve disorders patients with the possibilities of affiliation to Paralytic Association of Slovenia	Yes
Participation of medical doctor in Professional Council of Paralytic Association of Slovenia	Yes

3

II. PRM Specialists and team management

A. PRM SPECIALISTS IN THE PROGRAMME

Does your PRM physician have overall responsibility and direction of the multiprofessional team?	Yes
Does your PRM physician have overall responsibility and direction of the rehabilitation programme, not only medical responsibility?	Yes
Does he/she have a European Board Certification in PRM?	Yes
Does he/she meet National or European CME/CPD Requirements?	Yes
Number of CME or EACCME points earned in the last 3 years :	
The two primary functions for the PRM specialist in your Programme are to :	
Treat comorbidity	No
Assess the rehabilitation potential of the patient	Yes
Analyse & treat impairments	No
Coordinate interprofessional teams	Yes

Beside two primary functions of PRM specialists, a lot of work must be done in the treatment of comorbidity and impairments. Many of the admitted patients are older than 65 years with lots of accompanying diseases.

B. TEAM MANAGEMENT

Which rehabilitation professionals work on a regular basis (minimum of once every week) in your programme? (give the number)	
Physiotherapists	5
Occupational therapists	3
Psychologists	1
Speech & Language therapists	0
Social workers	1
Vocational specialists	0
Nurses	17
Orthotists/prosthetists assistive technicians/engineers	1
Other (please specify)	Internal medicine, neurologist, plastic surgeon, etc. (on request)
How often does your staff receive formal continuing education (mark as is)?	

In team rehabilitation :	Every year
In their own profession :	Every year
Do team activities in your rehabilitation programme include the following?	
Is the patient at the centre of a multiprofessional approach?	Yes
Do you always give informed choices of treatment?	Yes
Do you regularly promote family involvement?	Yes
Does your organisation of multi professional team working include :	
Holding regular team meetings with patient's records only (more than 2 members)	Yes
Holding regular team meetings (more than 2 members) with the presence of the patients	No
Joint assessment of the patient or joint intervention	Yes
Regular exchanges of information between team members	Yes

- 1
 - 2
 - 3
 - 4
- There are regular 2 hours team meetings of the staff once a week with the participation of a medical doctors, two university college graduated nurses, all present physiotherapist and occupational therapists, a social worker and a psychologist. Besides, team members also hold short daily meetings depending on problems pending, with or without the patient.

III. Description of the programme

A. GENERAL SCHEME

1. Before admission at the specialized department

After acute injury or disease onset patients can be admitted directly to one of regional hospitals in Slovenia for immediate diagnosis and treatment. If necessary they can be then transferred to one of two 3rd level hospitals, i.e. the university medical hospital in Ljubljana or Maribor. Depending on the diagnosis, they are treated in clinics/departments for trauma, orthopaedics, heart, abdominal or neuro-surgery, neurology, infectious diseases or internal medicine. Early rehabilitation is started there, as soon as their general condition is stable enough. It comprises maintaining joint mobility, prevention of pressure sores, deep vein thrombosis and infections, assistance of respiratory functions, early phase of movement promotion.

2. After admission

Patients are admitted two weeks to several months after trauma or disease onset, depending on their general medical condition. Rehabilitation programme usually lasts from 1 to 4 months. Patients have 3 - 5 hours of therapeutic program, according to their current needs and capabilities.

As soon as the patient's health state permits the continuation of rehabilitation, he or she is transferred to a specialized rehabilitation centre. The content and duration of the rehabilitation programme are individually tailored to the patient's impairments of body functions and structures, functional limitations and expected outcome. Rehabilitation goals are set by the team at the beginning of the program and are assessed and readjusted regularly (every two weeks) according to the patient progress.

After the admission, the patients are included into intensive programme of rehabilitation, which can last from 4 weeks up to 4 months. Unless there are acute complications, the patients leave their hospital rooms and attend the programmes therapeutic (physiotherapy and occupational therapy) rooms according to the schedule.

Patients are examined by a PRM doctor and, if necessary, by a specialist of internal medicine. Functional testing of cardiovascular system and lung functions can be performed. Intensive respiratory physical therapy is offered to those patients who need such treatment.

Regular nursing care is performed in beds as well as in the bathrooms and toilet facilities. Patient's gradual active participation in nursing is encouraged during the rehabilitation, with final goal to achieve independency. Prevention of pressure sores is performed in immobile patients. Different bed and seat anti-decubitus cushions are used. The patient's position in bed is changed regularly and the time of lying in one position is recorded on a special file by the nursing staff. If pressure wounds are already present, they are treated with all the available up-to date dressings. If necessary, small surgical procedures on the wounds can be performed on the ward. Regular blood and urine samples can be taken if indicated and send to nearby laboratory. Microbiological samples of wounds, urine, stools are taken if necessary and antibiotic treatments implemented according to the results.

At admission all patients are screened for nutritional risk with the NRS-2002 (Nutritional risk screening 2002). Patients at risk for malnourishment are assessed by a clinical nutrition team. Body composition assessment is performed with bioelectrical impedance analysis (Quadscan 4000, Bodystat Ltd., UK) and individually tailored nutrition care plan is provided.

1 Clinical pharmacologist can be consulted on possible interactions and side effect when
2 several medicines are given to a patient.

3 Urinary excretion and defecation functions are monitored and recorded regularly as well as
4 fluid intake if necessary by the nursing staff. After permanent urinary catheter is removed,
5 possible urinary retention can be monitored with portable ultrasound scanner. In case of
6 urinary retention, intermittent catheterization is introduced as soon as the patient's abilities
7 permit and regular catheterization by the nursing staff is ensured for the entire 24 hours. To
8 ensure proper defecation, laxatives, tea and suppositories are used

9 Independent wheelchair use is promoted early in the course of rehabilitation.

10 In physiotherapy, the programme of mobilization includes upright positioning on tilting
11 tables or between bars for tetraparethic and paraparethic patients. Walking training in
12 parallel bars or with walkers and crutches is started as soon as the patient's condition
13 allow. Manual muscle test (MMT) is performed at the beginning of the program and in
14 regular intervals during rehabilitation, as well as after discharge. Individual assisted or
15 active strengthening exercise program is introduced according to results of the MMT,
16 including EMG-biofeedback training, physiotherapist or several technical devices (fitness)
17 applied load. Special attention is put on achieving or preserving optimal passive joint
18 mobility before active movement is possible. Hydrotherapy one to two times daily is
19 performed when indicated and if there are no contra-indications.

20 Fine upper limb skills training and strengthening exercises are introduced by occupational
21 therapists. For that purpose, there are number of devices available and can be used by the
22 patients. Activities of daily living are trained in hospital rooms as well as in occupational
23 therapy facilities. Advices on the possibilities of home adaptation and removal of
24 architectural barriers are given. Demonstration on high-tech aids is available at smart
25 house (IRIS) at our Institute.

26 Patients are treated by a psychologist and a social worker. Interview at the department for
27 vocational rehabilitation is possible in needed. Sports activities and pool swimming are
28 organized.

29 Additional diagnostic procedures are available at the Institute, including EMG, ultrasound
30 examination of musculoskeletal system, arterial and venous system, urodynamic
31 investigations and iso-kinetic dynamometry.

32 Consultation with specialists in plastic surgery, orthopaedic surgery and radiology is
33 available at the institute 1-2 times per month.

34 35 **3. Discharge**

36 Discharge is planned based on agreed criteria:

- 37 1. The goals set at the admission have been achieved or
- 38 2. No major progress in patient's functions and activities has been achieved in the last
39 two weeks and
- 40 3. Patient is able to return to her/his home environment or admission to nursing home is
41 arranged.
- 42 4. (Acute) worsening of patient's health status that prevents active participation and
43 requires medical treatment in acute hospital. After improvement, patient can be
44 readmitted and rehabilitation continued.

45 **4. Comprehensive rehabilitation and follow up**

46 After their discharge, a follow up in the outpatient clinic is established, with first control visit
47 4 months after discharge. Follow-up is conducted at our specialized out-patient unit, first
48 two years at regular intervals (4 to 6 months), later at patient's or GP's request. Patients
49 who at that time show further rehabilitation potential are re-admitted for further in-patient
50 rehabilitation, or are, if possible (rarely), included into an outpatient programme.

1
2 Comprehensive rehabilitation includes evaluation of the patient's working ability and
3 vocational rehabilitation, as well as additional schooling and qualifications for those up to
4 45 years of age.

5 As additional (neurological and functional) improvement is expected in the following
6 months, patients are followed up at least for one year after discharge, before final
7 recommendation on working ability is given. Regular control visits in our outpatients' clinic
8 are provided after discharge, with control manual muscle test and EMG examination
9 performed every 4 months. If necessary, patients are readmitted to the ward for further in-
10 patient rehabilitation or are included in our outpatient rehabilitation programme.

11 In case of neurogenic bladder problems, patient's bladder diary is checked at each visit
12 and post-voiding retention is measured with ultrasound.

13 Due to generally favourable prognosis, the majority of younger patients return to work
14 within 1 to 2 years from injury or disease onset. However, in cases of severe disease or
15 injury with remaining functional impairments that enable return to work, the patient retires.

16 The majority of the patients are discharged to their home environment. If necessary, home
17 assistance is provided by social institutions, layman organizations and visiting nurse
18 services. The patient's relatives are included into rehabilitation. They learn about the
19 severity of the impairment, prognosis and the patient's progress. If necessary, they learn
20 the appropriate nursing skills, personal hygiene procedures, assistance in activities of daily
21 living, intermittent catheterization and procedures to be carried out at home.

22 During the rehabilitation program, the patients are encouraged to return home every
23 weekend. This serves as a good basis for later integration into the home environment.
24 Technical aids are tested and prescribed as well as home adaptations suggested. Before
25 discharge, patient can, alone or with his relative, spend a few days in Smart Home IRIS at
26 the Institute.

27 Patients with remaining severe functional impairments who cannot take care of themselves
28 and previously lived alone and/or in unfavourable home environment due to architectural
29 barriers need to be accommodated in appropriate social institutions.

31 **B. ASSESSMENT**

32 **1. Diagnosis**

33 PRM specialists can make a diagnosis on their own. If needed, they cooperate with a
34 specialist in Internal Medicine or other specialists

35 **2. Impairment**

36 **a) Clinical assessment**

37 FIM, MMSE

38 **b) Diagnostic tools**

39 MMT, ROM, , ECG, EMG, , SEP, MEP, urodynamics, US, kinesiological gait analysis,
40 Iso-kinetic dynamometry

41 **3. Activity and participation**

42 **a) Capacity evaluation (what somebody can do)**

43 We aim at achieving the expected functional capacity in relation to the level of impairment
44 (2).

1 **b) Performance (what somebody is actually doing)**

2 **FIM, 6-minutes walking test, 10 m walking test, Berg balance score (BBS), COPM,**

3 FIM is used for global assessment of the functional status. Walking tests are performed (6-
4 minutes walking test, 10 m walking test) if the patients are able to walk and BBS if there is
5 a balance problem. COPM is used in occupational therapy to identify areas and activities
6 important to patients and their inclusion into our rehabilitation program.

7 **4. Environmental and personal factors**

8 Self prepared questionnaire for assessment of environment at home, community,
9 school/work place in occupational therapy. Personal factors are assessed by a
10 psychologist.

11 At discharge, patient's satisfaction with hospitalisation and rehabilitation is assessed with a
12 National questionnaire prepared by the Ministry of health.

13 **C. INTERVENTION**

14 **1. PRM specialist intervention**

- 15 • Treatment of infections, arhythmias, hypotension and hypertension, diabetes,
16 bedsores, pain.
- 17 • Management and adaptation of drug treatment.
- 18 • Prevention of deep vein thrombosis
- 19 • Ensuring adequate lung function
- 20 • Necrectomy of wounds.
- 21 • Neurogenic bladder training, replacement of urine catheters, the first intermittent
22 catheterization after removal of the catheter, measurement of the delay in the
23 bladder.
- 24 • Replacement of the endotracheal tube.
- 25 • Digital rectal examination.
- 26 • Removal of sutures.
- 27 • Insertion and replacement of nasogastric tube.
- 28 • Urodynamic measurements. EMG, SEP, MEP. US of the skeleton.
- 29 • US Doppler of the veins
- 30 • Sensorimetry (thermotest)

31 **2. Team intervention**

32 Physiotherapy: MMT, ROM, TENS, EMG-BF, walking, standing, orthotic training, walking
33 aids testing

34 Occupational Therapy: Training of upper limb function. ADL, wheelchair tests and training
35 of its use, technical medical aids testing, environmental adaptations counselling, splints
36 making, construction of small devices for every day activities management, leisure time,
37 smart home, etc.

38 CPO: manufacturing and fitting of spinal orthoses, lower limb and foot orthoses and
39 orthopaedic shoes.

40 Psychologist, social worker: assessing personal factors, support, social support, adaptation
41 to new abilities (disability), of self esteem building.

1 Social worker: counselling and help, cooperation with the family, cooperation with Centres
2 for social work, help in claiming the patient's rights.

3 Nurses: intermittent catheterisation, wound nursing, pressure sore prevention program,
4 bowel management, positioning in bed, use of acquired independence in ADL at the
5 department, cooperation in and performance of assisted respiratory functions, teaching self
6 catheterization.

7 **D. FOLLOW UP AND OUTCOME**

8 **1. Review and progress through the programme**

9 Regular team meetings every second week, the team is led by a PMR specialist with
10 regular follow-up of the short-term and long-term goals. If necessary, at the end of
11 rehabilitation, interview at the Centre for vocational rehabilitation for the evaluation of the
12 work abilities or possible training program or counselling on education.

13

14 **2. Criteria for progress measurements**

15 Numerous assessment scales are used to evaluate the patient's progress and condition,
16 such as FIM, MMT, ROM, 10 m walking test, 6-minute walking test, BBS, SEP, MEP, EMG.

17 **E. PATIENT RECORDS**

18

Do the rehabilitation records have a designated space within the medical files?	Yes
Do you have written criteria for:	
• Admission	Yes
• Discharge	Yes
Do your rehabilitation plans include written information about aims and goals, time frames and identification of responsible team members?	Yes
Do you produce a formal discharge report (summary) about each patient?	Yes

19 Each patient has his or her own medical file used exclusively in the rehabilitation program.

20

21 **F. MANAGEMENT INFORMATION**

22

Does your programme show evidence of sustainability?	
• Established part of public service :	Yes
• Has existed for more than 3 years :	Yes
• Has received national accreditation (where available) :	Yes
How many new patients (registered for the first time) are treated in your programme each year :	75

In your day care or inpatient programme :	
• What is the mean duration spent in therapy by patients on this programme	30 days
• How many hours a day do the patients spend in therapy.	3-5 hours
Give the mean duration of stay spent in the programme :	40 days

Due to diversity of pathologic conditions causing peripheral nerve damage, the functional impairment and consequent duration and extent of rehabilitation programme differ largely among our patients.

G. PROGRAMME MONITORING AND OUTCOMES

Does your programme have an overall monitoring system in addition to patient's records?	Yes
Are the long term outcomes of patients who have completed your programme regularly monitored?	
• Impairment (medical) outcomes :	Yes
• Activity/Participation (ICF) outcomes :	Yes
• Duration of follow up of the outcomes :	longer
Do you use your outcome data to bring about regular improvements in the quality of your programme's performance?	Yes
Do you make the long term overall outcomes of your programme available to your patients or to the public?	No

All patients are invited to the out-patient clinic 4 months after the discharge. Regular follow-up is performed for 2 years after the disease onset or injury in the interval of 4 to 6 months with EMG and MMT performed at the time of visit. US of urinary retention can be made if indicated. After 2 years the recovery of peripheral nerves is generally finished and no major functional improvement can be expected. Orthotic and other medical technical aids can be adapted or new prescribed if needed

1 I.E. Quality improvement

2 A. WHICH ARE THE MOST POSITIVE POINTS OF YOUR PROGRAMME?

- 3 Multidisciplinary team-work approach in the provision of the rehabilitation programme
 4 Offering the optimal programme regarding to the patients abilities
 5 High quality nursing care and medical treatment preventing secondary complication
 6 Fitting with necessary medical technical aids
 7 Enabling the patient to return home
 8 At admission patients are given hand-outs with basic information in the department and
 9 procedures such as removal of the urine catheter and the training of catheterization

10 B. WHICH ARE THE WEAK POINTS OF YOUR PROGRAMME?

- 11 Inaccessibility of diagnostic tools such as X-ray, laboratory, abdominal ultrasound
 12 examination
 13 Inability to assure 24-hour additional oxygen supply to the patient due to lack of installation
 14 at the Institute
 15 Cooperation with external consultants - specialists in plastic surgery, othorinolaryngology,
 16 urology

17 C. WHICH ACTION PLAN DO YOU INTEND TO IMPLEMENT IN ORDER TO IMPROVE 18 YOUR PROGRAMME?

19 1. *Extrinsic requests (equipment, manpower)*

20 General adaptation of the ward (1st phase in 2012, 2nd phase in 2015), which will improve
 21 quality of patient stay and optimise working conditions (smaller 2-3 bed rooms with toilets
 22 and bathrooms, new dining room, new OT and enlarged PT facilities).

23 2. *Intrinsic improvements of the programme (organisation, training, assessment)*

24 The University Rehabilitation Institute plans to purchase a small transportable laboratory in
 25 2012

26 Improving bladder and bowel rehabilitation programme.

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