ANNEX 36. F Home physiotherapy and physical rehabilitation

36.F.a Home care for the spinal cord injury patient: equipment

The equipment and supplies needed for the effective management of spinal cord injury (SCI) patients is simple and not expensive. Some are part of a hospital's standard supplies or can be manufactured in the hospital workshop and made by local craftsmen, or readily purchased locally. Others require the more sophisticated expertise of a specialized centre or prosthetic workshop.

These materials include:

- special urinary condoms or, if unavailable, ordinary condoms (bought);
- plaster-of-Paris bandage for posterior splints to be used at night to prevent flexion contractures (hospital supplies);
- sponge foam mattress (bought);
- sheepskin (bought);
- standing frames (to be made);
- parallel bars (to be made);
- crutches (to be made);
- simple calliper or brace (manufactured at specialized centre);
- wheelchair (manufactured at specialized centre).

36.F.b Physical rehabilitation: guidelines

The following guidelines have been developed by the Physical Rehabilitation Department of the Assistance Division of the ICRC to be used by physiotherapists in-hospital and included in the home-care team's routine.

Objective
Through a multidisciplinary team approach, to restore the spinal cord injured (SCI) patient to functional independence and the optimal use of his[1] wheelchair and/or orthotic device.

Indication
All spinal cord injury patients according to the American Spinal Injury Association scale/ASIA scale (see Annex 36.B).

Contraindications
- Rehabilitation should be minimal when positive functional outcome cannot be expected, depending on age, level of injury (e.g. higher than C6), medical complication, associated diseases, poor social and cultural environment and patient motivation.
- Orthotic fitting should be postponed if the patient has an open wound, tissue inflammation, swelling, or is suffering from general weakness or pain.

Medical and non-medical knowledge additional to basic physiotherapy
The physiotherapist should:

- know the pathology of SCI including the different phases and the treatment related to each of them;
- know the variety of orthoses used and their aim;
- understand the principles of gait with lower-limb orthoses and the factors, both physical and biomechanical, that affect their use;

1 For the purposes of simplification, the masculine form is used for both genders. The term family refers to mother, other family member or caretaker.

- know the range of available wheelchairs (3-wheeler, 4-wheeler and tricycle) and their prescription;
- know the various wheelchair management techniques and when and how to apply them (e.g. management of slope, kerb, stairs) depending on the patient's ASIA level;
- know the method of efficient bandaging;
- understand the principles of spinal surgery, nursing care and general hygiene;
- be aware that the level of spinal cord injury, pre-existing medical conditions and social environment will affect the final outcome of the rehabilitation;
- understand the following points relating to orthotics and use of a wheelchair:
  - the static alignment of the orthosis and its effect on pressure distribution;
  - the mechanism of joint fixation;
  - the pressure sensitive areas of the body when using a wheelchair or lying in bed;
  - the different components of the wheelchair and possibility of influencing stability or mobility;
  - the basics of wheelchair maintenance;
- understand when and how to apply the distinctive phases in a gait-training programme (progressive static weight bearing, dynamic weight transfers, progressive walking exercises within parallel bars, progressive walking exercises with or without mobility aids, progressive functional exercises and getting around in the home environment);
- understand the origins and characteristics of spasticity and the appropriate techniques to reduce it;
- understand the major steps of the management of bladder and bowel function and be informed on the problems related to sexual dysfunction;
- be aware of complications related to the neuro-vegetative system (e.g. autonomic dysreflexia).

Required equipment

The physiotherapist should have at his disposal in the patient's home or be able to carry the following materials and equipment:

- assessment tools: goniometer, measuring tape
- bandages
- walking aids
- sandbags/weights
- strengthening equipment
- weight scale
- balance tools/push-up handles
- mats
- mirror
- treatment tables
- parallel bars
- gait-training course
- sports' articles and equipment (basket or volleyball)
- wheelchair (s)
- standing frame, standing table
- reference documents

36.F.c Patient management: multidisciplinary aspects and assessment

Where possible in a rehabilitation centre or a hospital, the physiotherapist should be part of the multidisciplinary team, together with orthotists, social workers, nurses, surgeons and psychologists.

Joint meetings for assessment, treatment evaluations, discharge and patient follow-up should take place on a regular basis to discuss individual patients.

- There should be written evidence of the patient's diagnosis, X-ray, history, medical and surgical treatments.

- The patient's physical status, including level of injury, motor and sensory impairments and general condition should be noted.
- The patient's social situation, psychological status and expectations should be documented.
- Relevant diseases (e.g. renal disease, vascular disorders and upper limb status), impaired cognition and other pathologies should be noted.
- A treatment plan, including goals agreed between patient and the rehabilitation team, should be established and regularly re-evaluated.

36.F.d Patient management: treatment plan

1. Bed rest phase

Rehabilitation should ideally begin the day of injury and/or just after surgery; in any case not later than one day after the injury.

The physiotherapist should :

- contribute to the prevention of all complications (pressure sores, contractures, muscle atrophy, oedema and respiratory complications) with various techniques such as massage, mobilization, postures and muscle exercises;
- inform the patient about the physiotherapy treatment and the importance of immobilization until the fracture is stabilized;
- contribute to the management of back/neck pain or neurological type of pain in the limbs;
- teach the patient how to prevent severe spasticity especially with early positioning;
- improve the general condition (endurance, function) of the patient with muscular and respiratory exercises and global mobilization;
- prepare the limbs for orthotic fitting by:
  - improving range of motion of all joints and teach self-mobilization when possible;
  - reducing the oedema and maintaining the local circulatory system;
  - improving the strength of weakened muscles;
  - ensuring sufficient neck strength and stability in tetraplegics before verticalization;
  - maximizing upper-limb strength before transferring the patient out of bed.

At the end of this phase, the physiotherapist should train the patient to overcome the loss of vasomotor control and postural sensibility with frequent change in position and gradual balance exercises.

A wheelchair and walking aids should be provided and the physiotherapist should prepare the patient in their use as early as possible, to prevent further complications such as pressure sores or contractures.

2. Rehabilitation phase

- The physiotherapist should check the wheelchair or orthoses for a correct and comfortable fit at the beginning of each treatment session, until the patient is able to do this himself. The patient should examine his skin before and after wheelchair or orthotic use.
- The physiotherapist should continue the close supervision of skin condition and breathing as long as the rehabilitation continues.
- The physiotherapist should continue to improve the general condition (endurance, function and coordination) of the patient with muscular and respiratory exercises and global mobilization.

- In order to adapt to the sitting position, progressive use of a standing table or standing frame is recommended.
- The patient should be taught how to manage the wheelchair in an optimal way according to the neurological level. Wheelchair use includes the management of kerbs, slopes and stairs independently or with the help of a trained person.
- The physiotherapist should teach the patient all relevant transfers to/from the bed or wheelchair, toilet and floor according to the level of injury, if possible independently or with the correct help of a carer.
- While the patient is wearing the orthoses, the physiotherapist should first teach efficient control of the limbs through postural control, weight transfers, and specific muscle strengthening and stretching exercises to prevent or correct unnecessary gait deviation.
- Instructed by the physiotherapist, gait training should then be built up gradually, starting between parallel bars and progressing to walking aids such as a walking frame, axillary or elbow crutches. Moving in or outside the home environment should be practised too.
- The physiotherapist should finally teach the patient a range of functional tasks relevant to the goals set for that individual: getting on and off the floor, getting in and out of a car, going up and down stairs and slopes, walking in a crowded environment, picking up objects from the floor, etc.
- Orthotic rehabilitation should aim to establish an energy-efficient gait, based on a normal physiological walking pattern.
- During the entire rehabilitation programme, the physiotherapist, together with other professionals, should contribute to the evaluation of the orthotic or wheelchair fit.
- The physiotherapist, the orthotist and/or a medical doctor should together review all fitted patients on a regular basis.
- Patients should be given instructions on proper orthotic and wheelchair use, considering pressure sensitive areas of the limbs.
- Guidance should be given on the daily care of the orthoses, socks and hygiene related to the limbs, especially the feet.
- Even if bladder and bowel management are performed primarily by a trained nurse, the physiotherapist should be able to participate actively in training the patient to be as self-reliant as possible.

3. Discharge and follow-up

- A final evaluation should be performed and a summary of the patient's function and wheelchair mobility and the discharge date documented in the treatment file.
- Advice should be given to the patient regarding limb care, orthotic and wheelchair care, such as cleaning the device or changing the shoe without influencing the alignment of the appliance.
- A home exercise programme should be discussed between the patient, the family and the physiotherapist for the upper and lower limbs, as well as the rest of the body; specific mention of skin protection and breathing should be given.
- Where possible simple adaptation(s) of the patient's home should be made with the support of the physiotherapist.
- A follow-up date should be fixed for the review of the patient after discharge.

4. Remarks

- Hands-on approach in physiotherapy is encouraged (close professional physical contact).
- During the bed rest phase, physiotherapy treatment should start the day after the surgery.
- During the rehabilitation phase, a daily minimum of 30 minutes of individual treatment plus 30 minutes group-exercises per patient is recommended.
- A special bed should be improvised at home, especially for high-level SCI patients to prevent complications and promote independence.
- Additional equipment might be necessary for special-needs patients (e.g. dressing material for patients suffering pressure sores or adaptive devices for tetraplegics in order to prevent further complications.
- For patients with a C7 neurological level or higher, special care of the hands should be taken: splinting to help tendon function and positioning are necessary.
- For patients with abnormal hand function, adaptive devices should be provided such as grip enlargements, wheeling gloves, writing splints, etc.
- The wheelchair should be regularly cleaned and maintained, all parts oiled and checked and the cushion washed when necessary.
- It is strongly advised to include the physiotherapy file in the hospital or out-patient file.
- Patient information leaflets about SCI condition should be available.
- Promotion of vocational training, social activities and sports should be encouraged.
- Active participation of the family is encouraged and necessary.