Initial Rehabilitation Program
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Although the rehabilitation professional should intervene early in the care of the spinal cord-injured patient, the focus of intervention should be on the patient's immediate concerns. These include programs for maintaining full-range of joint motion, reducing spasticity, bowel and urine management, proper skin care, and activities of daily living. At the same time, the rehabilitation professional can coordinate the efforts of a rehabilitation team to oversee individual and family counseling, vocational counseling, architectural renovations in the patient's home environment, and transportation services.

The rehabilitation professional should become involved with the spinal cord-injured patient almost immediately after the accident and initiate early contact. The timing of intervention is critical for both the rehabilitation professional and the psychologist providing counseling services.

The focus of early intervention is to make the patient aware of the availability of assistance. The rehabilitation professional should encourage the development of a positive outlook for rehabilitation but attempt no direct assistance or intervention. The potential to disrupt long-range chances for a positive relationship is great if the patient perceives that the professional is giving priority to future events when present-day problems are taking precedence. The rehabilitation professional gains most by initiating services when the patient has reached the acknowledgement stage of his or her post-injury psychological development.

In catastrophic injuries, especially spinal cord injuries, rehabilitation is not limited to vocational counseling after hospital discharge.

It also includes health-related services provided from the day of injury to the end of the hospitalization period. These services should include, but may not be limited to:

1. Maintenance of full range of motion in the joints;
2. Reduction in and control of spasticity;
3. Development of a bowel-management program;
4. Development of a urological-management program with intermittent or supra-pubic catheterization or an indwelling Foley catheter;
5. Development of a skin-care program; and
6. Training in wheelchair transfers and all activities of daily living including eating, dressing, personal hygiene, and maintenance of independent activity where appropriate.

Failure to provide range of motion exercises for the joints, treatment for spasticity, and proper skin-care programs can lead to a disuse syndrome. Disuse syndrome is a somewhat preventable set of problems that includes decubitus
ulcers, back pain, disuse osteoporosis, contractive deformities, loss of appetite, constipation, urinary retention, urinary tract infections, renal stones, and problems with the cardiovascular and respiratory systems. Metabolic changes that can result from prolonged bed rest include tissue-wasting, bone demineralization, fluid and electrolyte imbalance, and gastrointestinal dysfunction. All of the problems can be addressed and the magnitude of the problems reduced.

Other services that are provided during this rehabilitation phase include:
(1) Individual counseling to aid in personal adjustment and coping;
(2) Family counseling and education;
(3) Assessment of the home environment for appropriate renovations;
(4) Vocational guidance and counseling;
(5) Mobility and transportation.

Services during this interval are provided by physical therapists, occupational therapists, recreational therapists, psychologists, and vocational rehabilitation counselors. The physical therapist's responsibility is to focus primarily on maintaining and enhancing range of motion, reducing problems with spasticity, helping the patient in ambulation where appropriate, and assisting the patient in developing skills for transfer from the wheelchair.

During this stage of rehabilitation, the rehabilitation professional can be helpful in observing functional goals developed by the patient and applying them to work tasks and home activities the patient will confront after discharge. At times the activities of the physical therapist and occupational therapist will overlap.

It is important to consider each spinal cord patient individually and assess needs on a per case basis. When the rehabilitation team is flexible in helping the patient, and can design new approaches to the accomplishment of a task, realistic goals can usually be achieved.

**Joint Range of Motion and Control of Spasticity**

In general the longer bed rest is maintained and dependence reinforced, the more difficult the patient faces developing an independent functional status. For that reason, maintenance of joint range of motion, prevention of spasticity, and development of a skincare program should begin immediately after the onset of injury. Even during the early recuperative stages, the physical therapist can provide range of motion exercises at the patient's bedside. Early intervention assistance from the physical therapist can help prevent contracture deformities and joint complications that result from long-term confinement to a hospital bed. Range of motion exercises also help enhance the effort to reduce or prevent spasticity. Spasticity can severely interfere with a spinal cord patient's independent function and mobility. It may negatively affect the patient's ability to accomplish dressing, wheelchair transfers, and other activities of daily living.
However, range of motion exercises alone cannot be expected to control spasticity once it has become a significant problem. Medication therapy, biofeedback and relaxation therapies, neuromuscular re-education, and motor-point blocks may be considered.

**Skin Care**

It is extremely important to initiate a skin care program as early as the initial emergency room care period. At that point, the nursing staff should be responsible for turning the patient at appropriate intervals to avoid the breakdown of skin over bony prominences.

The use of vertical circo-electric beds for moving the patient to maintain good skin care is contraindicated because of the increased weight it places on the fractured spine as the individual is moved through the vertical position in turning.

The patient should be trained to maintain a skin-care program. This involves developing a habit pattern in which the patient regularly turns if reclining or makes postural changes while seated to reduce the potential for skin breakdown (decubitus ulcers). Heel pads, elbow pads, sheepskin, wheelchair cushions, or other equipment designed to reduce the incidence of skin breakdown should also be used. The most appropriate types of equipment depend in large part on not only the level of lesion but the age and functioning level of the patient. Young patients with lower level lesions (paraplegia) may not need equipment or pads, and may find postural changes while seated and maintenance of a good skin-care program sufficient. In the older patient or patient with a higher level lesion, for whom it is more difficult to maintain a skin-care program independently, pads and equipment such as an alternating pressure pad and pump may be required. However, all spinal cord injured people will require some sort of wheelchair cushion to provide long-term protection and maintenance of their skin. These cushions have to be replaced with a degree of frequency that assures they will not be come excessively worn or deteriorate.

**Activities of Daily Living**

It is generally the responsibility of the occupational therapist to train the spinal cord-injured patient during the initial rehabilitation phase in activities of daily living, including personal hygiene, dressing, eating, wheelchair transfers, and transportation skills. The therapist should aid the patient in developing independence and perhaps recommend aids to assist in independent functioning. The vocational rehabilitation counselor skilled in working with the spinal cord-injured may also be of considerable assistance in developing alternatives for equipment and aids.

**Vocational Guidance and Counseling**
Vocational counseling should not pressure the client in any one direction but rather help the client begin to explore alternatives and develop a realistic orientation toward avocational and vocational tasks. The goal here is not job placement, but to instruct the client in career-decision making and help the client understand that there are alternatives to look forward to after hospital discharge.

Attention should also be paid to avocational pursuits. Leisure time and recreational activities can have a significant and very positive bearing on future vocational potential. Helping the client even at this early stage to pursue constructive activities can lay the foundation for positive psychological outcomes as well as positive vocational rehabilitation outcomes.

As the patient passes through the acknowledgement stage into the adaptation phase, more attention can be paid to specific vocational tasks such as vocational goal-setting, job-seeking skills training, vocational evaluations, and assessment of vocational training alternatives.

**Home Renovations**

During the initial rehabilitation phase, it is typically the responsibility of one of the rehabilitation-team members - usually the occupational therapist or rehabilitation professional - to review the patient's home environment for necessary renovations. The purpose is, of course, to assess the environmental or architectural restrictions to access with a wheelchair. If an individual is going to be encouraged to remain as independent as possible in activities in daily living, it is necessary to make these renovations so the patient does not remain dependent on others for routine daily care.

An architectural barrier free environment is created in one of two ways: by (1) renovating an existing structure so that it is free from architectural barriers, or (2) designing a home to be barrier-free prior to construction. Although the latter method is less costly, it should not be assumed that no additional cost is involved because the changes required win most certainly be expensive.

The areas to be considered in a renovation assessment are: steps; doorways; kitchen accessibility; bathroom accessibility; bathtub or shower accessibility; sink accessibility; light switches; floor coverings; walkways; driveways; and the child's playroom/adult exercise or game room. Also, electrical outlets should be a proper height from the floor to facilitate the wheelchair user.

With respect to steps, it is necessary to consider not only the front steps for entering the residence but also any steps from the street and driveway to the front door and any sunken rooms or raised thresholds throughout the house. All must be ramped for wheelchair access. The width of doorways and height of cabinets, sinks, and light switches are also critical. In the kitchen, it is often
necessary to lower cabinets and design them so that the wheelchair can be pushed under countertops at critical points to create a work area. Access to the stove, oven, refrigerator and food storage areas must also be considered. In the bathroom, the wheelchair patient must have space to turn the chair around and make wheelchair transfers to the toilet and have access to the sink. The toilet may require a raised seat and should have appropriate safety handrails installed. It is preferable to have a shower designed so the wheelchair can roll directly into the shower area or, at the very least, to have a specially designed bathtub for easy transfer from the wheelchair.

Floor coverings must be given careful consideration. For example, deep-pile carpeting impedes wheelchair progress and limits accessibility. The angle of incline on driveways and walkways must be carefully considered as well. Many individuals assume that any ramped area is satisfactory for wheelchair accessibility, but if the patient is unable to negotiate the level of the incline, the ramping of that surface becomes a waste of money.

Another consideration often left out in home renovation plans is an area to maintain exercise equipment and leisure time materials. The room needs to be large enough for full wheelchair accessibility and, most importantly, to accommodate equipment, yet remain as functional as possible. It is difficult for the wheelchair user to constantly put up and take down equipment for storage, so wherever it is practical and realistic, a room set aside for this purpose can be helpful and will enhance the maintenance and long-term development of the patient's future-care program.

See Table 3, Architectural Renovations providing more specific information on architectural renovations and the specific changes that must be considered.

**Mobility and Transportation**

Mobility and transportation cover two primary areas to be considered during the initial rehabilitation phase. Mobility refers to the patient's ability to move about within the natural environment with the aid of braces, crutches, wheelchairs, and/or any other equipment, which may be necessary. It is critical for the patient's long-term physical and mental health to maximize this mobility and independent functioning. Transportation takes mobility one step further by addressing the patient's ability to be transported from one area to another by motor vehicle. Assessments should be made early in the rehabilitation phase as to whether or not the patient will ever be able to drive a motor vehicle independently. Depending on functioning levels, by level of lesion, many spinal cord injury patients can operate a vehicle independently and safely with the aid of special vans, wheelchair lifts, and hand controls.

The patient need not be limited to a single wheelchair or van as the sole means of independence and transport*. Dozens of different types of wheelchairs are
made to meet different needs. For example, the young or athletic spinal cord-injured patient should consider a variety of sports wheelchairs, as well as chairs for everyday use. It is relatively rare that more than two different chairs are necessary, but this depends in large part on the activities in which the patient engages.

*As a spinal cord injured person ages, their ability to make transfers decreases and they will require a van. For that reason, or as they develop deteriorating functions, transfers to an automobile are no longer practicable and a van may be required. Any person who requires a power wheelchair for mobility will require a van and a lift to accommodate this.*

**Table 3 – Architectural Renovations**

**DOORS**

Doors shall have a clear opening of no less than 32 inches when open and shall be operable by a single effort. Two-leaf doors are not usable by those in wheelchairs. Where possible doors should have kick plates extending from the bottom of the door to at least 16 inches up from the floor. The floor on the inside and outside of each door must be level for a distance of five feet. Sharp inclines or changes in level must be avoided at the doorsills. Door handles should be three feet six inches from the floor and horizontal lever bandies are preferred.

**ELEVATORS**

The elevator cab must be a minimum of five feet one inch deep by five feet six inches wide. The elevator doors must have density safety edges plus a sensing device to prevent closing while entering or exiting. Elevator controls should be no higher than four feet from the elevator floor.

**STAIRWAYS**

For those individuals ambulating with ankle-foot orthosis stairways must be illuminated at all times. The risers should be a maximum of five and three quarter inches high and the tread should be a minimum of 14 inches wide. Handrails should be 32 inches high and should be located on both sides of the stairs.

Ramps should be installed with a slope no greater than one-foot rise in twelve feet, or 8.33%. The ramp should have handrails on at least one side but preferably two sides and they should also be 32 inches in height. The ramp should have a surface that is non-slip and at the top as the ramp approaches a doorway it should have a level platform at least three feet deep and five feet wide. Each ramp should have six feet of clearance at the bottom and level platforms at thirty-foot intervals.

**WALKWAYS**

In educational facilities there should be at least one access without steps connecting facilities on campus. Pavement materials should be firm and nonskid. Any walkways over unlevel surfaces should conform to requirements for ramps.
(one foot rise in twelve feet). Gradings, manholes and any other impediments should not be located in walkways.

**CORRIDORS**

Corridors should be a minimum of five feet wide for wheelchair maneuverability.

**BATHROOM**

The toilet stall or area surrounding the toilet should be at least three feet wide. It should be at least four foot eight inches to five feet deep and if there is a doorway it must be 32-inches wide and swing out of the toilet. The toilet should have handrails on either side 33-inches high and parallel to the floor. The handrails should be one and a half inches in outside diameter and there should be at least one and one-half inch clearance between the rail and the wall. The toilet seat should be 20 inches from the floor. It is preferable that the toilet be wall-mounted.

**PARKING**

The width of a parking bay should be a minimum of nine feet. A ramp will be necessary if access from parking to the building has any changes in levels.

**SINKS**

A clear space below the sink should be a minimum of six inches above floor level. Faucet handles should be easy to operate (preferably lever handles). Hot water lines and drains underneath the sink need to be padded or shielded to protect the legs of the person in the wheelchair.

**SHOWERS**

Shower areas must be at least three feet by three feet to allow for maneuverability. The floor must be of a non-slip surface and if a curb must exist it should be no more than two inches above floor level. A ramped curb and/or wheel-in shower stall may be preferable. A shower seat positioned no more than 19 inches above the floor should be installed with handrails attached to the stall well opposite the seat and extending around the back of the wall. The water control, shower spray and soap tray should all be placed 3' 6' above the floor.

**KITCHEN**

Kitchen cabinets should be accessible preferably by having pullout drawers within each cabinet. At least one work space in the kitchen set-up similar to requirements for a sink should be included. Access to the stove must also be given consideration. If a laundry room exists off the kitchen or off the garage consideration must be given to access to the washer and dryer as well.

**DINING ROOM**

Entry to the dining room should conform to doorway requirements. There must be a 30-inch space from the floor to the undersurface of tabletops and if a table apron exists it must be recessed one foot. The width between the table and wall
should be 5 feet 6 inches or conform to corridor requirements.

**WATER FOUNTAINS**
The upper edge of the drinking fountain must be no more than three feet above floor level and controls and spouts should be located in the front. Water fountain controls should be hand operated.

**CONTROLS AND LIGHT SWITCHES**
No more than two light switches should be located on each plate and they should be positioned no more than three feet to three-and-one-half feet above the floor level. Electric outlets should be no less than 18 inches above the floor and controls for heat ventilation, windows, draperies, fire alarms and/or any other similar controls should be placed within the reach of individuals in a wheelchair (no more than 3 feet 6 inches above the floor).

**TELEPHONES**
In the instance where a public telephone is installed or a wall phone is necessary they need to be made accessible by making certain that the phone is no more than three feet six inches off of ground level. It is preferable that a push-button rather than dial set be used.

**FLOORS**
Floors shall have a nonslip surface and either should be level throughout or connected by a ramp. Floors that must be carpeted should not have a thick padding or thick pile, which would impede a wheelchair's progress.

**MIRRORS**
Mirrors in the bathroom should be placed so that the bottom edge is not more than three feet above the floor level.

The same concern should be extended to the purchase of transportation. Many paraplegics can function quite satisfactorily with hand controls installed in a two-door automobile. However, not all autos. are accessible and care must be given to choosing transportation that will allow the patient to bring the wheelchair into the auto without assistance. Where a van is necessary, there are a number of suppliers who provide excellent equipment including installation of hand controls, wheelchair lifts, and other items that enhance the safety and accessibility of the vehicle. (Table 5 provides additional information on transportation and hand control alternatives.)

To view part one of Table 4 “Functional Spinal Cord Levels”, click here (please see attached .pdf document “LCP2- Lesson 3- Initial Rehabilitation Program-Table 4- part 1- “Functional Spinal Cord Levels”)  
To view part two of Table 4 “Functional Spinal Cord Levels”, click here (please see attached .pdf document “LCP2- Lesson 3- Initial Rehabilitation Program -
Table 4- part 2- “Functional Spinal Cord Levels”
To view part three of Table 4 “Functional Spinal Cord Levels”, click here (please see attached .pdf document “LCP2- Lesson 3- Initial Rehabilitation Program- Table 4- part 3- “Functional Spinal Cord Levels”)
To view part four of Table 4 “Functional Spinal Cord Levels”, click here (please see attached .pdf document “LCP2- Lesson 3- Initial Rehabilitation Program Table 4- part 4- “Functional Spinal Cord Levels”)
To view part five of Table 4 “Functional Spinal Cord Levels”, click here (please see attached .pdf document “LCP2- Lesson 3- Initial Rehabilitation Program - Table 4- part 5- “Functional Spinal Cord Levels”)

To view Table 5, “Transportation: Equipment and Cost” click here (please see attached .pdf document “LCP2- Lesson 3- Table 5- Initial Rehabilitation Program- Transportation- Equipment and Cost”)