Rehabilitation of Spinal Cord Injured Patients

Miss Valerie Nuñez
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Rehabilitation of Spinal Cord Injured Patients

Definitions

Broad principles, practice and scientific basis

Rehabilitation of the spinal cord injured patient

History of Rehabilitation Issues
Rehabilitation

“Therapeutic program that focuses on recovering function”

(Standard Acute Care: Concentrates on identifying and curing the pathology.)
Definitions

**Preventative Rehabilitation:**
Designed to minimise the complications of inactivity that develop during a protracted curative process.

**Comprehensive Rehabilitation:**
Focuses on restoration of function.
Timetable for blending rehabilitation procedures with the curative program

<table>
<thead>
<tr>
<th>Curative Program</th>
<th>Rehabilitation</th>
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<tbody>
<tr>
<td>Emergency State</td>
<td>None</td>
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<tr>
<td>Critical Care</td>
<td>Preventative</td>
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<tr>
<td>Subcritical Stage</td>
<td>Preventative</td>
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<tr>
<td>Medically/Surgically Stable</td>
<td>Preventative</td>
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<tr>
<td>Protected Healing</td>
<td>Comprehensive</td>
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<tr>
<td>Healed</td>
<td>Comprehensive</td>
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Rehabilitation Programs
Preventative Rehabilitation

• **Skin Protection**
  
  Excessive pressure

  Sacral area

  Duration and Intensity of pressure

  2 hours
Rehabilitation Programs
Preventative Rehabilitation

• Contracture Prevention
  Lying posture
  Loss of Passive mobility
  Tissue stiffness
  Spasticity/Paralysis
  Preventative mobilisation
Rehabilitation Programs
Preventative Rehabilitation

• Patient Activation
  Mental Dulling
  Loss of Initiative
  Loss of muscle strength
  Cardiopulmonary deconditioning
Rehabilitation Programs

Preventative Rehabilitation

- **Patient Activation**
  - Deliberate Stimulation
    - Patient to assist in their self-care and turning in bed, and to sit up in a chair
  - Muscle strengthening
  - Cardiopulmonary reconditioning
  - Fibrous tissue mobilisation
  - Skin pressure relief
Rehabilitation Programs
Comprehensive Rehabilitation

Demands of Daily Living

1. Locomotion
2. Object Handling
3. Self-care
4. Bowel and Bladder continence
5. Cognition
Rehabilitation Programs
Comprehensive Rehabilitation

6. Communication
7. Social Adjustment
8. Psychological Stability
9. Recreation
10. Employment
Rehabilitation Programs

Comprehensive Rehabilitation

• Objectives and program planning
  Recovering optimum effectiveness
  Functional evaluation to identify deficits
  Expectations
  Realistic Goals
  Family participation

Ideal Goal: Recovery of full independence in each functional area
Second Objective: Develop a system of physical assistance which allows patient to return home
Rehabilitation Programs
Comprehensive Rehabilitation

• **The Multidisciplinary Team**
  
  Physician, nurses and allied health professionals (Physiotherapist, occupational therapist, speech therapist, social worker, psychologist, orthotist, prosthetist, recreational therapist, vocational counsellor and rehabilitation engineer.)

  Define level of healing of patient’s pathology

  Regular and open communication
Rehabilitation Programs
Comprehensive Rehabilitation

• The Rehabilitation Program
  Physical development
  Functional training
  Utilisation of specialised equipment

• Rehabilitation Site
  Inpatient/Outpatient care
Summary: Rehabilitation Principles

Apply to all types of protracted or permanent disability.

Program specifics vary with patient’s pathology. e.g.

Spinal cord injury - massive paralysis
Brain injury - cognition deficit
S.C.I. : Multisystem Paralysis

- Vertebral Instability
- Immediate integration of preventative rehabilitation into acute care program
- As spine fragility reduced, and physiological stability regained
- Initiate early stages of comprehensive rehabilitation
Multisystem Paralysis

i.e. CONTINUUM:

Equal emphasis on the Preservation and Development of Function.
Functional Preservation

Skin Care

2 hours
Log-rolling
Pillows
Specialised mattresses
Mechanical beds
38% incidence of pressure sores
Functional Preservation

2. **Chest Mobilisation**
   - Loss of chest expansion and coughing
   - Chest stretching early (manual/mechanical)
   - Glossopharyngeal breathing

3. **Bladder Protection**
   - Intermittent catheterisation
   - AUS/SARS
4. **Contracture Reduction**
   
   Early initiation of prophylactic range of motion
   
   Spasticity common
   
   Serial plaster casts
   
   Phenol blockade
   
   Operative lengthening/release of contracted muscle
Functional Potential

1. Neurological level of injury
2. Completeness of injury

Patient Classification

- Subclassification of quadriplegia and paraplegia
- Presence of effective strength in critical muscles (grade 3 min)
- Proprioception
Functional Potential

Physical Restoration

_____Strengthening of muscles available for function

Correction of contractors

Reduction of spasticity

Heterotopic Ossification
Functional Development

Locomotion

1. **Standing**: Sensation at the hips
   - Trunk control
   - Joint mobility sufficient for upright balance in KAFO
2. **Walking**: Quadriceps strength
   - Knee Proprioception
   - Freedom from hip flexion contractors
   - Arm control
Functional Development

• **S1-L5** Weak ankle plantar flexors and hip abductor/extensor muscles
  - Crutches
  - DFS/AFO

• **L3-L4** + quadriceps weakness
  - AFO + KAFO if paralysis sufficiently asymmetrical to preserve grade 4 strength on one side
Functional Development

- T12-L1
  Absent motor control and sensation at hips and distally

Swing-through gait
3. **Wheelchair Ambulation**

- Patient’s arm strength
- Independent control incl. managing curbs
- Paraplegic/Quadriplegic with C6 level function
- Electric wheelchairs for C5 or higher functional levels - Remote controls
Functional Development

4. Driving

Paraplegia/ low Quadriplegia capable of driving regular car

Hand controls substituted for foot pedals

Specially designed vans with automatic lift
Functional Development

Object Handling
Functional Development

Self-care, Writing, and Community Skills

C6 functional level

6 month program
Functional Development

Sexual Adjustment

S2-4 spinal cord segments

Anal reflex/Pin-prick sensation of perineum

Recreation

Employment
History of Rehabilitation Issues

1950’s

*Archives of Physical Medicine and Rehabilitation*

Research mainly in VA Hospitals

Stoke Mandeville program well established

Rehabilitation for SCI not focus for literature
History of Rehabilitation Issues

Last 40 years, three major phases in SCI Rehabilitation:

1. Building
2. Idealism
3. Practical Realism
History of Rehabilitation Issues

• **Evaluation of Outcome/Success**
  
  Attainment of Functional Gains
  
  FIM : no. hosp days = Efficiency Index

• **Responsibility of current health care crises**

• **Cost-effectiveness**
  
  Length of Hospital stay
  
  Readmission for inpatient rehabilitation, equipment and treatment of medical complications
History of Rehabilitation Issues

• **Research** - equipment and procedures
  little support proving effectiveness
  hope
• **Support Systems**
• **Major changes in Aetiology (NSCISC)**

<table>
<thead>
<tr>
<th>Time</th>
<th>RTA’s</th>
<th>Sports</th>
<th>Acts of Violence</th>
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<tbody>
<tr>
<td>Up to 1979</td>
<td>46%</td>
<td>14.6%</td>
<td>13.3%</td>
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<tr>
<td>1991-1994</td>
<td>35%</td>
<td>8.1%</td>
<td><strong>30.4%</strong></td>
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Conclusion

• Combination of intense curative and rehabilitative efforts
• Physical losses from paralysis = Psycosocial problems
• Re-entry into community living
• Disabilities Act (1990, USA; 1994, UK)
• Increasing responsibility, with decreasing resources
• Challenge to maintain and improve SCI programs
Thank You