

Spinal Cord Injury: Occupational Therapy & Outcome

**Jane Baumgarten, OT/L
Occupational Therapy
U.S.C.**

Neurological Classification of Spinal Cord Injury

Neurologic level - The lowest level at which key muscles are 3/5 and sensation is intact for this level's dermatome + the level above must be of normal strength and sensation. Diagnosed by the physician.

Functional Level

The lowest segment at which strength of key muscles are 3+/5 or above and pain sensation is intact.

Key muscles - those which significantly effect functional outcomes.

Acute Rehabilitation

- **Evaluation**
- **Psychological Support**
- **Prevention/correction of deformities and complications**
- **Engagement in meaningful activities**
- **Functional Improvements**
- **Strengthening and endurance training**

Important Principles

- Repetition
- Family/Caregiver Involvement
- Multi-Disciplinary Approach
- Kinesthetic Learning
- Practice, Practice, Practice

C1 – C4 Injuries

No upper extremity function
- (limited control of select
scapular muscles)

Functional Expectations

- **C1-C3 – ventilator dependent, C4 may require part time ventilator support.**
- **Dependent with all basic ADL, bowel & bladder management, bed mobility, & transfers.**
- **Independent power WC mobility**
- **Independently access home and community environment through the use of assistive technology**

Directing One's Own Care: Patient-Centered

- Promotes self-management
- Should be emphasized in all aspects of care & by all team members
- Facilitates autonomy

Mouthsticks

- Writing
- Painting
- Reading (turning pages)
- Board and Card games
- Computer Access

C5 injury

Add:

Biceps and Deltoids

Support and Positioning to Prevent or Correct Deformities

Protecting weak muscles with positioning/splinting

Functional Expectations

- **Independent eating with equipment following set-up**
- **Assisted to unable hygiene/grooming**
- **Dependent Bed Mobility**
- **Dependent Bed to WC Transfers**
- **Independent with written/digital communication with equipment, following set up**

Mobility

- **Independent power W/C propulsion in home and community**
- **Independent pressure relief with power tilt or recline**
- **Independent-Assisted with utilization of accessible public transportation**
- **Independent driving with highly specialized modified van with lift.**

C6 Injury

Add:

Clavicular Pectoralis

Extensor Carpi Radialis Longus

Serratus Anterior

Tenodesis Grasp

Passive opening of the fingers when the wrist is flexed and closing of the fingers when the wrist is extended (Wilson et al., 1984)

Wrist-Driven Wrist-Hand Orthosis

- Also: Tenodesis Orthotic, Flexor Hinge Orthotic
- Wrist driven
- Provides palmar/3-jaw chuck prehension
- Externally powered

Functional Expectations

C6 Injury

- **Independent to assisted feeding and hygiene/grooming**
- **Independent to assisted upper body dressing**
- **Assisted to dependent lower body dressing**
- **Independent to dependent bathing**
- **Independent (rarely) to dependent bowel and bladder management**

Functional Expectations (continued)

- **Assisted light meal preparation; dependent all other homemaking activities**
- **Independent with written/digital communication with equipment**
- **Independent power wheelchair propulsion. Independent manual wheelchair propulsion on level surfaces, assisted on uneven terrain**

C7 Injuries

Add:

Triceps

Latisimus Dorsi

Functional Expectations

C7 Injury

- **Independent feeding & hygiene/grooming**
- **Independent upper body dressing, independent to dependent with lower body dressing, bathing, bowel/bladder program**
- **Independent to assisted with light meal preparation; assisted to dependent other homemaking activities**
- **Independent written/digital communication**

C8 injury

Add:

Extrinsic hand muscles

Functional Expectations C8 Injury

- Independent to assisted with self care
- Independent to assisted home skills
- Independent to assisted transfers
- Independent written/digital communication
- Independent driving with equipment

Individuals with Paraplegia

T2-T7: Chest muscles

T8-T12: Abdominal muscles

L1-L5: Leg muscles

S2-S5: Bowel, bladder and sex

Functional Expectations Paraplegia

- **Modified independent to independent**
self care, transfers, transportation
- **Independent to assisted**
Homemaking activities

Skin Care

- **Persons with *paraplegia* are more prone to skin breakdown/pressure sores than persons with *tetraplegia*.**
- **Pressure Relief**
 - **1 minute for every hour; 1 second for every minute of sitting**
- **Skin inspection**

USC Pressure Ulcer Prevention Study

- **Lifestyle Redesign for Pressure Ulcer Prevention in Spinal Cord Injury**
NIH/NCMRR ##1R01HD056267, PI: F. Clark
- **RCT**
- **170 participants**
- **One year intervention, 2 years in the study**

Current Challenges

- **Shortened length of stay in acute rehabilitation**
- **Equipment: funding and procurement**
- **Insurance companies**

Summary

- **“Modify your lifestyle to accommodate your new reality”**
- **“Listen to your body and adopt a program that avoids the strain”**