

# ADL performance in individuals with cervical spinal cord injury after reconstructive hand surgery

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## Conclusion

The KB ADL Scale can capture significant changes in self-care after hand surgery. Both one- and bimanual tasks improved and assistive devices were discarded in relation to the performed reconstructive hand surgery.

### Introduction

Rehabilitation after a cervical spinal cord injury (SCI) is a lifelong process that requires a reorientation toward nearly every aspect of daily life. For persons with tetraplegia the loss of hand function poses a significant functional deficit and a major impairment in activities of daily living (ADL).

#### Reconstructive hand surgery

Reconstructive hand surgery can restore lost arm and hand function for individuals with tetraplegia and influence the ability to perform self-care for cervical SCI persons.

#### Purpose

The purpose of the study was to evaluate whether changes in SCI patients' daily activities can be influenced by reconstructive hand surgery and subsequent rehabilitation.

### Methods

71 persons with the level of injury between C5-C8 who undergone reconstructive hand surgery were divided into two groups:

- ⇒ Elbow group (n=24, including 18 with hand operations)
- ⇒ Hand group (n=47, only hand operations)

They were interviewed with Klein-Bell ADL Scale before and 12 months after the procedure.

#### Statistical analysis

Rang invariant Method describe and analyse group related changes, relative position (RP) & relative concentration (RC) separate from individual changes relative variance (RV).

### Results

The overall results of the study showed that significant changes pertaining to self-care can be measured with the Klein-Bell ADL Scale in connection with reconstructive hand surgery.

#### Elbow group:

- ⇒ increased range to reach to perform activities
- ⇒ Improved grip function in single handed activity

#### Hand group:

- ⇒ Increased ability to perform fine motor activities
- ⇒ Improved grip function in single-handed and bimanual activities

Elbow group n=24

Results

Hand group n=47

Overall fewer items were significant in RP, RC and RV in the elbow group. There were many non-significant items in mobility and hygiene over the limit of 0.1 that showed a change in activity at both group levels and individual level.

Overall significant group change measured with RP was more frequent in the hand group than in the elbow group.

#### Group change (RP)

Bladder management  
➢ Transfer toilet

Hygiene - Shower  
➢ Wash back body  
➢ Dry back body

Eat  
➢ Grasp fork/spoon  
➢ Eat

Mobility - transfer cars  
➢ Open & close car doors

#### Group change (RC)

Dressing  
➢ Put on shirt/jacket  
➢ Bring collar to neck

#### Individual change (RV)

Shower  
➢ Mobility on uneven surface



Individuals in the hand group more than in the elbow group seems to have been able to focus on becoming independent in activities which involve integrity, such as emptying the bowel, eat, brush teeth, shave & shower even if they had access to personal assistance.

#### Group change (RP)

##### Bowel management

- Emptying bowel (suppository)
- Reach, & wipe anal area
- Pull & fasten pants

##### Hygiene - Shower

- Apply water to body (shower)
- Grasp soap/wash cloth

##### Brush teeth

- Put toothpaste toothbrush
- Brush teeth
- Release toothbrush

##### Shave

- Grasp shaving device
- Bring shaver to face
- Release shaver
- Apply shaving aids

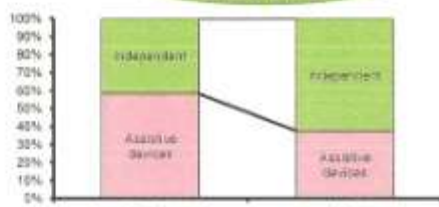
##### Dressing

- Zip zipper in pants
- Fasten cuffs
- Zip zipper in jacket

##### Eat

- Grasp knife
- Grasp fork/spoon
- Cut food
- Eat

### Elbow group

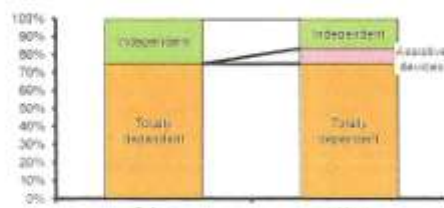


Using the fork (n=24)

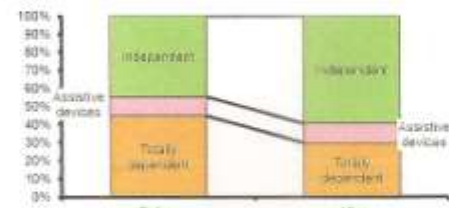
### Hand group



Using the fork (n=47)



Using the knife (n=24)



Using the knife (n=47)