Assistive Technology for Persons with Spinal Cord Injury

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Spinal Cord Injury & Disorders Center

VA Palo Alto Health Care System

SCI|D
Spinal Cord Injury/
Disorders Center

Veterans Affairs Health Care System

- VA – US Cabinet Department for Veterans Affairs
- VHA – The Veterans Health Administration is America's largest integrated health care system, providing care at 1,293 health care facilities, including 171 medical centers and 1,112 outpatient sites of care of varying complexity (VHA outpatient clinics), serving 9 million enrolled Veterans each year.
- VA's Spinal Cord Injuries and Disorders (SCI/D) System of Care provides a coordinated life-long continuum of services for Veterans with a spinal cord injury or disorder. VA serves Veterans in a convenient and connected network that delivers care for each phase of life.
- SCI/D does not have to be related to military service or combat.

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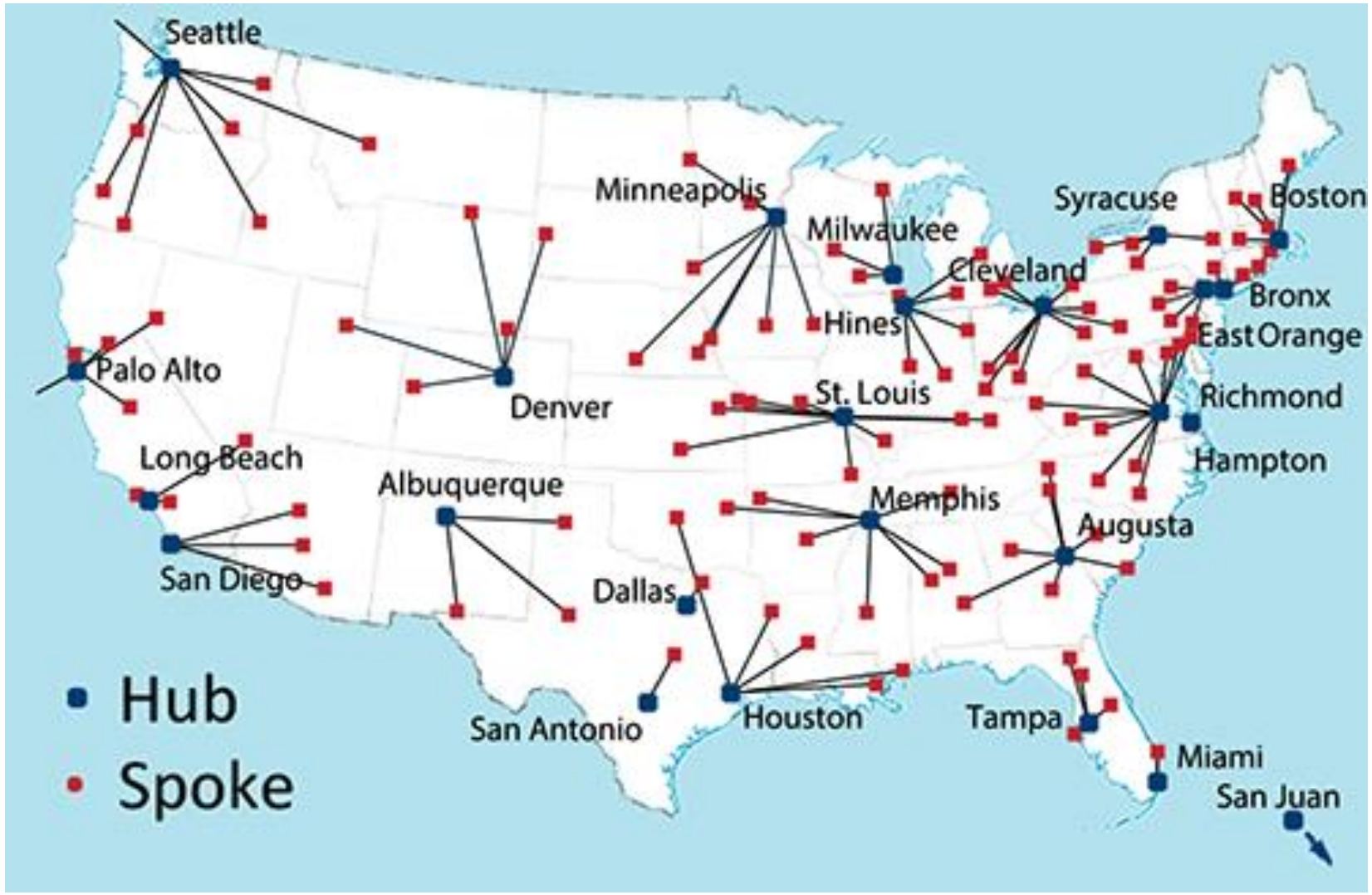
VA SCI/D System of Care – 25 Hubs



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VA Palo Alto Health Care System

- Provides to >1000 Veterans with SCI/D
- 5 Spokes – San Francisco, Fresno, Sacramento, Reno, Hawaiian Islands & Pacific Rim
- Lifelong Comprehensive Care – Physicians, nursing, Therapy (Physical, Occupational, Recreation), Psychology, Social Work, Dietary, Pharmacy
- Care Settings - Inpatient, Outpatient, Homecare, Telehealth
  ***COVID-19 resulted in expanded care by Telehealth*

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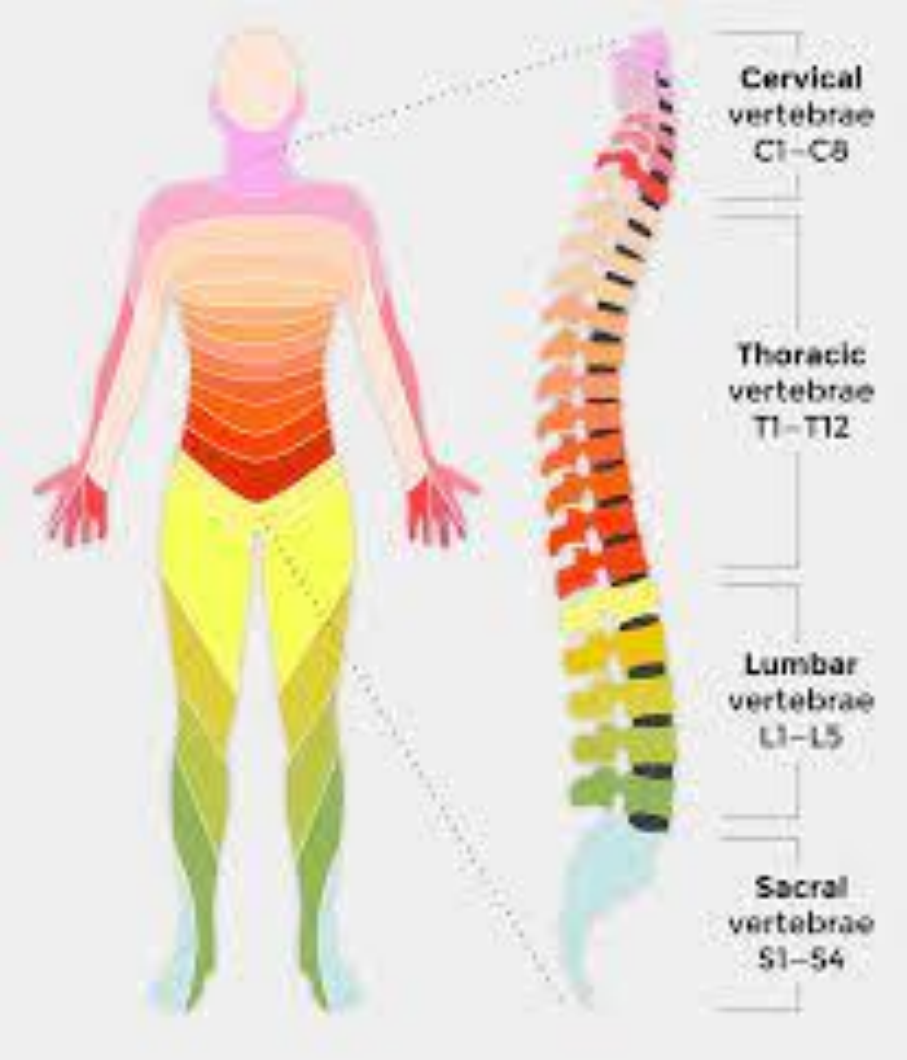
Spinal Cord Injury & Disorders (SCI/D)



- SCI/D – Damage to the spinal cord, may be traumatic or non-traumatic; can be caused by disease or medical disorder
- Designated by neurological level of function
- Tetraplegia/Quadriplegia – Upper & Lower extremities
- Paraplegia – Lower extremities
- Motor and Sensory Effects
- Complete or Incomplete
- 80% male

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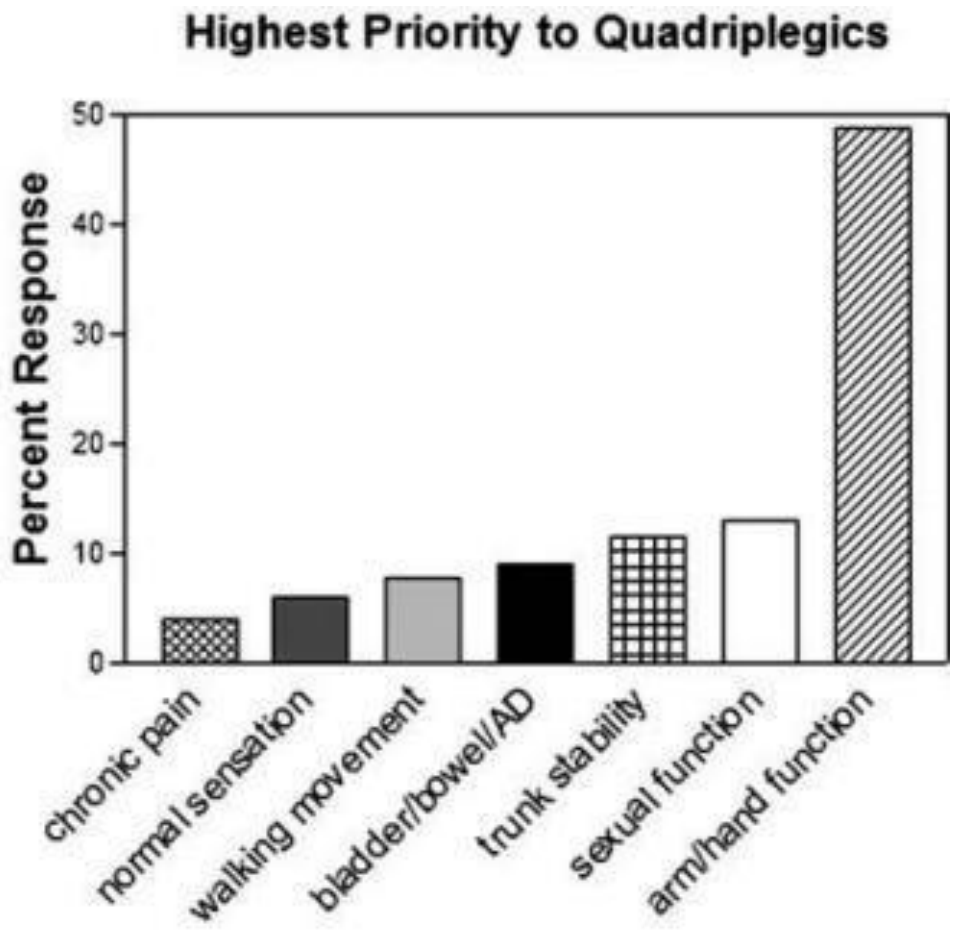
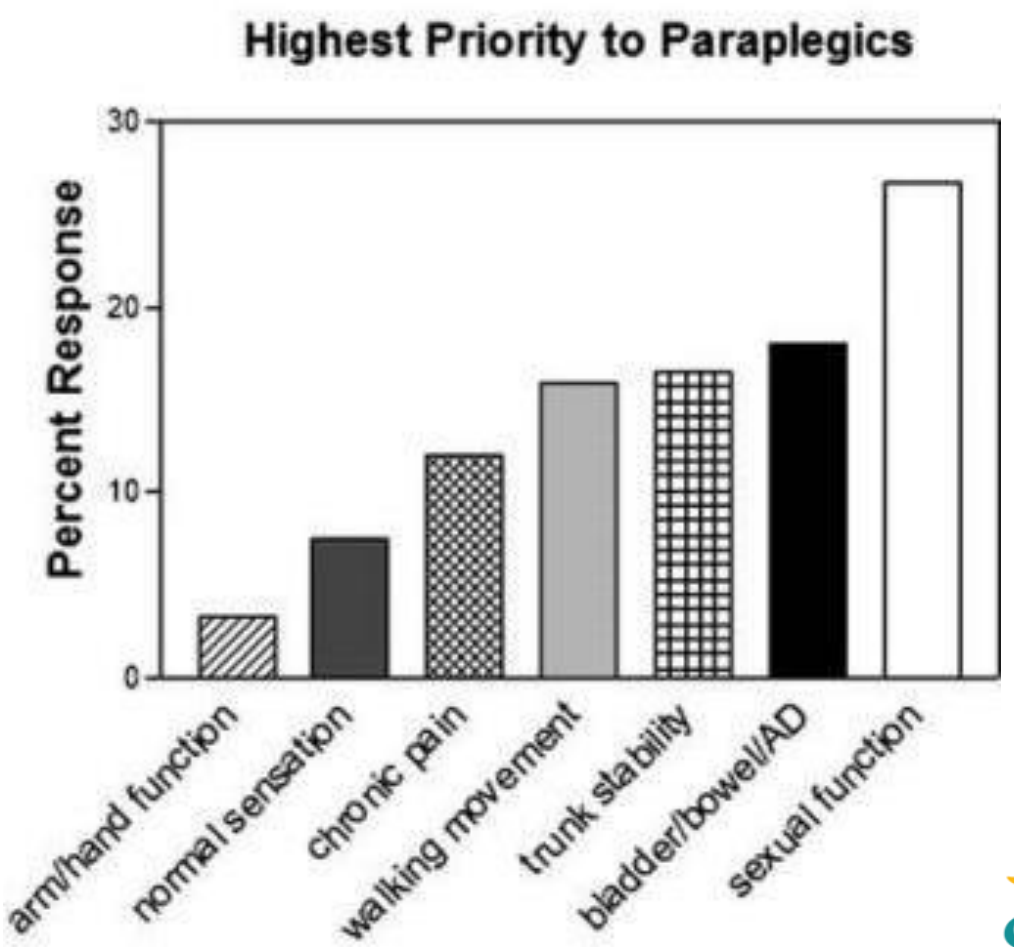
Recovery Priorities





Anderson KD. Targeting recovery: priorities of the spinal cord-injured population. J Neurotrauma. 2004;21(10):1371-83.

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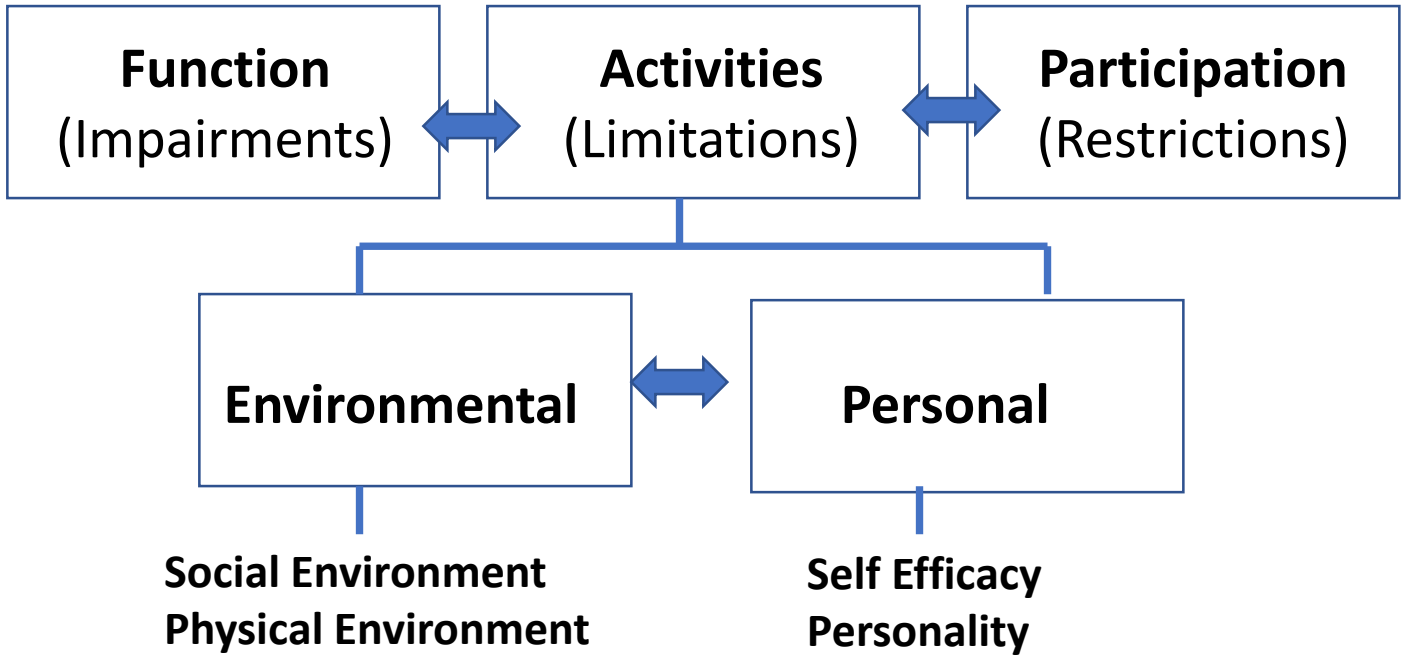
World Health Organization International Classification of Functioning, Disability & Health (ICF)



Leveraging Technology for Active Lifestyles

Creative Designs to Overcome Loss of Hand Function

https://quadtools.com/collections/all
https://youtu.be/Z-9HCYQtAQk

VA Palo Alto SCI Assistive Technology Lab


Waya Health


Waya Health

AutonoME - Environmental Control Unit

autonoME ECU/SGD tablet

All in One microphone/
sip and puff system

Floorstand

autonoME
command center

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AutonoME - Environmental Control Unit

Voice
The autonoME features a microphone so it can be controlled with vocal commands.

Touch
Individuals with use of their hands can operate the autonoME using its capacitive touch screen.
.

Sip and Puff
The sip and puff switch operates using a straw which allows users to activate the ECU / SGD switch by sipping and puffing to move across and down the screen.
.

Eye Tracking
Equipped with Eye Gaze, the autonoME's commands can be activated by the user's eyes. A camera tracks the pupils to move the cursor up, down, left and right.

Head Tracking
This feature works much like Eye Gaze, tracking the movements of the user's head to control the curser.

Bed - lights - phone - internet

Power Assist Wheelchair - Technology

Quickie
Xtender

NEXT
Tailwind

Frank Mobility
Emotion

Wheelchair - Technology

Mobius Mobility –iBOT Wheelchair

LEVO - Mobile Manual Standing Wheelchair

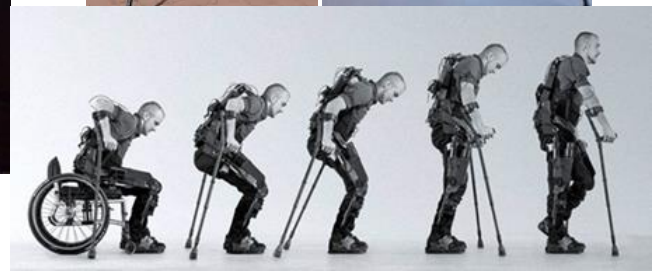
Multi-Purpose Arm Cycle Ergometer (M-PACE)


BATH
IN USE

Exoskeletons

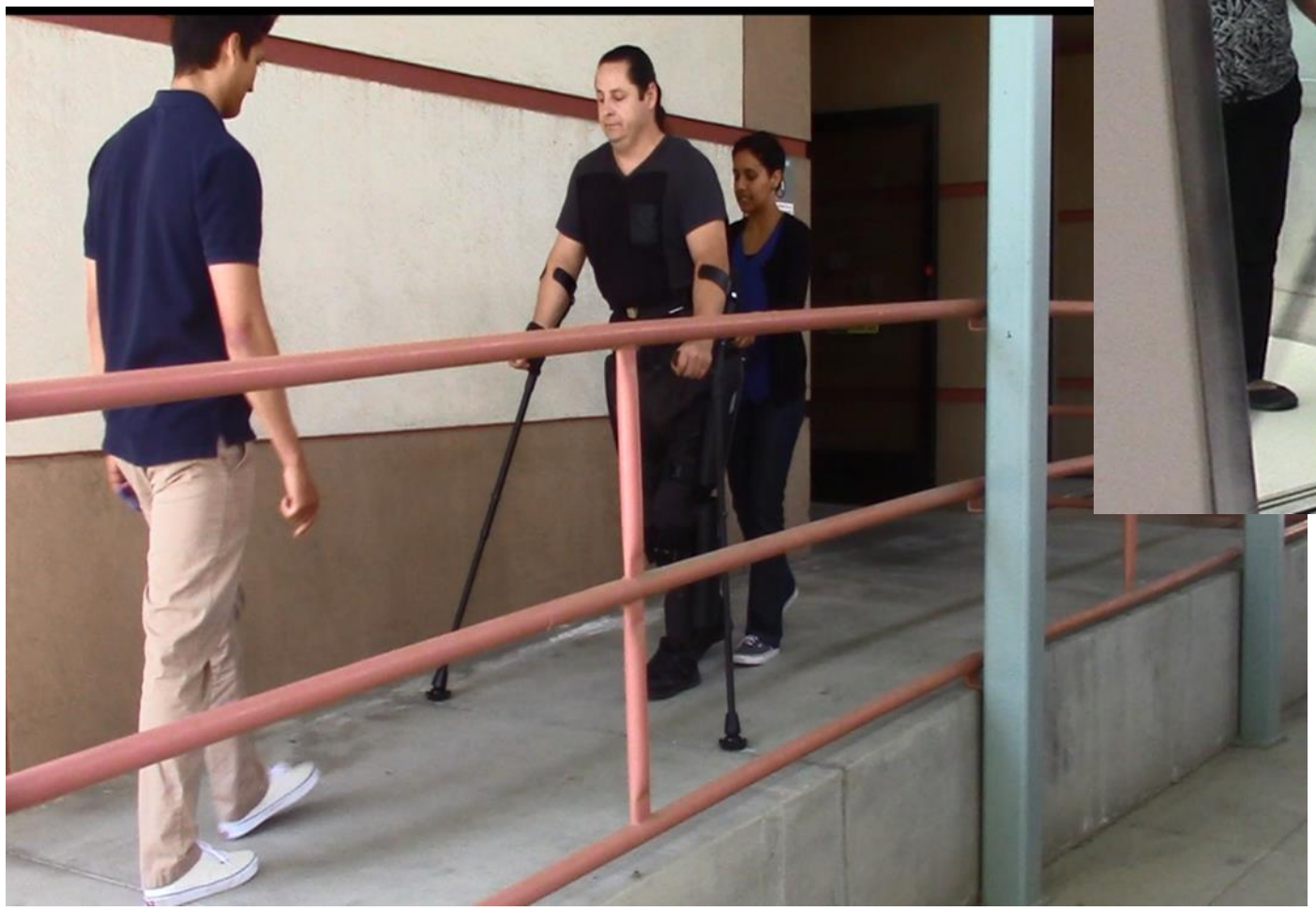
Then...

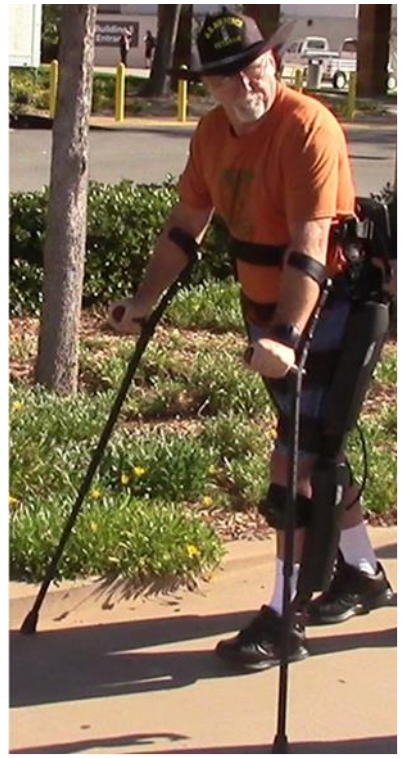
Now...



Future...

Futuristic…





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Available and Emerging Technologies

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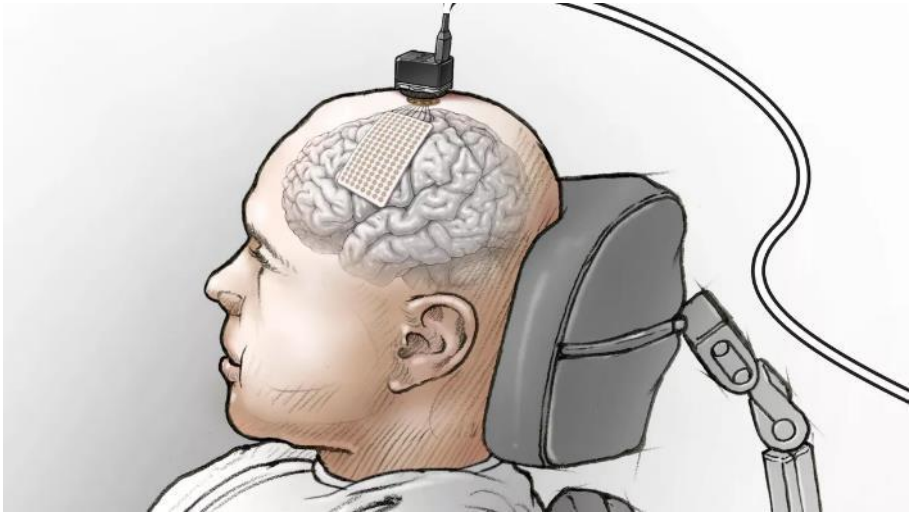
JACO – robotic arm with three-fingered hand

Brain Computer Interface

https://news.uci.edu/files/2015/09/walk_cropped-768x1134.jpg



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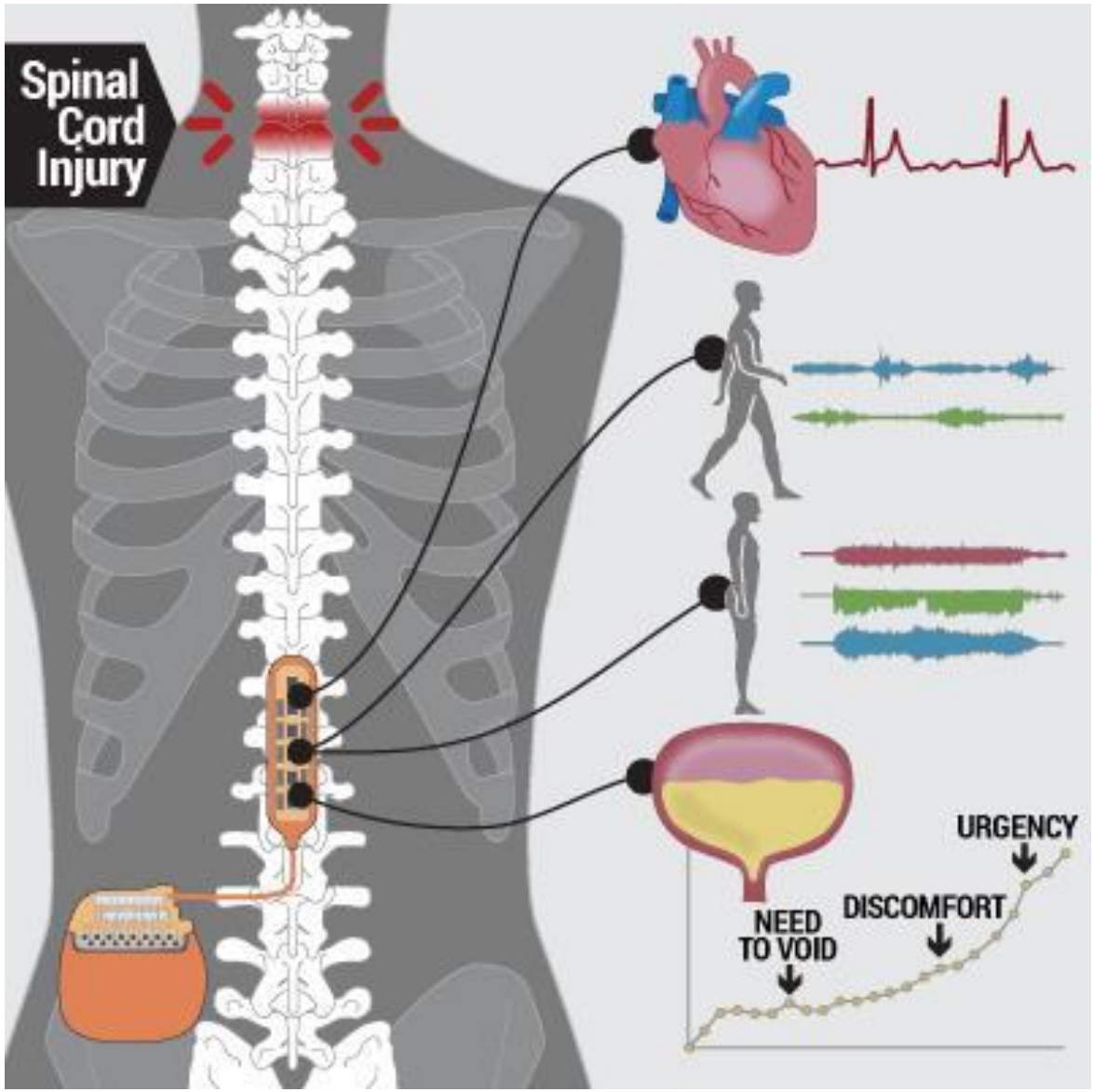
Spinal Cord Epidural Stimulation

http://depts.washington.edu/moritlab/wordpress/wp-content/uploads/2018/07/Researchmatters-600x400.jpg



https://www.frontiersin.org/image/researchtopic/11075