

Solution to Complex Drive Systems with the ALS Population

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GIVING LIFE TO POSSIBLE

Disclosure

- ▶ Pam Glazener
 - ▶ No conflicts to disclose
- ▶ Gina Strack
 - ▶ Independent rep for ASL and Star cushions.

Learning Objectives:

- ▶ Discuss two situations when modified proportional controls are indicated for ALS patients based on the disease progression.
- ▶ List two specific features of modified proportional control system for the ALS patient
- ▶ Discuss two situations when non-traditional drive controls are indicated for ALS patients based on the disease progression.
- ▶ List two specific features of non-traditional drive control system for the ALS patient.
- ▶ Discuss two situations when non-proportional drive controls are indicated for ALS patients based on the disease progression.
- ▶ List two specific features of non-proportional drive control system for the ALS patient.

Overview of ALS

The background of the slide is white with abstract green geometric shapes on the right side. These shapes include overlapping triangles and polygons in various shades of green, ranging from light lime to dark forest green. The shapes are layered, creating a sense of depth and movement.

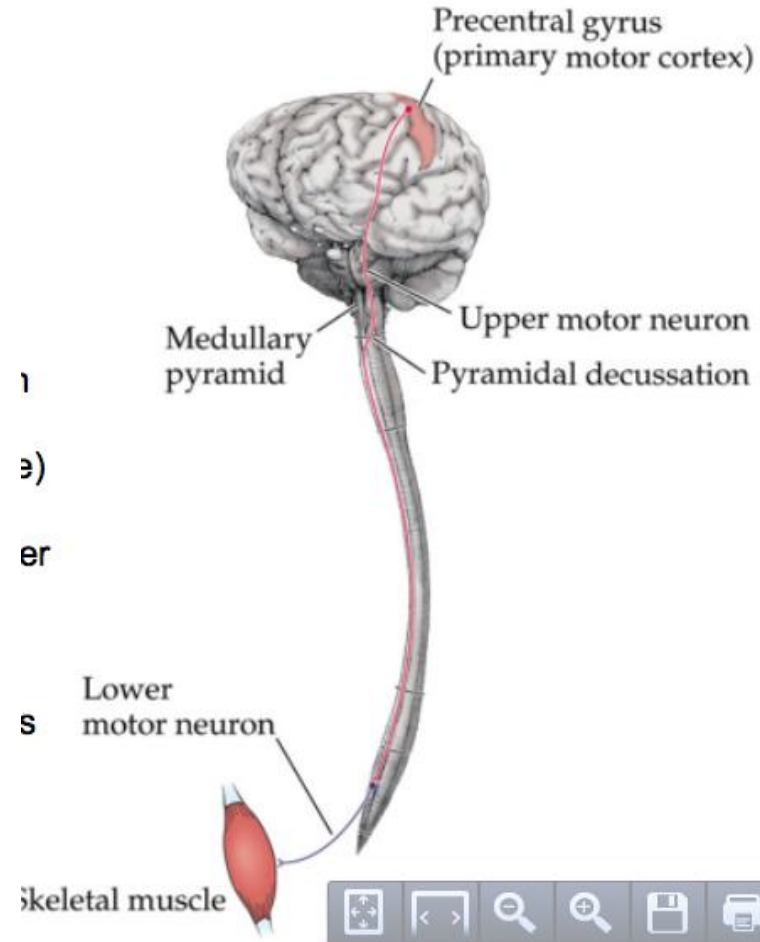
What is ALS?

- ▶ Amyotrophic Lateral Sclerosis (ALS)
- ▶ A motor neuron disease that affects upper and lower motor neurons at all levels of the motor tract in the brain and spinal cord.



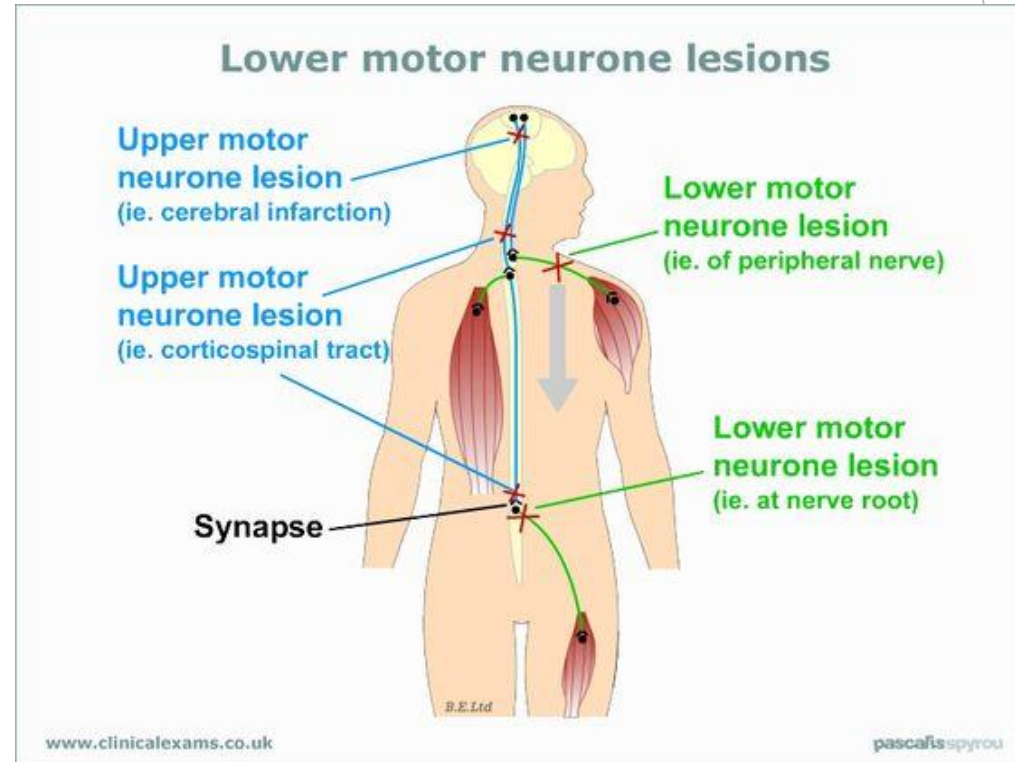
Upper motor neurons

- ▶ Upper motor neurons
 - ▶ Hyperreflexia
 - ▶ Weakness
 - ▶ Spasticity
 - ▶ + Clonus
 - ▶ Pathological reflexes
 - ▶ Babinski, Hoffman sign
 - ▶ Pseudobulbar
 - ▶ Emotional lability



Lower motor neurons

- ▶ Weakness
- ▶ Muscle atrophy
- ▶ Hypotonia
- ▶ Fasciculations
- ▶ Hypo reflexia



ALS

- ▶ Progressive, neurodegenerative disease
- ▶ As the motor neuron dies, muscle weakness and atrophy occurs
- ▶ Affects skeletal muscles: arms, legs, trunk, diaphragm and /or oral-pharyngeal complex



ALS

- ▶ 2:1 ratio of men : women
- ▶ Average age range of onset: 53-57 years of age
- ▶ Life expectancy averages 3-5 years; but can be quite variable
- ▶ 90% sporadic ALS
- ▶ 10% familial ALS (SOD 1 gene, C9-Orf)
- ▶ Affects all races
- ▶ Etiology is unknown
- ▶ Death is usually related to respiratory complications

Does ALS affect everyone the same way?

NO

- ▶ Initial symptoms are extremely variable in different people
- ▶ Rate of progression is variable in different people

Impact on the body

- ▶ Decrease in strength
- ▶ Decrease in function
- ▶ Nutrition (increase in metabolism)
- ▶ Communication
- ▶ Breathing
- ▶ Cognition (FTD)

Potential complications

- ▶ Falls
- ▶ Deep vein thrombosis / pulmonary embolus
- ▶ Pressure sores
- ▶ Aspiration/pneumonia

ALS Clinics

- ▶ Approximately 15-20 new diagnosed patients a month
- ▶ Follow up with each patient every 3-4 months
- ▶ Average 40-50 patients monthly at clinic
- ▶ Follow approximately 300-350 ALS patients

Ordering equipment

- ▶ “Sooner rather than later” is important
- ▶ Anticipate patient’s needs, they will be changing
- ▶ Order with capability to adapt as needed.
- ▶ Coordinate services with DME providers to expedite ordering delivery
- ▶ Think “outside the box”

Standard power wheelchair

- ▶ Permobil F3, F5, M300 and Quantum Q6 Edge 2.0
- ▶ Power recline
- ▶ Power tilt
- ▶ Power recline
- ▶ Power legs (center mounted)

Initial symptoms

- ▶ Lower limb onset
 - ▶ Approximately 90% maintain use of joystick
 - ▶ Bilateral thigh guides
 - ▶ Air cushion
 - ▶ Adjust for sacral sitting
- ▶ Bulbar onset
 - ▶ Head drop
 - ▶ Respiratory compromise

Initial symptoms

- ▶ Upper limb onset
 - ▶ Switch driver
 - ▶ Head array
 - ▶ Remove forward/reverse from head rest due to neck weakness
 - ▶ Possible future single switch driver
 - ▶ Bilateral gel arm pads with elbow blocks
 - ▶ Accu-Trac motors

Mr. H Trial

- ▶ 45 y/o diagnosed in 2014
 - ▶ Vocation: High school football coach
 - ▶ UE strength
 - ▶ 2/5 grossly except Lt distal 0/5
 - ▶ LE strength
 - ▶ RLE 3-/5 LLE 2/5 grossly
 - ▶ Trial
 - ▶ F3
 - ▶ Standard joystick
- ▶ (case study video)

MR. H

Permobil F3

- ▶ Power tilt/power recline/power legs
- ▶ Seat elevator
- ▶ ASL head array
- ▶ Enhanced display
- ▶ Upgraded tracking
- ▶ Gel arm pads
- ▶ Air cushion
- ▶ Stealth 10" with bilateral swing away facial pads for switch placement

Mr. S

- ▶ 42 y/o diagnosed Jan 2013
- ▶ Wheelchair Oct 2014
- ▶ Has 3 young boys, very active
- ▶ UE strength
 - ▶ RUE: 0/5 strength
 - ▶ LUE: proximal 1/5, distal 2-/5
- ▶ Permobil C300
 - ▶ Enhanced display
 - ▶ Micro-lite joystick
 - ▶ Gel arm pads
 - ▶ Left lateral swing away for mode switch



Mr. S

▶ (Video)

Mrs. R

- ▶ 48 y/o diagnosed 2011
- ▶ Wheelchair ordered 2015
- ▶ Strength
 - ▶ Shoulders 1/5, bicep 2-/5, finger flex 2/5
 - ▶ LEs: 1/5 grossly
 - ▶ Increased tone throughout
- ▶ Permobil M300
 - ▶ Enhanced display
 - ▶ Compact lite joystick with dome switches
 - ▶ Gel arm pads
 - ▶ ICS box with levers
 - ▶ Air cushion

Mrs R

▶ (Video)

Pastor Bill

- ▶ 66 y/o diagnosed in 2007
- ▶ 1st wheelchair 2009
- ▶ UE strength:
 - ▶ Proximal strength 2-/5
 - ▶ Distal strength 3-/5
- ▶ Permobil C300
 - ▶ Standard joystick
 - ▶ ICS box with levers

Modification: wood ball to mimic micro lite joystick throw



Pastor Bill

▶ (video)

Non-traditional proportional drive controls

- ▶ Chin controls
 - ▶ Micro extremity control
 - ▶ Mini compact joy stick
- ▶ Mounts
 - ▶ Harmonic mounts
 - ▶ Swing away mount
 - ▶ Harness
- ▶ Foot controls

Mr. A

- ▶ 64 y/o diagnosed in 2003
- ▶ First wheelchair ordered 2005
- ▶ UE/LE Strength: 0/5
- ▶ Neck strength: 3/5
- ▶ Permobil C300
 - ▶ Micro pilot with swing away chin mount on stealth head rest
 - ▶ Left swing away for mode proximity switch
 - ▶ Chest strap
 - ▶ Elbow blocks with gel arm pads
 - ▶ Enhanced display



Mr. A

▶ (Video)

Pastor K

- ▶ 56 y/o diagnosed 2006
- ▶ Bulbar onset
- ▶ Wheelchair in 2014
- ▶ Permobil M300
 - ▶ Enhanced display
 - ▶ Compact lite joy stick
 - ▶ Gel arm pads with elbow blocks
 - ▶ Now drives with foot



Pastor K (foot proportional control)

▶ Video)

Pastor K (standard joy stick)

▶ (Video)

▶ (Video)

Non-proportional drive controls

- ▶ 4 Switch ASL system
 - ▶ Atom module
 - ▶ Right and left proximity sensors with away head mounts
 - ▶ Proximity or microlight sensors for forward and mode change



ATOM MODULE

- ▶ The interface is combined within the ATOM Electronic Head Array for ease of access to the switch ports.
- ▶ The directional LED indicators help a clinician/provider see when a client is accessing a switch.

ATOM Module

- The important on/off switch is located for accessibility right on the back of the ATOM and can be accessed by the client with an additional switch.
- With the activation of a switch the ATOM Electronic can be used as a wireless switch interface for computer access, AAC devices.

Mr. F

- ▶ 60 y/o male
- ▶ Decreased tone
- ▶ Shoulder flex/abd 0/5
- ▶ Biceps Rt 1/5, Lt 2-/5

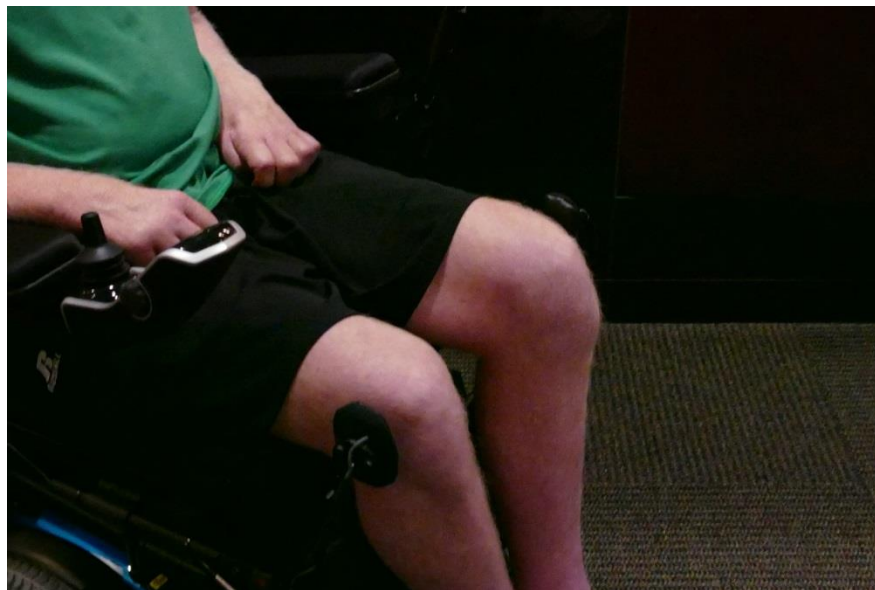


Mr. M

- ▶ 49 y/o male
- ▶ Diagnosed Dec 2014
- ▶ Multiple falls with injuries
- ▶ Increased tone
- ▶ Wheelchair bound
- ▶ 1/5 UE strength
- ▶ 1+/5 LE strength flex/ext
- ▶ 2/5 LE abduction/adduction
- ▶ 4/5 neck strength



Mr. M



Mrs M

- ▶ 49 y/o female
- ▶ Diagnosed July 2014
- ▶ Wheelchair assessed Oct 2015
- ▶ Multiple falls
- ▶ BLE: 3+/5
- ▶ BUE: 1-2/5
- ▶ Increased tone (LEs > Ues)

Mrs. M

▶ (Video)

Mrs. M

▶ (Video)

ASL hospital bed switch system

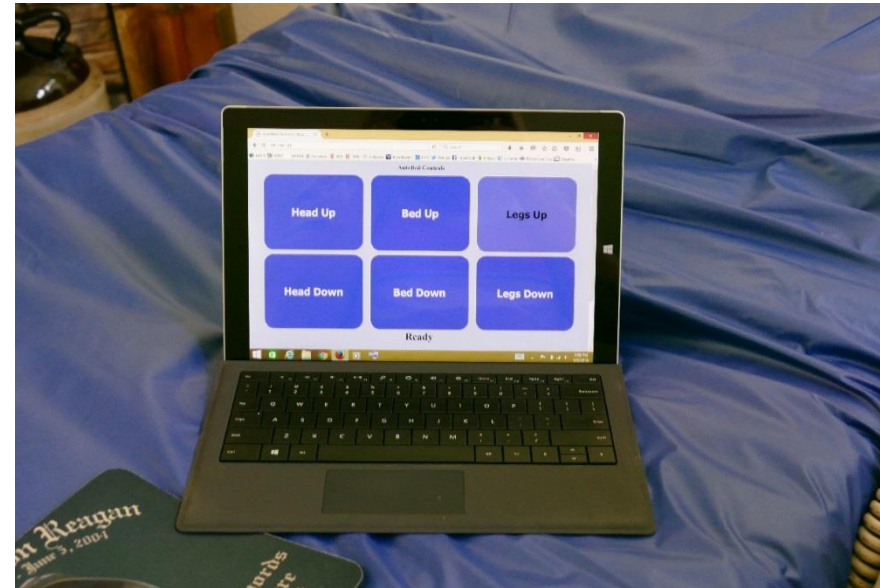
- ▶ Invacare beds
- ▶ Hill Rom Versa Care beds
- ▶ Hill Rom Care Assist beds

Hospital bed switch system

- ▶ Proximity switch system



Hospital bed switch system fiber optic / eye gaze



Mr. D

▶ (Video)

reference

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Thank you!

Questions?

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