Motor Disabilities

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CS 8803

Discussion Outline

- Definition
- General Statistics
- Types of Motor Disabilities
- Examples of disabilities, technologies
- ITA: Bonus Video

Definition

- Physical impairments that can impede movement, coordination, or sensation

CDC National Health Survey

- Difficulties in physical functioning
- Example of measures included:
  - Very difficult or cannot walk a quarter of a mile
  - Very difficulty or cannot grasp or handle small objects
  - Very difficult or cannot push or pull large objects
- For Adults aged 18 and over:
  - At least one basic actions difficulty or complex activity limitation: **74.8 million or 32.4%**
  - Unable (or very difficult) to walk a quarter mile: **17.1 million or 7.1%**
  - Any physical functioning difficulty: **36.2 million or 15.5%**

Selected characteristic	Any physical difficulty[1]
Total	15.2 (0.26)
Sex	
Male	12.6 (0.34)
Female	17.6 (0.36)
Age (years)	
18–44	5.4 (0.26)
45–64	19.4 (0.50)
65–74	29.8 (0.90)
75 and over	48.0 (1.16)

[1]"Any physical difficulty" consists of a "very difficult" or "can't do at all" response to at least one of the nine physical activities shown in the remaining columns.

CDC National Health Survey

- Based on the format of the survey results, CDC is trying to say: **strong positive correlation between age and motor disabilities**

Types: Breakdown

Traumatic Injuries

1. Spinal cord injury
2. Loss or damage of limb(s)

Congenital Conditions

1. Cerebral palsy
2. Muscular dystrophy
3. Spina bifida

Diseases – Onset correlated with age

1. Arthritis
2. Parkinson's disease
3. Essential tremor
4. Multiple sclerosis

Diseases – Still a mystery

1. ALS (Lou Gehrig's Disease)

Source: WebAIM (http://webaim.org/articles/motor/)

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Spinal Cord Injury

- Can result in paraplegia (paralysis of legs) or quadriplegia (paralysis of all 4 limbs)
- Average age at injury: **31.7 years**
- The leading causes of spinal cord injury are as follows:
  - motor vehicle accidents: 44%
  - acts of violence: 24%
  - falls: 22%
 - sports: 8%
  - other: 2%
- Percent male patients: **75%***

*Do you think the gender statistics affect design & development of AT? Why or why not?

Cerebral Palsy

- Symptoms generally appear in early childhood

- Common characteristics include muscle tightness or spasm, involuntary movement, and impaired speech

- Video, example technology: **the Eye Harp*, a musical instrument controlled by eye tracking technology**

*Thoughts? Have you developed or are currently developing similar technology?

https://www.youtube.com/watch?v=KKfNGGS5yCM
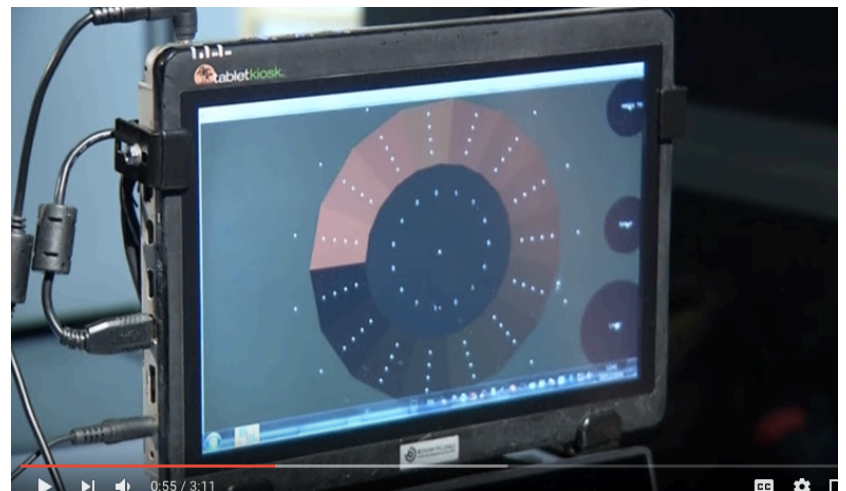
DBS for Parkinson's Disease

- Deep Brain Stimulation (DBS) implant delivers electrical stimulation to targeted areas to block abnormal nerve signals associated with PD*

- Cannot cure or stop progression of PD

*When do you consider it ethical to surgically implant assistive technology – particularly in the deep brain?

Deep Brain Stimulation

Lead

Electrode

Thalamus
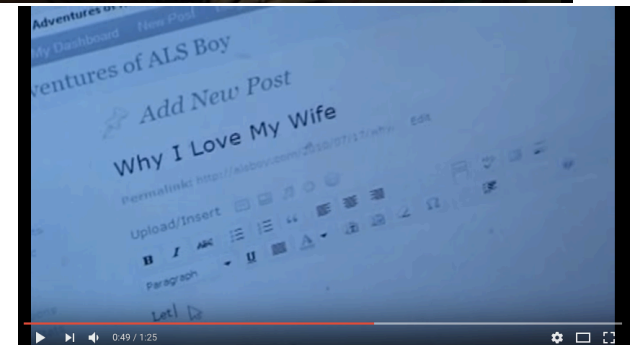
Extension

Pulse Generator
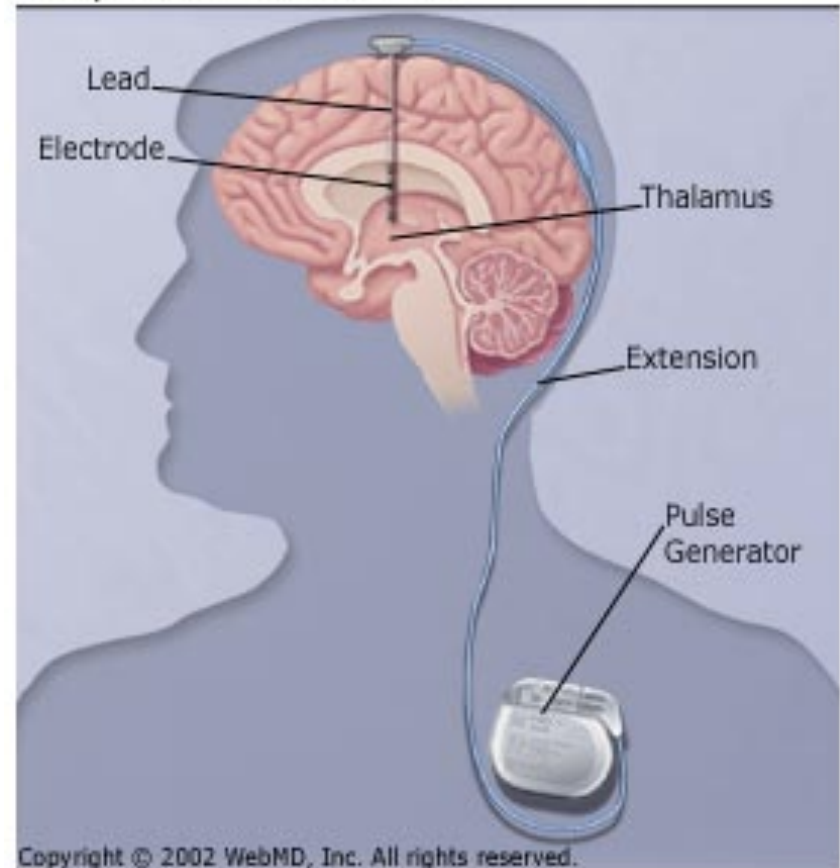
ALS

- Progressive neurodegenerative disease that affects nerve cells in the brain and the spinal cord
- Video, example technology: Low tech communication and interdependence*

*From surveys see that despite the numerous hi-tech options available (most developed from in-lab research), most individuals rely on low-tech forms of communication because they are affordable and reliable. **Is it your responsibility as a researcher to ensure your accessibility technology research is *accessible*?**

https://www.youtube.com/watch?v=z7Io0XuxywY

Any other questions or comments?

Bonus

- https://www.youtube.com/watch?v=f31m5-5-xUY *
- ***Why are dogs perfect?**