



SWITCH ASSESSMENT, PART 1:

DETERMINING THE BEST SWITCH TYPE AND LOCATION FOR CLIENTS WITH MUSCLE WEAKNESS

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What are we covering?

Assessment considerations

Switch Types

Switch Placement

Case Study

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Assessment Considerations

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Assessment Considerations

- How does muscle weakness impact access?
 - Active range of motion or travel distance may be limited
 - Activation force is limited
 - Endurance is limited
 - Impacts repeated switch activations
 - Impacts force available over time
 - Impacts sustained force for driving PWC




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Assessment Considerations





- What diagnoses are characterized by muscle weakness?
 - Pediatrics:
 - Spinal muscular atrophy (SMA)
 - Duchenne muscular dystrophy
 - Congenital Myopathy
 - Other dystrophies
 - Adult
 - ALS
 - Other dystrophies



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Assessment Considerations

	Determine where the client has movement	
	Determine how likely that movement will persist or be spared	Based on movement typically spared in this diagnosis
	Determine how much force the movement has	
	Determine how much endurance the movement has	Repeatability (i.e., scanning) Sustained force (i.e., PWC)

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Let's get Practical!

- Think of a client you are working with
- As we move through the webinar, think of **where** you may try and place a switch and **what type** of switch for access to assistive technology

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Ideal Switch Site




- An ideal switch site uses:
 - small movement
 - isolated movement
 - volitional movement
 - controlled activation
 - sustained pressure
 - controlled release
- Let's take a closer look!

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An ideal switch site uses:

- **A small movement**
 - This is not typically a problem for people with muscle weakness
 - The movement may only be possible, however, if the area is well supported
 - i.e., to support small finger movements, the forearm and hand may need support



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An ideal switch site uses:

- **An isolated movement**
 - This is not usually an issue for clients with muscle weakness
 - Movement does not typically result in overflow

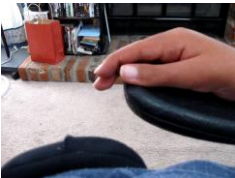


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An ideal switch site uses:

- **A volitional movement**
 - This is also not typically an issue
 - Non-voluntary movements are uncommon in muscle weakness



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An ideal switch site uses:

- **Controlled activation**
 - Activation travel
 - Reduced travel
 - Activation pressure
 - Reduced or no pressure
 - Speed
 - May be impacted by weakness
 - Accuracy
 - May be impacted by weakness




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An ideal switch site uses:

- **Sustained pressure**
 - In power mobility
 - Fatigue issues




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An ideal switch site uses:

- **Controlled release**
 - Timing (particularly in power mobility)
 - Consistency
 - Some people with muscle weakness have difficulty with release as they stabilize against the switch



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Questions?

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Switch Types

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Switch Types

- Mechanical
 - activation pressure
 - travel
- Electrical
 - no pressure
 - travel often required
 - less feedback



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Mechanical Switches


- Plate
- Light Touch Plate
- Not usually appropriate for clients with muscle weakness
 - Large plate switches
 - Lever
 - Pneumatic

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Plate Switches

- AbleNet
 - Jellybean
 - Specs
 - Buddy Switch
 - Formerly Tash
 - Takes more pressure than Jellybean


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Plate Switches

- Adaptation/Origin
 - Orby Switch



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Plate Switches

- Enabling Devices
 - Gumball
 - Mini Gumball
 - Compact



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Plate Switches

- Stealth Products
 - Mo-vis Twister switches
 - Light force



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Light Touch Plate Switches

- AbleNet Microlite
 - Personalize with Color
 - Also available through Stealth Products
- ASL
 - Ultra Light switch
 - Extremely light touch
 - Various color strips for top
 - 2 tap holes

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Light Touch Plate Switches

- AbleNet Plate Switch
- Adaptation Pal Pads
- AMDi
 - Moon Switch



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Light Touch Plate Switches

- Enabling Devices
 - Mini saucer



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Electronic Switches

- Proximity
- Fiberoptic
- Infrared
- Touch
- Sensor
- Piezo Electric Film (detects vibration)

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Proximity Switches




- AbleNet Candy Corn
 - Big and Little
 - Battery
- Adaptation HoneyBee
 - Battery
 - Adjustable range



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Proximity Switches - adjustable

- Arrays and single switch versions
 - Adaptive Switch Laboratories (ASL)
 - AMDi
 - Stealth Products i-Connect
 - Mo-Vis
 - Switch It!

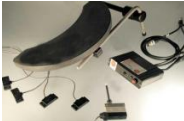





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Proximity Switches - placement


- Typically mounted at the head or hands

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Fiberoptic Switches

- Arrays and single switch versions
- Captures very small movements
- Fragile
- Rarely used with clients with increased tone
 - Adaptive Switch Laboratories
 - Stealth Products
 - Switch It!





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LocLine for mounting

Stealth Products i-Connect

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Infrared Switches

- Enabling Devices
 - Eye Blink Switch
 - Not appropriate for PWC use as switch contact cannot be sustained
 - Client must keep head still
 - Not typically used for clients with increased tone



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Touch Switch

- AbleNet Plate Switch
- Adaptation Taction Pads
- AMDi
 - Picture Plate membrane switch



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Sensor Switches

- A sensor picks up muscle activity
- Not recommended for power mobility as vibration of the power wheelchair may activate the switch

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Sensor Switches

- Enabling Devices
- Tinkertron EMG Switch
- Control Bionics
 - Neuronode EMG switch



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Piezo Electric Film

- Vibration of a piece of film causes activation
- Not recommended for power mobility as vibration of the power wheelchair may activate the switch

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Piezo Electric Film Switches

- Adaptation
 - TableTapper
 - Also, a switch latch and timer
- Enabling Devices
 - Twitch



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Let's get Practical!

- What switch type do you think might work for the client you identified?

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Switch Placement

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Switch Site Hierarchy


- Hands
- Head
- Mouth
- Feet
- Lower Extremities

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Switch Site Hierarchy

- Hands
 - under tray placement
 - finger movement




Proximity Switches


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Finger movement



Fiberoptic Switches




Micro Light


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Finger movement



Fiberoptic Switches



Micro Light

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Switch Site Hierarchy

- Head
 - Side of head

Spec

Spec

Jelly Bean

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Switch Site Hierarchy

- Head
 - chin
 - under chin
 - side of chin
 - can use jaw or head movement

ASL fiberoptic

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Switch Site Hierarchy


- Head, less used sites
 - eye brow – sensor switches
 - eye blink – infrared switches

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Switch Site Hierarchy

- Mouth
 - Sip and/or puff
 - Tongue
 - These are usually not possible with a client who has muscle weakness



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Switch Site Hierarchy

- Feet
 - Above foot (dorsiflexion)
 - Below foot (plantar flexion)
 - Sides of foot
- These locations typically require too large a movement

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Switch Site Hierarchy

- Lower extremities
 - medial knee
 - lateral knee – typically too hard
 - superior knee – typically too hard


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Medial Knee



Micro Light



Proximity

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Let's get Practical!

- Where do you think you might try and place a switch on the client you identified?

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Questions?

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Case Study

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Case Study

- Julian
- 24 years old
- SMA, type 1
- Goal: switch access for SGD from wheelchair and bed




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Julian

- Julian has used switches since age 1 for play
- He started using a PWC at age 3 with a combination of mechanical and electrical switches

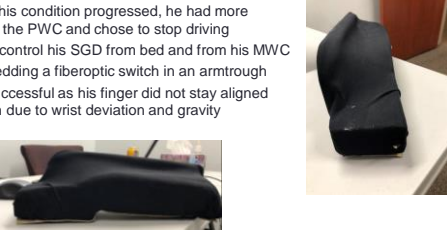


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Julian

- Over time, as his condition progressed, he had more difficulty using the PWC and chose to stop driving
- He needed to control his SGD from bed and from his MWC
- We tried embedding a fiberoptic switch in an armtrough
- This was unsuccessful as his finger did not stay aligned with the switch due to wrist deviation and gravity




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Julian


- We made a splint and attached the fiberoptic switch to the splint to keep him in alignment
- He can wear this in bed and in the MWC



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Julian



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Take Home Message

- Switch Access for people with muscle weakness requires:
 - Small activation travel
 - Little or no activation force
 - Ability to accommodate change
 - Postural support

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Questions?

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Thank You!

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