A Mouse by any Other Name

O'T access considerations for people with ALS

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ALS – Alternative Communication Program

Boston Children’s Hospital
Occupational Therapy/Assistive Technology

Access Site
Preparing for the next
Real Life Use
Access Settings
Access Method
Access Site
Activity Goal
Access Consideration

Assistive Technology
Occupational Therapy
How the customer explained it.

How the project leader understood it.

How the analyst designed it.

How the programmer wrote it.

What the customer really wanted.
Activity Goal

People with ALS have a lifetime of fast, sophisticated, multimodal communications.

Participate in conversation

Relay novel messages

Relay quick messages – wants/needs

(communication, non-computer)

OT related – includes activities of daily living (non-
Activity Goal

Reading
Movies/videos/music
Games
Internet
Spreadsheet (often work-related)
Word Processing
Facebook
Email
Computer

Phone
Text
Email
Smart phone or iPad

Music
Games
Reading
The activity goal drives the process.

Other important considerations:

Technology availability

- Computer at home? PC? Mac?
- Hands? Head? Foot?
- Motor control available
- Speech available

- Breath support
- Intelligibility

- Fatiguing?
- Somebody nearby to troubleshoot?
- Casual user or computer whiz?
- Technology availability
- Intelligible?
- Breath support?
Low Tech vs. High Tech
Physical Access Control Site assessment

- Direct selection
  - Preferred method – if possible
  - Positioning/mounting
  - Adaptive stylus
  - Computer adjustments

- Indirect selection
  - Best control site (s)

Pressure, excursion, range
- Shoulder, trunk, arm/hand, leg, knee, foot
- Head, eyes, mouth, tongue, respiratory (sip/puff), voice, chin

Physical Access Control Site assessment
Considerations for access selection:

- Motor control that is reliable and repeatable
- Motor control that is fine-tuned
- Include eye control and voice production
- Exploit the strengths and circumvent the weaknesses
- The range and control of movement
- The short and long-term use and practice required to achieve
- The amount of training needed
- The short and long-term costs/benefits of using the access method
- Motor control that is reliable and repeatable

Access Selection Considerations for
"He cannot use his hands. We have tried everything. He can't use a computer."
I have ceded to the disease and now I type with one hand.

NO. You are not giving into the disease. You are outsmarting the disease and getting the job done another way.
Direct Selection

- Reposition to be near body, add stylus
- Cannot drag across the screen
- One point of contact
- Timing matters – longer touch results in different action
- Skin (not fingernail), capacitive tip stylus
- Not pressure sensitive – capacitive
- Touch screen (iPad for example)

Touch Screen (iPad for example)
Home made access
Computer Access
Direct Selection

Keyboard Adjustments – sticky keys and filter keys

Type with one hand

Typing aid (pointer)

Support arms/wrists

Close to body

Small keyboard

Keyboard
Small keyboards

- One-handed use - easier to reach all keys
- Can position a mouse close by
- Easy to position close to the body

Small keyboards
Arm support
Decreases work load of shoulders and elbows
Supports weight of the arms
Typing Aid

Allows accurate and fast typing with limited finger control

Keeps your fingers above the keyboard

Consider ease of donning/doffing

 Alvarez Medical School

HARVARD MEDICAL SCHOOL

Boston Children’s Hospital

Until every child is well.
Typing aid on one hand, touch typing with the other?
Keyboards adjustments

™

Sticky keys™

Allows the user to type keys in a row

™

Designed for one-handed typing

Great for poor coordination

Press the shift key five times to turn on

Sticky keys

Keywords: Keyboard adjustments

™

Sticky keys™

Allows the user to type keys in a row

™

Designed for one-handed typing

Great for poor coordination

Press the shift key five times to turn on

Sticky keys

Keywords: Keyboard adjustments
Keyboard Adjustments

Filter Keys

- Adjusts for tremor or for holding the keys down too long
- Can add key click for auditory feedback
- Hold the right shift key for 8 seconds to turn on

Filter Keys

Keyboard Adjustments
Direct selection touch screen

- Finger lift only between words
- Compensate for tremor/shakiness
- Increase typing speed
  - Consider swipe
- Consider vertical vs. horizontal orientation
- Improve accuracy
  - Consider stylus – keeps fingers away from the screen, may support arm
- Position device close to body
Swipe in action
Problem

- difficulty gripping the mouse, hard to move cursor across the screen, hard to hit the left mouse button, accidently hitting the mouse buttons

Solution

- Trackball
  - no reaching to move it
  - Trackball remains stationary
  - Do not need to grip
  - Solution – Trackball

Buttons are separated from the mouse movement

- can move the ball with any part of your hand

Direct Selection: Mouse
Problem – difficulty gripping the mouse, hard to move cursor across the screen, hard to hit the left mouse button, accidentally hitting the mouse buttons

Solution – Hands-free Cursor control

- Head Mouse
- Foot Mouse
- Foot Mouse
- Head Mouse
Foot Mouse

- Trackball
- Foot time mouse
Head Mice

- Tracker Pro
- Natural Point
- Quah Zono
- Origin Instruments
Head Mice

Head movement provides cursor control – need to add clicking function.

Head Mice can be programmed to be used on hand or foot.

Zono is gyroscopic – no line of sight required.

Infrared devices require "line of sight"

Quha require good head control.

All require USB port (no Bluetooth yet).

All involve transmitter and receiver.

All provide wireless cursor control.
How do I click?

™

Switch click

™

Any reliable switch site
–

except for the head.

Activates left click, double click, and drag.

Switch click

How do I click?
Switchless clicking

Have a pause button
Set the jitter box
Set the dwell time

Point in Click
Smart Click
Dragger
Auto click dwell

Switchless clicking
Head Mouse in Action
Features:
- Reach Interface Author
- Softype
- Ouscreen
- Windows onscreen
- On Screen Keyboard
- Mouse-only access
- Macro capability
- Built-in dwell option
- Size adjustments
- Word prediction
Dasher

Video game style

- Word and phrase prediction
- Minimal movement
- Streaming letters
- Attack of the alphabet
Dasher
run down the battery quickly
Hey Siri may require the iPhone to be plugged in/may
Siri cannot voice answer an incoming call

Limited functionality
Will have difficulty with soft or dysarthric speech.
Not intended as an accommodation for a disability

Alexa

OK Google

(Hey) Siri

Voice input
Plan for a learning curve

Custom commands available (Dragon)

Best for word processing

Will have difficulty with soft or dysarthric speech.

Not intended as an accommodation for a disability.

Microsoft/Mac built in voice recognition software

Dragon Naturally Speaking

Voice input - computer
For people with limb onset ALS, voice recognition software allows them to remain connected to friends, family and the world. Use of voice recognition software requires training and customization.

- Adding command macros
- Adding text macros
- Adding vocabulary
- Adding text macros
- Learning how to dictate, learning commands

Voice recognition software may provide the means of remaining employable.

Voice recognition software may remain connected to friends, family and the world.

For people with limb onset ALS,
Living with ALS seems a bit like going into the witness protection program. Everything I have ever known about myself, how I look, how I act, how I interact with the world is rapidly and radically changing.

When I could no longer type with my hands, I knew I could give up writing entirely or use voice recognition software. I'm not a young woman. This took real work. Interestingly, I write more now than ever before.
Voice mouse control

- "Drag mouse up/down/right/left"
- "Mouse click" / "Mouse double click"
- Stop
- Slower / Much Slower
- Faster / Much Faster
- Move mouse up/down/right/left
- Mouse Grid
Check my email

Alt + D


Enter

MySecretPassword

Enter

Wait

JohnSmith@yahoo.com

Enter

Wait

MySecretPassword

Enter

Wait


Alt + D

„Check my email“ =
Signing into Yahoo – several steps

1. Go to the Yahoo login page.
2. Enter your Yahoo email address in the first field.
3. Click the “Next” or “Sign In” button.
4. Enter your password in the second field.
5. Click the “Next” or “Sign In” button again.
6. If you have any messages or notifications, they will appear.
7. Once you are signed in, you can access your inbox and other features.

Tips:
- Use your keyboard shortcuts to save time.
- Keep your password secure.
- Stay updated with Yahoo’s latest features.

Peggy Dellea
January 2017
Command Macro Examples

**Facebook** = Alt + D

www.facebook.com

Enter

**Email sign in** = johnsmith@aol.com

Tab

Email sign in =

Password

Enter

My%secret967Password

mysecret967Password

Tab

johnsmith@aol.com

Enter

Email sign in =

Password

Enter

www.facebook.com

Tab

Alt + D

= Facebook

Peggy Dellea January 2017
Keystroke: Enter
Typing: MySecretPassword
Wait
Keystroke: Enter
Typing: JohnSmith@yahoo.com
Wait
Keystroke: Enter
Typing: MySecretPassword
Wait
Keystroke: Enter
Keystroke: Alt + D
Typing: "Check my email"

Peggy Dellea January 2017
Check my email one step further.
Yes – this can be done with individual voice commands/typing.

But Catherine Royce once told me to "choose easy."
“Short Pier” = Ctrl + A

Times New Roman

Alt + O

F

Tab

8

Enter

Control + Enter
A little cognitive assist
Eye Gaze Interface — The eyes have it
Infrared Camera

Position

Enlarged Targets

Position

Position

Infrared Camera

Eye Gaze

Switch clicking

Blink, Dwell, or

Eye Gaze
Selection dwell in Action Tracking Eye
Eye tracking - switch click

Selection
<table>
<thead>
<tr>
<th>Problems</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Ptosis</td>
<td>Cataracts</td>
</tr>
<tr>
<td>- camera needs to view the full pupil</td>
<td>- Glassess and Contacts</td>
</tr>
<tr>
<td>(Re) Positioning</td>
<td>Head Movement</td>
</tr>
<tr>
<td>Attentional deficits</td>
<td>Dry Eyes</td>
</tr>
<tr>
<td>Nystagmus</td>
<td>Cataracts</td>
</tr>
<tr>
<td>Constricted Pupils dilated or</td>
<td>(Re) Positioning (position, position, position)</td>
</tr>
</tbody>
</table>
Eye Gaze for Computer Interface

- Requires use of "gaze interaction" software
- Moves cursor across the screen
- Connects via USB
- "Eye camera "bar" connects via USB
- Eye camera "bar" connects via USB

Eye Camera "bar"
Wheelchair Mounts
Floor Mounts
Phone mounts
"Reading is huge."
Access to books (hardcopy or digital)
Easy to adapt

Simple program (free is good)

Out of copyright material is free

Available for PC or Mac

Free download (Amazon.com)

Kindle for the computer
Click to turn page:

- Mouse
- HeadMouse
- Switch-adapted mouse
- Dwell software
- Eye Gaze interface
- Switch programmed to the right arrow key
- “Press right arrow” command
- Custom voice command (e.g. “turn page”)

back of your head.”

“I have, at least, a well-polished, silver-plated coffee-pot in front of me,” said he. “But, tell me, Watson, what do you make of our visitor’s stick? Since we have been so unfortunate as to miss him and have no notion of his errand, this accidental souvenir becomes of importance. Let me hear you reconstruct the man by an examination of it.”

“I think,” said I, following as far as I could the methods of my companion, “that Dr. Mortimer is a successful, elderly medical man, well-esteemed since those who know him give him this mark of their appreciation.”

“Good!” said Holmes. “Excellent!”

“I think also that the probability is in favour of his being a country practitioner who does a great deal of his visiting on foot.”

“Why so?”

“Because this stick, though originally a very handsome one has been so knocked about that I can hardly imagine a town practitioner carrying it. The thick-iron ferrule is worn down, so it is evident that he has done a great amount of walking with it.”

“Perfectly sound!” said Holmes.

“And then again, there is the ‘friends of the C.C.H.’ I should guess that to be the Something Hunt, the local hunt to whose members he has possibly given some surgical assistance, and which has made him a small presentation in return.”

“Really, Watson, you excel yourself,” said Holmes, pushing back his chair and lighting a cigarette. “I am bound to say that in all the accounts
"The best thing about that session was seeing his face when he was using the Kindle software."

The best thing about that session was seeing his face when he was using the Kindle software."
Shouldn’t the switch be done without the switch? He won’t be able to use this without the switch. He won’t be able to use the switch when the disease progresses. “Shouldn’t he be doing this?”
Speech Generating Device Access

(they are often computers, after all)

Touch screen

Stylus and stylus holders

Keyboard

Mouse

Trackball

EYetracking access

Switch scanning

Adapted mouse

Head tracking

Switch scanning

Adapted mouse

Head tracking
Mounting options

Siri

Adaptive access

Voice typing

Use of finger and/or stylus

Position of device

Access to iPad/Android tablets
Phone Access

- Landline options – large buttons, speaker phone
- Smartphone use
- Hands-free cell phone use
- Switch scanning on iPhone
- Siri/OK Google/Alexa
- Mounting options

Phone Access
Call system/attention signal

Portable speech output device

Baby monitor

Switch-adapted attendant alarm

Commercial wireless doorbell

With or without switch
Brain Computer Interface (BCI) Trying to make its way to the end user yes it is a real thing that reads "aha" response P300 Latest method for brain-computer interaction "Reads" output of brain cells, interprets the signal Implanted vs. surface electrodes no, it cannot read your mind

"BCI"
Tele-treatment
Dear John,

Thank you for our meeting last Tues. As we move forward slowly, I appreciate your intent to truly understand Eric and his desires. As you have surmised he is slowly processing what he wants, and “forcing” decisions does not work.

I later realized what relief I felt, knowing we would not somehow be abandoned because we could not resolve the next step in a timely manner. Truly...I was relieved of an anxiety I had not realized I had. I appreciate your passion and resulting offer to always be available, even to doing home visits. I later realized what relief I felt, knowing we would not somehow be abandoned because we could not resolve the next step in a timely manner. Truly...I was relieved of an anxiety I had not realized I had.

Thank you for our meeting last Tues. As we move forward slowly, I appreciate your intent to truly understand Eric and his desires. As you have surmised he is slowly processing what he wants, and “forcing” decisions does not work.

Amelia
Short Pier
Dear Peggy:

I am able to use the single command for downloading CaringBridge. Saved me so much agita!!

Michelle

A recent email
A little cognitive assist
Signing into Yahoo – several steps

Peggy Dellea January 2017
Checking email with text macros and built-in commands.

- "go to address bar"
- "yahoo sign in page" types URL
- "press enter" goes to that page
- "yahoo user name" types email address
- "press enter" brings up password page
- "yahoo password" types password
- "press enter" signs you in
- "go to address bar" types URL

Peggy Dellea January 2017
Command Macros

- Open programs/files
- Record mouse movements and keystrokes
- String together several steps
- Input keystrokes, not just text
Command Macro Examples

- “Facebook” =
  Alt + D
  www.facebook.com
  Enter

- “Email sign in” =
  johnsmith@aol.com
  Tab
  my&%secret967password
  Enter
Check my email = Keystroke: Alt + D


Keystroke: Enter

Wait

Keystroke: Enter

Typing: JohnSmith@yahoo.com

Keystroke: Enter

Wait

Keystroke: Enter

Typing: MySecretPassword

Keystroke: Enter

Wait

Keystroke: Enter

Typing: peggydellea@bostonchildrenshospital.org

Keystroke: Enter


Keystroke: Alt + D

"Check my email" =
Yes – this can be done with individual voice commands/typing.

But Catherine Royce once told me to "choose easy."

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