



Making Clinical Decisions for AAC and Scanning

Articles at a Glance · Scanning

Fager, S., Bardach, L., Russell, S., and Higginbotham, J. (2012). Journal of Pediatric Rehabilitation Medicine: An Interdisciplinary Approach. *Access to augmentative and alternative communication: New technologies and clinical decision-making*, 5, 53-61.

What question did the researchers try to answer?

What are the new advances in access technology for children with severe physical and speech impairments? Also, what are the clinical decision-making considerations for each technology?

How did they do it?

The authors reviewed new technologies and clinical decision-making considerations for augmentative and alternative communication (AAC) access.

The authors presented case studies for the following access methods:

- Direct Access (e.g., touch, eye tracking, and head tracking)
- Indirect Access (e.g., using a switch to move a target and make selections)

They went on to review future innovations in technology such as speech recognition, brain-computer interface, and handheld mobile devices.

What were the results?

The access selection method process included both the individual using AAC and a team of therapists, clinicians, doctors, and family members. The authors recommended that teams should always consider several body parts as control sites (a multimodal approach) and discussed characteristics and clinical decision-making for specific access methods:

Eye Tracking

- Cameras track an individual's eye movement. Targets are selected when a user dwells on an item for a specified length of time, blinks, or hits a switch. May be especially helpful for individuals who are unable to use direct access.
- New technology requires less calibration to a users' eyes than earlier models.
- Majority of available research is on adults; further research on children is needed.
- **Clinical Decision-Making:**
 - **Training Time and Practice:** Early clinical evidence suggests that some children demonstrate difficulty understanding how to use their gaze to point for communication.
 - **Calibration Routine Modifications:** When calibrating, a user must focus their gaze on visual targets as they move to different locations. Children may find this task too difficult to complete. Using colorful images of cartoon characters or motivating objects as calibration targets may increase motivation and reduce complexity for children.
 - **Limitations:** The various contexts and positions a child experiences throughout the day can make eye tracking difficult. The team must also have other access options available.

Head Tracking

- An infrared camera follows a reflective dot on the user's forehead (or another location such as a hat, glasses, a hand, or a finger).
- The user's head movements control a cursor on the screen.
- **Clinical Decision-Making:**
 - **Range of Head Movement and Control:** Some children have very limited head movement or difficulty controlling their head or neck movements with ease.
 - **Training Time and Practice:** Very young children (or those with cognitive impairments) may struggle to understand that their head movements cause a cursor to move. Also, limited research results in few training strategies to help children learn how to use head tracking.
 - **Limitations:** Children using this method may be at risk for repetitive stress injuries, pain, or an increase in tone.

Scanning Techniques

- The communication partner or AAC device highlights (by pointing, outlining, speaking, etc.) targets in a sequence.
- The AAC user indicates selections through a body movement, vocalizations, and/or a switch (activated by the user's hands, fingers, head, feet, etc.).
- The communication partner or the AAC device speaks the selected message or places it in a Message Window.
- Scanning methods have remained largely the same over the years, but there are more switch options that may reduce physical fatigue for users.

- **Clinical Decision-Making:**

- **Cognitive and Motor Difficulties** Scanning requires high cognitive and motor processes that are very challenging for children with complex communication needs or physical impairments, although it does require less head and neck control.
- **Modifying to Increase Success:** Visual and auditory feedback seem to reduce learning demands. Auditory scanning may be a very successful communication method for children with low vision.
- **Part of a Multimodal System:** Use scanning in conjunction with other access methods. A child may need to use scanning in one environment and tracking in another.

Future Advances in Access Technology

- **Speech recognition:** Automatic speech recognition (ASR) is a viable method of computer access for some users.
- **Brain-computer interface:** Individuals use implanted electrodes or external EEG monitoring devices to control computer functions.
- **Access to handheld and mobile technologies:** For individuals with adequate hand control, smartphones and tablets can help with communication. Switch scanning access for these devices is beginning to emerge.

How can we apply this to Tobii Dynavox communication solutions?

When a child is undergoing an evaluation for access, you must understand the available access technologies. These technologies all come with both benefits and limitations, and the child and his or her supporting team of clinicians, doctors, parents, and teachers should choose the most effective access method for the individual

Since this population may face a lifetime of communication access and technology, the team should choose options that will be safest and most efficient for a child to use over time. Consider multiple types of access because children are in a variety of contexts throughout their day. One access method may work well within the school classroom, but another method might be more effective at home or on the playground.

At Tobii Dynavox, we continue to do user experience testing for children with complex needs. We talk to clinical experts and assistive technology centers to generate ideas for decreasing the cognitive and motor demands of learning these new access methods. Snap Core First includes new settings and feedback options to provide better feedback to people using eye gaze, tracking, or scanning.

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