

High-tech devices typically have the capability of having multiple access (input) methods ranging from direct selection on a touch screen to various types of scanning, mouse/joystick controllers, or encoding systems. Encoding systems use a simpler set of movements such as a series of eye blinks to represent a longer communication. Some computer-based devices can be accessed via eye gaze. For children who have both severe communication and physical disabilities, these alternative access methods are often needed. Systems that allow direct selection (eg, with a finger) are used with children who have adequate control of movements.

The advantage of high-tech SGDs is their expandability, flexibility, and mobility, especially those that incorporate commercial touchscreen tablets. For children whose communication skills are improving over time, the vocabulary in the SGD can be modified to accommodate the changes to language development and communication needs of the child. Thus, the skills of the child and capability of the device work in tandem and promote communicative proficiency throughout the continuum of care.

As an example, for a child who has ASD but is being limited in communication by using the PECS and low- or mid-tech supports do not meet their expressive communication needs, evaluation for high-tech AAC or SGD is recommended.^{24,25} Persons with fine motor impairments may have difficulty accessing hardware connections, and more sophisticated switches may not be able to be used. It is critical that the team include a variety of professionals including occupational therapists (OTs), physical therapists (PTs), assistive technology professionals (ATPs), and speech-language pathologists (SLPs) to identify all the needs of the patient to make the best recommendations for switch access or other access modifications to operate the equipment.

High-tech electronic devices are often constrained by their need for a power source, limiting their usefulness in situations in which battery power gets depleted. A lower-tech solution (such as a word or picture board, a set of pictures or phrases on a ring, or other simple devices) should always be available as a backup for high-tech AAC system users. People who have typical language ability and speech are accustomed to a high rate of expressive speech. Therefore, patience and training are necessary to communicate with an individual who is using an AAC system. Patience and training are particularly important if the child is using a low-tech communication aid, such as a symbol, letter, or word board.

CURRENT RESEARCH AND LIMITATIONS

Prior studies have demonstrated the benefits of early intervention for speech and language disorders, including using augmentative systems, such as pictures or sign language.²⁶ Furthermore, research has shown that the use of AAC

systems does not decrease the use of natural speech and may promote an increase in verbal expression expertise, which should provide reassurance to physicians and families.²⁷ Multiple systematic reviews and controlled research studies have definitively shown that the use of AAC has not decreased the vocabulary for children with minimal expressive vocabulary; in most cases, AAC use has helped to increase their vocabulary.^{28,29} At least one review has also shown evidence of additional improvements in receptive language with the use of AAC.³⁰ A recent systematic review including studies published in the last decade demonstrated that AAC improves communication (particularly vocabulary) in pediatric AAC users ages 6 to 10 years with various diagnoses.³¹ Most of these studies have been conducted with children with ASD and sometimes show improvements in social interactions in addition to increased vocabulary.³²

AAC use has also been evaluated in children with other disorders and disabilities that cause CCN, including Down syndrome, craniofacial disorders, intellectual developmental disorder, childhood apraxia of speech, severe dysarthria, deafness/hard of hearing or deaf-blindness, and CP and similar motor impairments.^{33–38} Some children with ASD develop expressive language through gestalt language processing or scripts, which is a type of language development in which full phrases (scripts) can be memorized and used to communicate ideas before basic units of speech such as individual words or phonemes.³⁹ Developing competency in AAC can support all children who have unreliable expressive communication skills.

Currently, there is no consensus about the earliest age at which a child can successfully use a more complex AAC device (eg, an SGD), although some have demonstrated successful use of complex devices with children younger than 3 years^{40–42} and even children as young as 9 months.⁴³ Experienced researchers Beukelman and Mirenda have demonstrated the need to study the process by which AAC devices for young children are selected and used.⁴⁴ Their research suggested that if a child with severe communication impairment is successfully using an AAC device by first grade, the child will more actively participate in their classroom settings. These findings were reinforced in more recent work in which young children who were skilled and comfortable with their AAC devices communicated more frequently with their typically developing peers.⁴⁵ Despite the results of these studies, additional research on early toddler age (12 to 18 months) use of AAC systems is needed to determine whether earlier exposure to communication aids will promote more ease of use and other gains (such as improved social skills and participation).

ASSESSMENT ISSUES

The assessment of a child with a communication disorder and the selection of AAC device(s) is usually performed