

Augmentative and Alternative Communication (AAC)

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Abstract. *This is the first of a two part series on augmentative and alternative communication (AAC) and life care planning. The purpose of this first part is to provide a basic overview of AAC by identifying individuals who may benefit from AAC and describing key components of AAC assistive technology, service, and supports. The article focuses on applying the principles of evidence-based practice in the assessment of and intervention for high technology AAC solutions in order for life care planners to ensure quality outcomes. An AAC Checklist for life care planners also is included. Part two of the series will be dedicated to examples of individuals who rely on AAC and tools and resources to support life care planning involving AAC.*

Key Words: Augmentative and Alternative Communication (AAC), Evidence-based practice (EBP), Language Representation Methods, Outcomes

"Of all my possessions...I would choose to keep the power of communication, for by it I would soon regain all the rest." –Daniel Webster

Introduction

Communication is the essence of human life. Most individuals take for granted the ability to communicate. Our ability to maximize our potential and achieve life goals is related to effective communication. Most individuals rarely contemplate losing the ability to use natural speech as a means of communication. Yet, various acquired and congenital disabilities exist which can contribute to a person's inability to speak and maintain functional, independent communication throughout a lifetime. Approximately two million individuals in the United States have some type of disability which impacts functional communication (Beukelman & Ansel, 1995). Adults with acquired neurological disorders such as amyotrophic lateral sclerosis (ALS), Parkinson's disease, aphasia, or traumatic brain injury may experience a loss of speech and functional communication. Adults and children with congenital diagnoses such as cerebral palsy, Down syndrome, and other developmental disabilities may never have been provided with adequate supports and services to communicate independently. The field of augmentative and alternative communication (AAC) addresses the technology, services, and supports that benefit individuals with complex communication needs (CCN). Life care planners (LCPs) can play a significant role to enhance the quality of life of individuals with CCN by becoming aware of factors to consider when AAC is being included in a life care plan.

What is AAC?

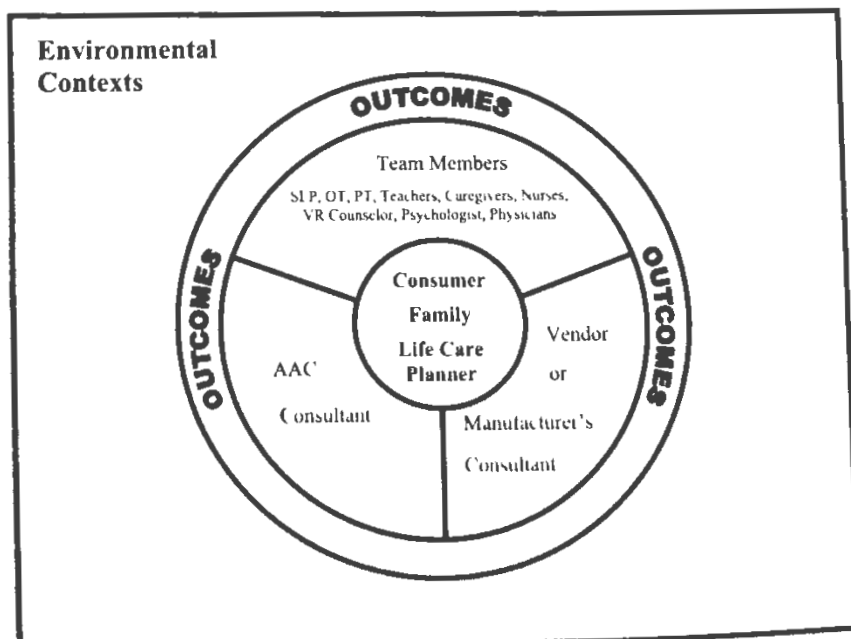
AAC refers to communication approaches that augment or supplement existing speech or act as an alternative to natural speech (Lloyd, Fuller, & Arvidson, 1997). AAC refers to all methods or modes that can be used to make communication easier for a person who has speech difficulties. Everyone uses multiple modes to communicate what they are saying such as gestures and facial expressions, and people with complex communication needs (CCN) may use gestures and facial expressions to help convey messages. They may use an alphabet board to augment communication with family and friends, or, many individuals who rely on AAC have an AAC system or speech generating device (SGD) to use in different daily environments to improve functional communication. AAC provides strategies to have a quality life experience with communication that is as effective as possible.

A range of AAC strategies is available depending on individual abilities and needs. A multidisciplinary team, usually headed by a speech-language pathologist (SLP), evaluates and makes decisions about AAC strategies and systems. Because of the relatively low incidence of AAC need, team members may or may not have significant experience, knowledge, and skills in this area and only about two thirds of speech-language pathologists, for example, include AAC in their professional practice (American Speech-Language-Hearing Association, 1999). Those who do not have the required knowledge and skills have an ethical responsibility to refer to SLPs who do. Most professional codes of ethics also require the interests of the individual being served to be held paramount.

Despite the wide range of factors influencing a team's decisions, the goal of AAC always remains the same. That is to provide the supports and services that result in the most effective communication possible. LCPs participating on AAC teams can bring unique qualifications and responsibilities to the team process to ensure accountability toward the goal. Figure 1 represents a consumer-centered service delivery model that identifies the possible team stakeholders (Hill, Glennen, & Lytton, 1998). LCPs take a place in the inner circle as advocates for a care plan that is a lifelong guide to the delivery of quality AAC goals in accordance with the standards of practice developed by the International Academy of Life Care Planners (2003).

AAC strategies are classified as unaided and aided (Glennen & DeCoste, 1998). Strategies that are considered unaided or "no-technology" include gestures, talking slowly, exaggerating

Figure 1. AAC Consumer-Centered Service Delivery Model (Hill, K., Glennen, S. and Lytton, R., 1998).



movements. Aided or low-technology strategies include the use of symbol and/or alphabet communication boards or eye gaze boards. These boards are simply constructed with various methods possible to select letters, words, and messages including direct selection such as pointing to letters, words, or symbols, use of a laser pointer, or use of partner-assisted scanning techniques. High-technology strategies include the use of speech generating devices (SGDs) such as computers or dedicated AAC devices with voice output. Decisions and planning for high-technology AAC systems will be the focus of the remainder of this article.

AAC Assistive Technology

The primary function of AAC assistive technology is to provide speech output communication. Secondary and tertiary functions include computer access and environmental control.

Current technology-based AAC products are available in two forms: dedicated AAC systems (hardware designed specifically for this application) and software that runs on mass market computer hardware. The selection considerations regarding technology decisions are based on the three basic components comprising AAC systems. These include the language representation method (LRM), the user interface, and the outputs. The AAC team collects data to evaluate the current and projected skills and needs of the individual, determines the most effective language representation method(s) and access technique(s), and measures the communication performance among various AAC systems to determine the best match. Figure 2 is a photo of an adult who relies on AAC. The AAC assistive technology being used daily is reflective of the primary function of speech communication as well as secondary and tertiary functions of computer access and environmental controls. In addition, the AAC system involves an alternative access technique using an infrared pointer and a mounting system for the wheelchair as an accessory. Performance data used to make clinical decisions for the AAC system will be presented in Part 2 of this series.

Figure 2. Photo of individual who relies on AAC depicting various components of assistive technology



AAC System Components

The first and most important element in recommending or selecting an AAC system is identifying the available language representation methods. How language is represented and generated on an AAC system is a leading factor influencing communication performance (Hill, Romich, & Holko, 2001). Despite a large number of AAC systems on the market, only a limited number of language representation methods (LRMs) are used on systems to generate spontaneous, novel conversation: single meaning pictures, alphabet-based methods, and semantic compaction (Romich, Vanderheiden, & Hill, 2000). A thorough understanding of the characteristics and performance differences among the three language representation methods is critical to providing an AAC system that will achieve the desired outcomes. Table 1 provides LRM definitions and examples of language application programs based on the chosen LRM(s). Table 2 compares the characteristics for the three LRMs. This type of information emphasizes the importance placed on exploring language issues first and technology second in order to enhance communication competence. Communication competence involves the ability to transmit messages efficiently and effectively based on individual interests, circumstances, and abilities (Beukelman & Mirenda, 1998). To achieve communication competence, the person using an AAC system must have access to LRMs capable of handling the vocabulary and message demands required of the four purposes of communication: 1) communication of needs/wants, 2) information transfer, 3) social closeness, and 4) social etiquette (Light, 1988).

The second component to consider is the user interface or physical selection method. The user interface is based on the selection of items that will produce the desired output (Vanderheiden & Lloyd, 1986). The items being selected included the language representation elements which may be letters, whole words or symbols that represent vocabulary or messages. Physical techniques for making selections are based on direct selection or scanning. A common example of direct selection is the use of a computer keyboard to select letters by finger to spell a word. However, use of head sticks, light pointers, and joysticks allow someone with more complex physical challenges to use direct selection as an interface. Scanning refers to techniques in which items are presented sequentially in order to make a choice. Typically an individual uses a switch to select from a choice of items, arranged in a matrix of rows and columns, which are presented in a time sequence. Since communication rate is important to people who use AAC and is a function of selection rate, teams generally choose the selection technique that results in the fastest communication possible. Performance data can be collected and analyzed to compare the rate differences among various selection techniques.

Output is the third basic component of an AAC system. AAC system outputs commonly used are speech, displays, beeps, lights, data, infrared, and other control formats. Two types of speech or voice output are commercially available on AAC devices. Digitized voice output is the recording of a human voice that is electronically produced. Synthesized voice output is the computer generation of speech that allows for use of text-to-speech technology to speak text-based messages. Commercially available AAC systems with digitized speech generally are less expensive than AAC systems that support synthesized speech or both options. However, an AAC system that supports text-based activity is appropriate for anyone with spelling and reading skill. In considering features, the output feedback options can enhance use of the available language representation methods and facilitate the interactive nature of communication. The amount and quality of communicative interaction is dramatically affected by the type of output an AAC has available (Cook & Hussey, 1995).

Table 1. Definitions for AAC Language Representation Methods (LRMs)

LRM	Definition	Examples of AAC Language Application Programs
Single Meaning Pictures	The use of graphic or line drawn symbols to represent single word vocabulary or messages (phrases, sentences, and paragraphs). A variety of AAC symbol sets are available. A large symbol set is required to represent the typical spoken vocabulary.	•VocabPC •Gateway •Velocity
Alphabet-based Methods	The use of traditional orthography and acceleration techniques that require spelling and reading skills. The user selects from a standard keyboard, alphabet, or word overlay to spell or select vocabulary. Spelling letter-by-letter is a very slow process.	•Adult Quick Learning System (AQLS) •Word Power •Word Core
Semantic Compaction	The use of a small set of multiple meaning icons (symbols) to select vocabulary and linguistic structures. Minspeak is the only patented LRM (Baker, 1982). The number of symbols is reduce to represent the typical spoken vocabulary as well as the number of required keystrokes relative to spelling.	•Unity 128 •Unity Enhanced

Table 2. Chart comparing the basic characteristics of the three language representation methods.

Method ↓ Attribute	SINGLE MEANING PICTURES	ALPHABET-BASED SYSTEMS	SEMANTIC COMPACTION
LITERACY	Not required	Required	Not required
SYMBOL SEQUENCE LENGTH	Short	Long	Short
SYMBOL SET SIZE	Large	Small	Small

AAC Life Planning Considerations

AAC service delivery has made a shift from a clinical art form to the science of today. The American Speech-Language-Hearing Association (ASHA) articulates the expectation of data collection, outcomes measurement, and the provision of services in accordance with the principles of evidence-based practice through the ASHA Scope of Practice (2001). LCPs can identify with the suggested guidelines for AAC clinical competence developed by ASHA (2002) that include:

1. Knowledge and skill in using systematic observation.
2. Knowledge and skill in identifying and measuring outcomes.
3. Skill in preparing, monitoring, documenting, and analyzing goals, objectives, procedures, and progress.
4. Knowledge of performance ratings for AAC systems.

As advocates, LCPs can consider their role on an AAC team consistent with life care planning management guidelines that include: documentation of treatment resources, coordination of interdisciplinary direction, provision of a plan for ongoing treatment and follow-up, and development of an outline of financial resources for treatment options (Weed, 1999). AAC systems, services, and supports might fall under several of the areas that need to be considered in a Life Care Plan such as projected evaluations, projected therapeutic modalities, diagnostic testing and educational assessment, vocational rehabilitation, and aids for independent function, to name a few.

The assessment process for recommending an AAC system may be one of the first considerations encountered by the LCP and an AAC Checklist for Life Care Planners is included at the end of this article. The Checklist includes questions that can be asked to ensure provisions have been made for the services and supports needed to achieve the desired outcomes. LCPs may wish to ask these or similar questions to members of the AAC team involved in the evaluation. The individual, family, and LCP should feel confident that the chosen AAC system will provide the most effective communication possible, and that provisions will be made for training and support beyond the evaluation. The experience, knowledge, and skills of team members related to AAC are a major component influencing the effectiveness of evidence-based practice in addition to the quality of the recommendations. Critical to the feature-match process or matching the person and technology (Scherer, 1991) used to determine the optimal AAC system is the trial period collecting data to compare the

performance differences among various approaches. Many high performance AAC systems have built-in language activity monitoring which allows for the automatic recording of data to support performance and outcomes measurement (Hill & Romich, 2001).

Intervention considerations should be introduced as recommendations concluding the assessment process. Intervention services not only include initial training for the individual with CCN, but may include training of family members and significant others within the client's environment. Long-term training or intervention must be considered for many individuals with CCN. Consequently, performance and outcomes measurement should be built into a quality life care plan. Support services include technical support, trouble-shooting, and equipment maintenance. Many AAC manufacturers/vendors provide training, technical support, and equipment repair and maintenance although the quality and range of services varies widely among manufacturers/vendors and should be a consideration in the recommendation of the AAC system. Extended warranties can minimize the downtime and administrative hassles associated with repair needs.

Financial considerations for AAC include both the technology and professional services. Technology costs will be incurred for major equipment and accessory purchases. Equipment maintenance and replacement of parts is another cost as well as upgrading and replacement of AAC systems. State-of-the-art changes happen rapidly with high performance technology; however, many individuals with older AAC equipment can out perform others with newer technology because of advantages provided by the chosen language representation methods. Professional services that should be considered as a component of life care planning include speech-language pathology, occupational therapy, physical therapy, and rehabilitation engineering. Other professionals also may be involved in AAC teams depending on the diagnosis, abilities, and needs of the individual. Each professional works collaboratively to ensure accountability for the provision of services, to search and appraise the best evidence to address the lifelong AAC planning for the individual, and to measure and monitor communication performance to make timely revisions to the AAC plan.

Summary

LCPs are in a position to assist the client and family in achieving optimal outcomes. Client-oriented AAC assessment and intervention plans and life care plans are dynamic documents and both require comprehensive assessments, data collection and analysis, application of research, and knowledgeable, skilled professionals; all components of evidence-based practice (EBP). EBP places the client's benefits first, as practitioners adopt a process of lifelong learning to apply evidence of direct practical importance to clients (Gibbs, 2003). LCPs armed with the tools and resources to ask the best AAC questions, collect accurate data, and apply the principles of evidence-based practice can have a significant impact on an improved quality of life for persons with a communication disorder who would benefit from AAC.

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About the Author

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APPENDIX

AAC Checklist for Life Care Planners

Life Care Planners may wish to ask these or similar questions to members of the AAC team involved in the evaluation and/or intervention process. You should feel confident that the chosen AAC system will provide the most effective communication possible, that provisions have been made for on-going training and support, and the plan is dynamic to accommodate any changing abilities and needs or advances in products and services.

1. What are the team members' experiences with and qualifications for providing AAC services?
 2. Is the team committed to providing recommendations for AAC systems based on current state-of-the art products and services that will result in the most effective communication possible?
 3. Will the team explain and demonstrate the three AAC language representation methods of single meaning pictures, alphabet-based methods, and semantic compaction? How will the team decide which language representation methods will result in the optimal outcomes for the client? Will they provide trials on various language application programs based on the chosen language representation methods?
 4. Does the team apply the principles of evidence-based practice? How are the client and family member(s) included in the evaluation of the evidence and data?
 5. Does the team have reliable outcomes data? What outcomes do individuals achieve with similar profiles matching the client? What is the disuse rate for AAC systems that are recommended?
 6. Can I talk with other individuals who are using AAC systems and/or their family members?
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7. Will the team discuss the performance differences among the AAC systems that are being considered? Will they be measuring performance to help in the decision-making process and to monitor changing needs? What will they measure and how often will they provide performance results and outcome data?
 8. How will services and supports be provided to learn an AAC system and develop independent communication using an AAC system? How much time for training will be required? What different types of training will be available? Who will be trained? What is the anticipated cost of training?
 9. Is there consideration for the services and supports provided by the manufacturer/vendor? Will they identify the costs associated with various services and supports offered by the manufacturer/vendor? What is the anticipated cost of maintenance? How can the reputation of the manufacturer/vendor be verified?
 10. How will reviews and revisions to the AAC plan be completed? How often are equipment upgrades likely to be needed and at what cost?
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