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# Augmentative and Alternative Communication Intervention for a Child with Acquired Aphasia with Convulsive Disorder: A Case Study

## *Intervention du système de communication suppléant et alternatif auprès d'un enfant atteint d'aphasie acquise et de troubles convulsifs: étude de cas*

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### **Abstract**

This paper describes augmentative and alternative communication (AAC) assessment and intervention with a young boy diagnosed as having acquired aphasia complicated by a convulsive disorder. The case study reviews the child's communication status on referral and provides information on the client's progress during a 12 month intervention period. A review of the literature is provided, as well as a discussion of theoretical and clinical questions regarding the use of AAC systems by children with acquired aphasia.

### **Résumé**

*Cet article décrit l'évaluation et l'intervention de la communication suppléante et alternative (CSA) auprès d'un jeune garçon souffrant, selon le diagnostic établi, d'aphasie acquise à laquelle s'ajoutent des troubles convulsifs. Cette étude de cas examine l'état de l'enfant pour ce qui est de la communication après renvoi à un spécialiste et fournit des renseignements sur l'évolution du client pendant la période d'intervention de 12 mois. Cet article comporte en outre une revue de littérature sur le sujet ainsi qu'une discussion des questions cliniques et théoriques sur l'utilisation des systèmes CSA par les enfants atteints d'aphasie acquise.*

Acquired aphasia with convulsive disorder is characterized by the onset of seizures preceding or following the loss of previously acquired language (Cooper & Ferry, 1978). While there has been some clinical documentation of the case histories of children with acquired aphasia with convulsive disorder (Deuel & Lenn, 1975; Gascon, Victor, Lombros, & Goodglass, 1973; Mantovani & Landau, 1980; Msall, Shapiro, & Balfour, 1986), little is known about the causes or prognosis for children with this condition (Miller, Campbell, Chapman, & Weismer, 1984). For those children who do not recover the use of speech, the use of augmentative and alternative communication (AAC) systems and strategies is advocated. To date, clinical documentation has focused on the use of AAC systems by children whose seizure activity has been brought under control. This paper presents a case study of a seven year old boy to illustrate the potential usefulness of

AAC systems for children with severe language disorders and ongoing seizure activity.

### **Literature Review**

Acquired aphasia with convulsive disorder typically occurs in otherwise normally developing children between the ages of three and seven and is characterized by the loss of receptive and expressive language ability coincident with generalized seizure activity and abnormal electrical discharges from one or both temporal lobes (Miller et al., 1984). Seventy-five cases of the syndrome have been described since the syndrome was first identified by Landau and Kleffner in 1957 (Van de Sandt-Koenderman, Smit, van Dongen, & van Hest, 1984). The cause of the seizure activity and aphasia is often difficult to identify. A review of case histories by Miller et al. (1984) suggests that a variety of pathogeneses, including an active low grade encephalitis (Worster-Drought, 1971), may be responsible for this disorder.

The most significant impact of acquired aphasia with convulsive disorder is on the individual's linguistic abilities. Both expressive and receptive language abilities are severely compromised, and these communication problems recur or persist beyond six months in 94% of the cases (Miller et al., 1984). Because of their severe comprehension deficits, children with this disorder sometimes appear to be deaf; however, the use of audiometric brainstem response testing typically reveals hearing within normal limits (Gascon et al., 1973). Behavioural abnormalities (e.g., inattention, refusal to respond, aggression) are often observed concomitant with the loss of communication.

The recovery of speech and language abilities by these children does not follow a predictable course. While some clinical investigations have reported that the aphasia symptoms were alleviated by the control of the seizure activity

with anti-convulsant medication (Deuel & Lenn, 1975), others have reported that speech does not always return after the seizures have been controlled (Msall et al., 1986). To date, clinical researchers have been unable to identify those factors that best predict recovery (Mantovani & Landau, 1980), although the importance of controlling seizure activity has been emphasized (Shoumaker, Bennett, Bray, & Curless, 1974).

Much of the case literature to date has described the progress of children with acquired aphasia whose seizure activity has been brought under control. A number of clinicians (Worster-Drought, 1970; Cooper & Ferry, 1978; Christopher, 1980; Miller et al., 1984; Pearce & Darwish, 1984) have documented the successful use of AAC techniques (e.g., sign language, gestures, communication boards of pictures or words) with children who present with acquired aphasia and a controlled convulsive disorder. Miller et al. (1984) hypothesized that AAC systems enabled these children to make use of previously acquired linguistic knowledge.

These reports provide evidence of the usefulness of AAC with children who have experienced a severe loss of language; there are limitations, however, in the available literature. In the cases described, the children experienced only a single brief episode of seizure activity or their seizures were controlled successfully through medication. At present, there is no case literature concerning the use of AAC by children who have undergone a language loss and continue to experience ongoing seizure activity. As well, detailed information regarding the use of the AAC systems as a means of facilitating receptive and expressive communication is unavailable.

The following case study reviews the assessment process and progress over a twelve month intervention period for a seven year old boy with acquired aphasia with an ongoing convulsive disorder. The case study documents the clinical investigation of the following issues:

- (1) Would an AAC system support this child in compensating for his severe expressive and receptive aphasia and provide him with a functional means of communication?
- (2) Which AAC techniques would best meet his needs?

## Case Study

### Case history

Michael had been attending a regular senior kindergarten class when the seizure activity first started in November, 1986, at the age of 5;9. He had no prior history of seizure activity. Michael had been assessed formally at age 4;2. At that time his general level of cognitive ability was in the high

average to superior range with verbal, quantitative, and perceptual abilities all equally well developed. Language comprehension was developed to age 7, and expressive language was assessed as being at age 6;3.

Michael's loss of language abilities occurred in two phases. The first loss occurred after Michael experienced his first series of seizures in November, 1986. As this initial seizure activity was brought under control through medication over a one month period, it appeared that his language skills and speech were slowly returning. This progress was reversed by a second series of seizures three months later in February, 1987, that resulted in severe expressive and receptive aphasia. A tentative medical diagnosis of seizure activity as a result of an active low grade selective encephalitis in the left temporal lobe was made. Although the cerebral oedema caused by the encephalitis was arrested with extended cortizone therapy, Michael's seizure activity was very difficult to control. Speech and language functioning did not return to pre-seizure levels, and Michael continued to experience severe and mild tonic clonic seizures, as well as complex partial seizures. The number of seizures experienced by Michael varied widely, from as many as five or six in one day to as few as one a week. A single seizure left Michael temporarily disoriented; a series of seizures resulted in extended periods of distractibility and impulsivity. Michael was treated with a number of anticonvulsant medications, including Depakene, Dilantin, and Mysoline. An EEG revealed multifocal epileptiform activity involving frontal, parietal, and temporal regions independently, as well as a disturbance of background activity. In summary, Michael had a diffuse encephalopathy involving both hemispheres, which made localization of a discrete seizure focus extremely difficult.

Michael was referred to the Augmentative Communication Service in September, 1987, at the age of 6;7, ten months after the onset of seizure activity. At the time of the referral, Michael was typically a very active young boy, unless he was experiencing a high level of seizure activity. Michael was left handed, as he was prior to the onset of the seizure activity, and he demonstrated good fine motor control, with a slight ataxia at times. Michael performed most activities of daily living independently, but he required supervision as his behaviour was often impulsive and he did not demonstrate a good awareness of safety issues (e.g., running out into traffic, touching cooking utensils while in use). Michael's vision appeared to be within normal limits, and no concerns in this area were expressed by his parents. His hearing abilities were more difficult to assess and will be discussed in detail below.

Michael lived at home with his mother and father and attended school at a treatment centre for physically disabled children. His educational program focused on the development of functional life skills (e.g., self care, food preparation,

recognizing and writing his own name) as well as the development of appropriate leisure activities (e.g., participating in a turn-taking activity using building blocks). He demonstrated age appropriate skills in a limited number of nonverbal tasks, including independent completion of 100 piece puzzles and creation of elaborate paper models of houses and planes.

Michael presented as a playful and likable young boy who often tried to initiate interaction with preferred peers and adults. He frequently experienced difficulty in making himself understood at these times. He typically managed the interactions by initiating familiar shared activities in which the expectations for both Michael and his partner's participation were routine and, hence, clearly understood (e.g., a tickling game, tic-tac-toe).

Michael displayed strong likes and dislikes with respect to activities. He would participate within preferred activities (e.g., food preparation, drawing a picture, playing with construction blocks) for extended periods of time and found it difficult to change activities until they were completed to his satisfaction. He typically refused to participate in undesired activities (e.g., workbook activities, imitation tasks) and expressed his disinterest at these times by folding his hands and lowering his head or by withdrawing from the activity.

## Assessment

Assessment information was gathered in three phases. First, a detailed investigation of Michael's audiological functioning was carried out. Second, observations in naturally occurring situations were used to collect information regarding Michael's receptive and expressive communication skills. Third, dynamic assessment activities (cf. Feuerstein, Rand, & Hoffman, 1979) were used to investigate Michael's receptive and expressive communication skills further. These dynamic assessment activities employed teach-test procedures to examine Michael's ability to benefit from intervention approaches.

### Investigation of audiological functioning

Michael's audiological status was difficult to assess. Central distraction and reinforcement procedures (CORA) were used to test Michael's ability to localize pure tones and speech under headphones. As a result of this testing, Michael's hearing was assessed as grossly normal and adequate for communication. However, Michael demonstrated inconsistency in his ability to comprehend and process auditory information. Although he had, on occasion, demonstrated fleeting awareness of voices, he typically did not respond to linguistic information (i.e., the speech of other people) and continued activities without appearing to hear or recognize adult voices. He had been observed to respond appropriately to some nonlinguistic auditory information: for example, he answered the doorbell

when it rang. He did not, however, demonstrate the ability to match a familiar sound (e.g., the ring of a telephone) to a picture of that item. The audiological investigation provided evidence that the use of speech was insufficient to meet Michael's receptive communication needs.

### Observation of expressive and receptive language skills

A number of observations of Michael's expressive and receptive language skills were carried out at both Michael's home and school. Observational techniques were used because Michael had difficulty participating in formal testing situations. It is unclear whether these difficulties arose from Michael's inability to understand the expectations within the task or from a refusal to participate. He typically would not imitate targeted behaviours, even when presented within the context of preferred activities. Therefore, there are no formal assessments of his cognitive status or his language abilities available.

It was observed that Michael frequently was unable to comprehend attempts by communication partners to convey a message to him. Michael responded more accurately if spoken input was augmented with gestures. He recognized common gestures, such as a shrug of the shoulders, as well as idiosyncratic gestures from his own expressive gestural repertoire (described below).

It was noted that Michael attempted to make use of a variety of expressive communication modes including speech approximations, a limited number of gestures, and pointing to pictures and line drawings. When speaking, Michael's voice was often strained and high pitched. He made inconsistent use of approximately 30 speech approximations to request objects and activities, provide information, and request information. These approximations were intelligible to familiar partners in context (e.g., "coke" was typically pronounced /kə kə ko /). More frequently, his speech was unclear and poorly articulated, which resulted in severe comprehension difficulties for his listeners. Both Michael's parents and the school staff reported frustration in using speech to communicate with Michael.

Michael had developed a repertoire of approximately 15 idiosyncratic gestures that he used expressively. These gestures tended to be highly transparent: the gesture for "McDonalds" consisted of drawing an M in the air, and the gesture for "I don't understand" consisted of a shrug of his shoulders and a questioning facial expression. He accepted and rejected items offered to him by making appropriate use of a head shake for no and a head nod for yes. Michael was often unable to make himself understood at both home and school.

### Dynamic assessment

A review of Michael's existing skills and his outstanding communication needs (as identified by his parents and teacher)

led to a decision to use dynamic assessment activities to address two primary questions: (1) to identify a means to improve Michael's comprehension so as to permit his consistent understanding of one step instructions in familiar contexts; and (2) to provide Michael with a means to request objects and activities and convey basic information. Dynamic assessment activities were initiated to investigate the use of traditional speech therapy and additional AAC techniques as a means to improve Michael's ability to communicate.

A speech-language pathologist worked with Michael in order to determine his potential for recovery of speech. Michael demonstrated limited participation and lack of progress during these sessions. He typically would not imitate targeted behaviours, even when presented within the context of preferred activities. As well, Michael frequently made use of speech approximations that were unintelligible even to familiar partners.

During AAC assessment activities, evidence was found of Michael's ability to both understand and make use of AAC techniques based on visual representations (e.g., pantomime, line drawings, and photographs) in situations in which he did not respond to or make use of speech. As an example, on one occasion Michael was verbally asked "Are you tired?," to which he gave no response. When this same question was accompanied by an appropriate gesture for tired, Michael nodded his head yes and went to lie down.

Michael demonstrated the ability to match photographs and line drawings of people and objects to their concrete referents. Although he demonstrated the ability to match pictures of 2 different examples of categorically similar items (e.g., 2 different cars), he was unable to categorize objects or pictures based on their function (e.g., a spoon and a fork). Michael demonstrated some understanding of how pictures could be used to communicate simple concepts: for example, when shown a photograph of his mother, he typically responded by getting ready for her arrival. Michael's responses to pictures were not always consistent. At those times when Michael did not respond to instructions given using pictures (e.g., when told it was time for his workbook activities), it was unclear whether his lack of response was due to a lack of understanding, a lack of compliance, or difficulty switching focus and relating to new topics introduced by a partner. The communication partner's use of alternate modes of communication (e.g., showing Michael his workbook) was not always responded to consistently. Michael also made expressive use of line drawings: He spontaneously pointed to a line drawing of a grapefruit at snack time, when that food item was out of view, to request this preferred food item. It appeared that Michael's participation in communicative interaction improved when he and his communication partners made use of AAC techniques.

### Augmentative communication system selection

Due to Michael's relatively good fine motor skills (as demonstrated within art activities) and his demonstrated competencies with previous, informal applications of AAC techniques, both a gestural system and/or a graphic communication display appeared to be a possible means of augmenting Michael's communication skills. During the assessment activities, signs for "more" and "drink" were introduced within the context of motivating activities. Michael ignored attempts to encourage gestural imitation and physically resisted graduated guidance. Although Michael had independently developed a number of gestures as representations for objects and activities (e.g., drawing a grid in the air to request a game of tic-tac-toe), assessment activities revealed that Michael only made use of gestures that he had developed himself. Michael would not imitate or make use of new signs, regardless of whether the signs were visually similar to the referent (e.g., drink) or more abstract in nature (e.g., more). It was unclear whether this was a personal preference on Michael's part or reflected his inability to understand the representational meaning of the new signs to which he was introduced.

Michael was, however, more accepting of an individualized graphic communication display (Mirenda, 1985) that was developed for him. This display contained approximately 75 photographs and Picture Communication Symbols (Mayer-Johnson, 1984,1985) that were organized in a multi-page menu folder. In creating the communication display, the augmentative communication consultant interviewed Michael's parents and the educational team in order to determine what vocabulary Michael might want to communicate (e.g., favourite toys, preferred food items, familiar people), as well as vocabulary that could be used to convey information to Michael (e.g., upcoming events, specific work activities). The vocabulary selected was made up predominantly of nouns because it was anticipated that Michael would make use of these basic concepts first; some verbs and adjectives were also included. The vocabulary was organized into themes (e.g., people, toys, T.V. shows) to facilitate retrieval by Michael for his expressive use of the display and by staff to use in communication with Michael to support his comprehension of instructions.

Michael appeared to understand the use of the picture communication display when it was used to convey simple information to him. He also demonstrated the ability to make limited functional use of this display as an expressive means of communication. Michael displayed these competencies both in a clinical setting and within interaction in the natural environment. It was therefore decided that the picture communication display, in combination with his existing vocabulary of signs and gestures, would be used both to augment receptive communication and to support his expressive communication (e.g., as a means to request objects and activities that were not

present within the immediate environment and to provide information).

## Intervention

### Training approaches

The AAC system was introduced within the natural environment rather than in an isolated clinical setting, so as to teach Michael functional skills in the environment in which they would be used (Nietupski, Scheutz, & Ockwood, 1980; Brookshire, 1987; Holland, 1983). The provision of motivating opportunities for Michael to develop his ability to comprehend messages, to request objects and activities, and to provide information, were discussed with Michael's educational staff and family. For example, a food preparation activity was developed in which the picture communication display was used to instruct Michael as to the steps involved in making a fruit salad. Snack time was used as an opportunity for Michael to request preferred food items. Opportunities to provide information were difficult to establish, as Michael typically was most interested in participating in an activity rather than communicating within an interaction. However, it was observed that Michael would vocalize in an excited manner at the end of the day when his parents came to pick him up. Classroom staff were encouraged to provide Michael with an item (e.g., a completed art activity, a photograph of the day's activities) which Michael could use as a shared referent to facilitate communication when he interacted with his parents at these times. Michael's parents and the educational team added vocabulary to the display as Michael developed new interests and needs.

## Progress

### Thirteen Months Post-onset

Thirteen months post-onset (three months following the initial intervention), it was observed that Michael's comprehension was facilitated by the use of gestural input from his partners and that he was continuing to make expressive use of the gestures in his repertoire. Receptively, Michael clearly demonstrated understanding of some of the picture vocabulary presented to him using the picture communication display. The use of the communication display allowed Michael's partners to convey basic concepts to Michael that were unsuccessfully communicated by speech or gesture. At the same time, Michael, either did not understand or ignored other instructions conveyed using the picture communication display. It was unclear whether these inconsistencies were due to the ongoing seizure activity (and the accompanying medication), Michael's difficulty with the pictorial representation of an activity, or Michael's incomplete understanding of how the communication display could be used to interact with others.

Michael also was making appropriate, but sporadic, use of his picture communication display as an expressive means of communication. He made appropriate use of the communication display to request items not immediately available to him and for which he did not have a speech approximation (e.g., to request a hamburger at McDonalds, to request a visit to a friend). In using the display, Michael pointed to a single picture representing a noun to request objects and activities and provide information. He typically did not make use of the pictures that represented verbs. Although he imitated the facial expressions used to represent emotions (e.g., the smiling face used to represent happy), he did not make use of this picture vocabulary in a meaningful way to convey his emotional state.

Although Michael was making some appropriate and spontaneous use of the communication display, in many situations he preferred to obtain items independently or to vocalize or make speech approximations and point if the item was available in the environment. While this was often a successful communication technique and was recognized and encouraged by communication partners, at times the speech approximations were unintelligible and communication breakdowns occurred.

A trial training period was instigated to determine whether through repeated practice, in a clinical setting, Michael could be encouraged to make more frequent and generalized use of the vocabulary in his communication display as a precursor to conveying more sophisticated communicative concepts (e.g., requesting information, providing clarification when his speech was not understood). The trial training procedures involved a traditional approach to teaching communication display use (Collins, 1986) in which the student receives multiple opportunities within a structured situation to request items using the augmentative system. During these sessions, the use of the communication display as a means to request desired objects was modelled for Michael, and then Michael was encouraged to use his communication display to ask for preferred items that were hidden from view. At first, Michael made some use of the display in these training situations. As the training continued, however, he quickly became frustrated by the expectation that he use his communication display in situations in which he felt he could obtain the desired item more efficiently using an alternate mode (e.g., obtaining the item independently, pointing to where the object was hidden, and making use of a word approximation for "please"). Due to the fact that Michael was not making the desired progress and in fact seemed to dislike the expectations that were being placed upon him, the trial training period was discontinued after five sessions.

While Michael was being resistant to the use of his communication display within the structured training activities, it

was reported that he was continuing to make use of the communication display in more familiar natural settings. After a careful review of Michael's demonstrated competencies, the following conclusions were reached. Michael was most likely to make use of his communication skills (speech approximations, pointing, gestures, pictures) when the following criteria were satisfied: (1) there were motivating opportunities for participation within familiar routines; and (2) Michael's use of what he considered the most effective means of communication was recognized and accepted. When these criteria were satisfied, Michael typically would participate to the best of his abilities and sometimes successfully conveyed a novel message to his communication partner. For example, after an outing with a teacher's aide, he told his Mother about their trip to McDonalds by making a gesture for McDonalds and then pointing to a picture of the toy car he had received. When these criteria for participation were not met, Michael typically would withdraw from the interaction. For example, during the trial training session, when Michael's selected mode of communication was ignored, he would refuse to participate. Michael's intervention program therefore was modified to emphasize the development of motivating opportunities for communication within familiar functional activities. At these times, staff modeled the use of the communication display and gestures as effective means of communication. They were also encouraged to accept whatever mode of communication was used by Michael. If the mode of communication chosen by Michael (e.g., unintelligible speech approximation) was unclear, Michael was encouraged to clarify his message using his communication display.

### Twenty-two Month Post-onset

Twenty months post-onset (twelve months following the initial intervention) Michael continued to make use of AAC strategies. He was observed to make expressive use of approximately 70 of the 180 picture vocabulary items available to him and continued to make use of approximately 15 gestures to request objects and activities and provide information. Michael typically used his display to initiate messages. He did not use it to clarify when a spoken message was unintelligible, rather he persisted in using his speech approximation. Michael's communication partners' use of gestures and of approximately 85 picture vocabulary items as augmented input facilitated Michael's participation in a variety of classroom and home activities.

Michael's ability to participate in communicative interactions varied on a day to day basis with his physical and medical status. Ongoing seizure activity during the 12 months of intervention reported here had a negative impact on Michael's cognitive and linguistic abilities; in spite of ongoing speech and language therapy, progressively fewer spoken vocabulary items were heard during the 12 month period. While the use of a picture communication display and gestures by no means

remediated all of Michael's severe communication difficulties, they helped to compensate for the severe restriction of his speaking abilities and provided a valuable means of augmented input during communicative interactions.

## Summary of Findings and Future Directions

Michael's selective use of augmentative communication techniques raises a number of interesting issues concerning the assessment-intervention process with children with acquired aphasia with convulsive disorder. Although previous case histories have documented the use of AAC systems with children with a controlled seizure disorder, this case is unique in that the AAC system was introduced even though the subject was experiencing a high level of seizure activity. Miller et al. (1984) have suggested that children who display aphasia with a controlled convulsive disorder may be able to make use of an AAC system in a manner that reflects their previous linguistic knowledge. This was not observed with Michael, who, perhaps because of ongoing seizure activity and other unidentified factors, was only able to make use of the AAC system to communicate simple needs and wants, and provide basic information. The use of AAC systems, however, did enable Michael to understand and express concepts that were not successfully conveyed through speech. Although the prognosis for sophisticated use of an AAC system probably would have been improved by successful management of the seizure activity, this case provides evidence that important intervention work can take place even though the seizure activity is ongoing.

As to the issue of which AAC technique is best for children with acquired aphasia with convulsive disorder, the answer may be that no one technique is best, but that a combination of modes should be considered (Vanderheiden & Lloyd, 1986). Research to date has focused on the use of a single mode of AAC and may in fact have ignored the presence of communicative behaviours that were being expressed by alternate modes.

While Michael's case provides some interesting insights into the use of augmentative and alternative communication systems by children with acquired aphasia with convulsive disorder, there is a need for more detailed case studies to document the effectiveness of AAC system use in facilitating the clinical progress of these children. It is anticipated that by developing a better understanding of the language and neurological dysfunctions experienced by these children, we will be better equipped to offer effective communication intervention in the future.

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