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Augmentative communication : assessment intervention and follow-up protocols.

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AUGMENTATIVE COMMUNICATION:

Assessment, Intervention, and Follow-up Protocols

By

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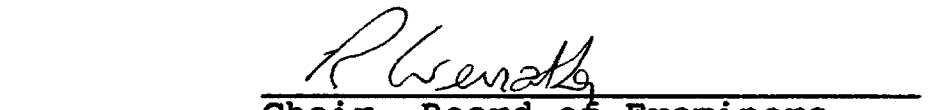

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CHAPTER 1

INTRODUCTION

"Communication is the binding force in every human culture and the dominant influence in the personal life of everyone of us" (American Speech-Language and Hearing Association [ASHA] 1977, in Deich and Hodges, 1977). The impact of successful communication is obvious in our society. The term "successful" in this sense refers to our ability as speaking individuals to say what we want, to whom we want, and when we want. However, as stated by Deich and Hodges (1977), the inability to communicate ideas and needs can be temporarily frustrating or permanently crippling to the extent of preventing or impairing normal development, normal communication and normal thinking. Thus, the quality of life is dramatically influenced by the ability or inability to communicate successfully.

Communication is a very dynamic and complicated process and is influenced greatly by the physical, emotional and mental capabilities of the client. This paper will focus on those individuals whose physical status is such that vocal and manual communication is not functional and as a result requires augmentation.

There has been a significant increase in the use of augmentative communication systems (ACS) over the last ten years. The literature provides us with a wealth of information regarding ACS. It does not, however, provide

any one specific protocol or procedure that is routinely carried out with individuals who are in need of an ACS. Those in need are the non-vocal, physically handicapped (NVPH). The term non-vocal, as it will be used in this paper, refers to those individuals for whom speech is not a functional means of communication. The American Speech-Language-Hearing Association (ASHA, 1985) provides us with an operational definition: " a group of individuals for whom speech is temporarily or permanently inadequate to meet all his/her needs and whose inability to speak is not due primarily to hearing impairment." This paper will present a review of the literature that deals with management, assessment, intervention and follow-up procedures used with NVPH individuals.

The information presented in this paper will limit itself to discussing those NVPH individuals who possess the cognitive skills needed for communication. From the literature review, this author will compile procedures most commonly implemented and compare that information to the protocol implemented at the Montana Center for Handicapped Children (MCHC) in Billings, Montana. To measure effectiveness of the strategies employed at MCHC, involved individuals (i.e., clinic manager, speech-language pathologist, occupational therapist, social worker, parents, caretakers, teachers, and clients), will be asked questions regarding adequacy of services rendered. The involved personnel will be informed of the findings and suggestions

will be made where appropriate. A case study will also be presented.

Initially, however, a brief discussion regarding the importance of communication and the pre and/or co-requisite skills needed for acquisition of a successful communication system will be presented.

Normal personal and social development is heavily dependent on one's ability to successfully communicate within one's environment. In turn, the environment must provide appropriate and adequate stimulation and a method of reinforcing the child's actions so those actions are encouraged to occur again (Vanderheiden and Grilley, 1975). Non-vocal physically handicapped children are not only unable to verbally interact with their environment but they are also unable to access their environments physically. Farrell and Sherman (1978) stated that a child's initial relationship and understanding of things in his world is based upon motor patterns and handling of things. Interactions give rise to experiences and experiences facilitate development. Vanderheiden and Luster (1975) add that children's development is characterized by an orientation of themselves in their environment, an exploration of their environment, and interaction in their environment. The importance of providing the NVPH child with a method of orienting, exploring and interacting in his or her environment at an early age cannot be over-emphasized. Having the ability to actively explore the

environment supplies the child with a knowledge base and motivation. This ability provides the foundation upon which communication is built. If no effective means of communication has been developed in the preschool years, social, cognitive, emotional and personal development will be affected. NVPH children often remain at the infant stage of development in terms of interaction. In terms of personality, early traits developed may include stubborness, aggression or similar traits which give the child some feeling of control in his or her environment (Vanderheiden and Luster, 1975). If a child enters the educational system with interactive skills of an infant and an atypical personality, the chance for a successful educational experience is unlikely.

If a child remains non-communicative through the preschool years, his or her readiness skills will also be delayed (Vanderheiden and Luster, 1975). Such delays will also have an impact on the success (or lack of success) the child achieves in the educational and social arenas. The importance of early intervention at this point is obvious.

Without an effective communication system, the NVPH child is set up for failure. If an individual experiences repeated failures at an early age, motivation to communicate is reduced. If a NVPH client is not motivated, any attempt made at implementing an ACS will be unsuccessful.

CHAPTER 2

COMMUNICATION SYSTEM REQUIREMENTS

A successful expressive communication system requires competency in many areas. Cognition, receptive language, pragmatics, syntax, semantics and an intact physical mechanism are all vital to the success of a vocal/verbal expressive communication system.

Cognition

Cognitive development is considered a major pacer of development of communication skills (Schiefelbusch, 1980). Researchers such as Bloom (1970), Bowerman (1974), and Cromer (1974, 1976; all cited in Schielfelbusch, 1980) propose a cognition hypothesis which states the following: "there are cognitive prerequisites to linguistic achievements that are necessary, but not sufficient, for these achievements". Data presently available discussing the extent to which cognition influences language acquisition is inconclusive but the fact that cognition does have an impact on language acquisition has gained general acceptance.

Jean Piaget's accounts of early cognitive development represents the most comprehensive and thorough theory presently available (McCormick and Schiefelbusch, 1984). The Piagetian view of development states that a child represents the world to himself through interactions with the environment, and that from birth to 2 years is when these initial interactions occur (Cromer, 1976, in Morehead and

Morehead, 1976). This period covering birth to 2 years of age is referred to as the sensorimotor period of cognitive development and involves the acquisition of object permanence, imitation, causality, schemes, and means-end relationships. The sensorimotor period is broken down into stages ranging from 1 to 6. It is during these stages that the above mentioned concepts appear. As the child progresses from one stage to another, the concepts he/she acquired in the previous stages become more complex and new concepts appear.

Stages 1, 2, and 3 cover birth to approximately 8 months of age. During stage 1 (birth to 1 month), the child's behaviors are reflexive and the child believes he/she is "a part of all objects and causes all events" (Owens, 1984). Stage 2 involves sound localization, visual tracking, increased hand-eye coordination, and self-imitation. During stage 3, the child demonstrates some primitive causality, object permanence, and imitative behaviors (Owens, 1984). Although some causality, object permanence and imitative behaviors appear during these stages, the child is not yet able to separate his/her self from the environment.

In stage 4 (8 months to 12 months), the child becomes "less egocentric in thought and action" when interacting with his/her environment (Owens, 1984). During this stage, the child develops means-end behaviors, more complex imitative behaviors (e.g., imitation of actions he/she

cannot see), object permanence (e.g., manual search for visually displaced objects), and a limited short term memory. Owens (1984) states that these behaviors are significant for later symbol use.

Stage 5 covers 12 to 18 months of age. During this stage, the child develops more complex methods of interacting with his/her environment and becomes more aware that he/she is a separate entity in his/her environment. Object permanence is further refined and the child will now search for an object after visual sequential and/or multiple displacements. The child's imitation skills have improved and he/she is now able to accurately imitate actions never seen before.

Stage 6, covering 18 to 24 months of age, is the last stage in the sensorimotor period. It is during this stage that the child moves from "sensorimotor intelligence to representational intelligence and can represent reality when it is not present" (Owens, 1984). He/she is able to recall actions seen in the past and replicate those actions (i.e., deferred imitation), and he/she is also able to understand and produce words when the referent is not present (Owens, 1984). It is the ability to "separate" one's self from other objects or people that is critical in terms of developing symbolic representation necessary for an expandable and flexible communication system.

Again, researchers do seem to agree that cognition plays a very important part in language development, but

that it alone cannot explain the overall acquisition process (Naremore, 1980; Bloom, 1970; Bowerman, 1974; and Cromer, 1974, 1976, all cited in Morehead and Morehead, 1976). Cognitive skills thought to be related to speech and language development include imitation, object permanence, causality, means-end relationships, and play behavior. Imitation is a skill important to early meaning formation and is related to symbolic representation. If a child demonstrates the understanding of object permanence, he/she knows that even if an object is not in view, that object can still exist. This concept is important in terms of using words to describe or discuss objects or ideas that are not a part of or a result of stimuli in the immediate environment. Having the concept of causality implies that the child realizes he/she is a separate entity in his/her environment and is capable of causing action. As a result, he/she also realizes that language can be used as a vehicle to cause action and change situations in the environment. Means-end behaviors are considered to be significant in terms of language acquistion (Bates, 1979, as cited in Owens, 1984). This skill has been correlated with language development as early as stage 4 when the child first begins to use gestures to communicate and does so intentionally. Play behaviors are significant especially when the play becomes symbolic. If the child is able to use one object to symbolize another, the potential of using a word to symbolize an object exists. However, the extent to which these skills affect language

acquistion is not clearly delineated and the research available is mostly correlational (Owens, 1984).

Even though there is no definitive data that specifies the relationship between cognition and language development, there is sufficient correlational information available that implies a definite relationship exists. According to the information presented above, symbolic representation is necessary for language development. Some skills required for this symbolic representation appear in as early as stage 4 (e.g., gestural communication and intentionality), but the ways in which the child can use these skills is limited. It is during stage 6 that the child is able to talk about things that he/she is seeing for the first time or that are not present in the immediate environment (Owens, 1984). Although the ability to talk about novel situations and/or things not present allows for flexibility and expansion of language, language skills do develop prior to acquistion of this skill.

Receptive Language

In 1957, Noam Chomsky indicated that the difference between speech and language could be made using two psychological terms: performance and competence. He went on to explain that "competence" refers to the underlying knowledge of language that an individual has and that "performance" refers to the expression of that competency when an individual understands or produces well-formed sentences (Love, Mainord and Naylor, 1976). The "underlying

knowledge" Chomsky mentions refers in part to an individual's ability to extract vital information from a communicative exchange, process that information and formulate a meaningful, appropriate response.

Receptive language skills are a part of language competence. Receptive language refers to the ability to comprehend or understand events occuring in the environment and involves a well developed lexicon. A lexicon is more than a diverse vocabulary. A well developed lexicon provides information regarding meaning, pronunciation and those words required to link words to words, words to concepts, and ultimately concepts to concepts (McCormick and Schiefelbusch, 1984).

Syntax

In addition to having a well developed lexicon (i.e., adequate semantic information), information regarding the structural aspects of the productions (i.e., syntax) is necessary. Syntax refers to word order and the acceptable ways in which strings of words can be combined.

Pragmatics

In conjunction with semantic and syntactic integrity, an individual must know how to use his/her language to initiate conversations, maintain topics, request information, request clarification or the need for more information, maintain appropriate eye contact, etc. In other words, the individual must demonstrate appropriate pragmatic skills.

Love, Mainord and Naylor (1976) stated that without language, meaningful speech is impossible. Therefore, for an individual to be a successful communicator, he/she must possess adequate semantic, pragmatic and syntactic skills.

Physiological Component

For language acquisition and acceptable speech production to occur, an intact physiological mechanism is critical. There are many physiological variables that influence language acquisition and more noticeably speech production.

Audiologically, the child must be able to hear speech if he is expected to acquire oral language. If a child is not able to hear, language becomes a barrier preventing full realization of academic, intellectual and social potential rather than a learning device (McCormick and Schiefelbusch, 1984). Horowitz and Leake (1979, in McCormick and Schiefelbusch, 1984) stated there is a growing awareness that "consistent and discriminated auditory input during the first year of life is important for language and cognitive development".

Having adequate visual skills is often overlooked when discussing skills needed for development of speech and language. As mentioned earlier, children learn through interactions with their environments. When a child is stimulated and required to process new information, the more modalities or sensory channels available for use, the more learning is apt to occur. Vision is one of the most

important methods of sensory input the child has. When a child sees things in the environment that are unfamiliar, he can see what it looks like, where it is and actively examine that object on his own. Without vision, the child would need the assistance of other individuals to explain where the object is and what the object is. The full realization or experience of the child's environment would be dependent on other individuals and their willingness to bring the child's environment to him.

The importance of an intact speech mechanism is obvious when discussing speech production. There are three major components included in the speech mechanism: the respiratory, the laryngeal and the pharyngeal-oral and nasal components. The respiratory component supplies the power source in the form of an airstream. This airstream is directed to the laryngeal component which is responsible for phonation as well as changes in pitch and loudness. The pharyngeal-oral-nasal component receives the sound and provides that sound with resonatory and articulatory characteristics. Although these components can operate somewhat independently during other tasks, they have a common end goal in terms of speech production (Hixon, Shriberg, and Saxman, 1980). Neurological integrity is vital to speech production. The willing, planning, and programming aspects of speech production require neurological coordination as do the voluntary behaviors necessary for production of an acceptable end product (Hixon

et al., 1980; Fey, 1986). Therefore, a breakdown in the neuromuscular system may result in the loss of control or coordination of the voluntary and/or involuntary behaviors involved in the speech production process.

The status of the physiological structures needed for acceptable speech production as well as language acquisition is of paramount importance. Having knowledge of the integrity of the physiological mechanism provides insight regarding prognosis for speech and language acquisition in the future.

The necessities for a "normal" and successful expressive speech/language system lie on a continuum. Although there is no set limit as to how "good" a system can be, there are thought to be minimal requirements without which a successful expressive speech and language system could not develop. These minimal requirements involve the physiological mechanisms as well as cognitive and psycholinguistic abilities mentioned previously. For a NVPH child, many of the skills needed for successful speech and language acquisition are compromised. As a result, modifications must be made so that the skills these children do possess are maximized and alternative methods are introduced to compensate for those areas compromised.

Communication System Options

A nonvocal communication system requires some modifications be made for the NVPH individual due to the compromised physical mechanism. When speech can not be

relied upon to produce a message, an augmentative production system is necessary. This alternative must include a display of what the individual wants to say, which is an alternative symbol system since the spoken word is not functional. When the message is relayed, the NVPH individual must do so in an acceptable rule-governed fashion. Because we are faced with a system that needs modifications, we must realize that with those modifications come compromises. Therefore, it is very important that changes made make best use of the client's strengths such that communication is as effective as possible (Vanderheiden and Grilley, 1975).

Reaching a decision as to the most appropriate modifications needed for each client is highly variable and the procedures professionals use in the decision-making process will be discussed later in this paper. At this point, a brief discussion of the various indication techniques and symbol system options will be presented along with information regarding communication aids/devices available for ACS users.

Augmentative Indication Techniques

If one must rely on an alternative method to access vocabulary, the rate at which information can be accessed will be affected. Information exchange in our society happens quickly, therefore, we need to choose an indication technique that allows access to be as fast as possible while still appropriate for the child's level of functioning.

Direct selection is the first method of indication to be discussed. This method simply requires the client to directly access the desired information using his/her physical skills to direct the communication partner's attention to the desired information. He/she may do this by pointing with a headstick, pointing with a finger, or directing his/her eye gaze toward the desired information.

Scanning is a second method of indication. Formally defined, scanning is a technique win which the selections are offered to the user by a person or display and the user selects the characters by responding to the person or display (Vanderheiden, Harris-Vanderheiden, 1976). Depending on the aid used, the client can respond by simply signalling when the correct choice is presented or by actively directing an indicator toward the desired choice. For example, a Light Talker is an electronic device which operates on a sophisticated software system called MinSpeak. This device can be set up to scan. The scanning process involves a light which will systematically work its way through choices on the Light Talker display. It can be set up to row-column scan or scan item by item. If a client has a scan set-up on a Light Talker and makes use of a switch to access the device, he/she would simply activate the switch when the light was at the desired location. Once the choice or choices have been made, a visual and verbal message is produced by the Light Talker. This technique is powerful in that it can be used with severly involved individuals but

speed of communication is greatly reduced. The decrease in the rate of information exchange is variable. If the scanning technique is used in conjuction with some type of electronic aid (e.g., the Light Talker), adjustments in the scanning speed can be made by accessing the software system and re-programming the scanning speed.

Encoding is the last method of indication to be discussed. Encoding refers to any technique in which the desired choice is indicated by a pattern or code of input. The pattern or code used must be memorized or referred to on a chart (Vanderheiden, Harris-Vanderheiden, 1976). For example, if the client has very limited physical ability such that he/she can not access a clinician-made communication board, he/she may have 5 numbers arranged in such a way that he/she can access those numbers. The communication board would have those same numbers going across the top and down the side of the display. When the child wants to communicate, he/she accesses the two number combination that directs the communication partner to the choice on the clinician-made board. Vanderheiden and Grilley (1975) state that this technique requires more responses and therefore, more work from the client in terms of physical and mental abilities.

Communication Aid Options

In addition to the indication options, there also are choices regarding communication aids which are available. A hierarchy exists in terms of levels of augmentative

communication aids. The various "levels" differ in the amount of energy that is required by the listener to receive and interpret the message sent. Different "categories" of aids require different skill levels in terms of physical and mental abilities of the clients as well as the communication partner.

Unaided techniques do not involve any physical augmentative aids. Examples of unaided communication include sign language, gestural systems, and directed eye gaze. No external equipment is utilized. If the information exchange is unsuccessful, the only means of repair would involve a guessing game between the NVPH client and the communication partner. The communication partner would simply ask the individual questions and when the correct information surfaced, the NVPH individual would produce some familiar signal. As one can tell, this is a very limited method and would require the communication partners to be very familiar with the client.

Fundamental or simple aids are aids that can implement scanning, encoding or direct selection techniques for indicating (Vanderheiden and Grilley, 1975). However, these aids still require effort from the communication partner. The client indicates his/her choices but the partner must interpret the movements and put everything together. For example, with a clinician-made communication board, the child simply points to a word or series of words and the partner needs to formulate and interpret the message.

Fully dependent aids produce either a spoken or written output which requires the communication partner to listen or read the message. These aids can be portable or non-portable. Commericially available examples include the Touch Talker, Light Talker, All-Talk, Epson Real Voice, and adapted computer set-ups.

Symbol System Options

Selection of an appropriate symbol system is critical to the success or lack of success of the ACS. By providing a NVPH individual a symbol system, we are providing that individual a way to represent thoughts and ideas in a form that can be physically presented to communication partners (Harris-Vanderheiden and DePape, 1977). When selecting a symbol system, it is very important to consider the appropriateness of the symbols to the needs and abilities of the NVPH client and the compatibility of the symbol system to the aid or technique used (Harris-Vanderheiden and DePape, 1977; Fristoe and Lloyd, 1978). Harris-Vanderheiden and DePape (1977) present other factors which need to be considered: the symbols should be as least restrictive as possible, they should be at developmental levels appropriate to the linguistic and cognitive abilities of the client, they should be flexible to change with the changing needs of the client, and they should be acceptable and understandable to the client and his/her communication partners.

Another issue that has surfaced when discussing symbol systems is that if a child comes to rely on an alternate

output mode (i.e., something other than speech), he/she will not be motivated to use the speech abilities they do have. Vanderheiden and Grilley (1975) cite a study done in 1974 that addresses this issue. Results indicated that 63% of children learning a symbol system showed no change in the number of vocalizations and that 35% increased the number of vocalizations during the time they were receiving symbol instruction. Franklin Silverman (1980) cites numerous research articles which also state that teaching a person to use nonspeech communication modes does not appear to reduce his/her motivation for speech.

A variety of symbol systems exist and range from being very concrete and straightforward to very abstract and nebulous. The following information provides symbol system possibilities ranging from concrete to abstract and was taken in part from Harris-Vanderheiden and DePape (1977).

Tangible objects may be used as very early symbol systems. They are very concrete and may be helpful in assessing the clients object discrimination and symbolic representation capabilities. Objects are very straightforward and once labels for the objects are learned, movement towards more abstract systems may be attempted. Problems associated with using actual objects include potential for reliance on the objects, the unavailability of objects in certain environments, and most importantly the fact that all concepts are not represented by objects (e.g., action concepts, prepositions, feelings, and emotions).

Photographs, pictures and line drawings are the next step up and requires the individual to understand symbolic representation. Utilizing this type of symbol system also requires that the client be able to store and recall information, and have better visual discrimination abilities. Problems associated with this system include the facts that pictures take up a large portion of the display, action concepts are hard to capture in a picture, and semantic categories are difficult because pictures are specific.

Blissymbols and Rebus symbols are examples of the more abstract systems available. Blissymbols are ideographic (i.e., idea based) and some are pictographic. There are approximately 50 symbol elements in the Bliss system and they are combined in different ways to produce a symbol. The symbols are presented in the form of a line drawing and are always accompanied by the written word so that individuals unfamiliar with Blissymbols can interpret the message. This system is more "general" than pictures, therefore, a wider variety of topics are possible. Bliss is good in that it can be used with pre-readers, it is less visually complex than pictures or photographs, knowledge of the "rules" of language are required when combining symbols, and as an idea-based system, generalization of concepts may be facilitated. If The child becomes competent with the "rules" of language, the transition from Bliss to traditional orthography may be easier. This has

implications in regard to the child's academic and/or vocational success. Problems associated with this system stem largely from the fact that, to someone unfamiliar with the symbols, they appear confusing and intimidating.

Rebus is a system that is composed of 950 single symbols which are primarily pictographic, Different symbols represent different words (Clark, 1984). This symbol system is more iconic than Bliss, and therefore does not require as much abstract thinking. However, because it is more iconic, it may be less flexible. Another drawback to Rebus is that the system is phonetically based and phonetic skills are difficult for the nonvocal population to master.

Abstract symbol systems that may be used with the NVPH population exist. Premack developed a system where meanings attached to the symbols were totally arbitrary. The system was initially developed for use in teaching primates to communicate. A similar symbol system was developed by Carrier (1973, 1976 in Harris-Vanderheiden and DePape, 1977) for teaching linguistic communication skills to NVPH children. The program was called Non-SLIP (Non-Speech and Language Intervention Program) and was intended to be used as a program to get children in the process of learning linguistic communication skills, not as a communication system (Carrier, 1976, in Harris-Vanderheiden and DePape, 1977).

The last symbol system which will be discussed is traditional orthography (i.e., written language). This

system is the most commonly used and requires reading and spelling skills. It is the most flexible system in that it can generate an infinite vocabulary. Traditional orthography demands the user have adequate phonetic skills which are very difficult for the NVPH individuals to develop. With a compromised speech mechanism, this population cannot personally "experience" sound production and the tactile and auditory feedback that results from that production. As a result, learning orthographic symbols would be similar to learning an arbitrary and abstract system.

There have been studies done that looked at various symbol systems and the corresponding rate of acquisition. Rebus and the simplist form of Blissymbols were shown to be easier to learn than spelled words (Clark, 1981; Woodcock, 1968, in Clark, 1984). Clark (1981) compared learning of words when presented in traditional orthography, Rebus, Bliss and Non-SLIP symbols with a group of 36 normal, non-reading pre-schoolers. She found Non-SLIP, Rebus and Bliss all to be easier than traditional orthography; Bliss and Rebus easier than Non-SLIP; and Rebus easier than Bliss. Other studies address symbol acquisition by the mentally retarded population. The results of these studies suggest that the more iconic or concrete the symbol system, the easier the acquistion (Clark, 1981 and Hurlbut, Iwata, and Green, 1982, in Clark, 1984). Even with the data available at the present time, additional research is needed. Clark

(1981) posed the following questions: 1) Does early learning of an iconic system enhance later acquistion of a more efficient abstract system such as Bliss? 2) What level of intellectual or developmental functioning is needed for nonvocal individuals to learn and effectively use rules of a generative system? and 3) What is the minimal level of intellectual or developmental function needed to acquire an iconic symbol system? Answers to these questions may provide insight and direction when choosing an alternative symbol system for communication.

Regardless of what symbol system is chosen, application of the system should be systematic and done with attention given to the client's current developmental level.

CHAPTER 3

ASSESSMENT

Service delivery for the NVPH population requires extensive data collection and requires expertise from a wide variety of individuals. A position statement on non-speech communication from ASHA (1985) delineated components involved in service delivery for this population. These components include assessment to determine the need and appropriateness of an ACS, selection and development of an effective system, development of interaction skills, and finally follow-up and ongoing evaluation of system effectiveness.

As mentioned previously, there is no one specific protocol or approach routinely used for delivering services to the NVPH population. The following information was taken from various establishments in the United States and Canada who provide services for the NVPH population. The information does not represent one specific protocol but instead is a combination of those procedures most routinely implemented across settings. Information from the following establishments was used: Ontario Crippled Children's Centre, Toronto, Ontario; Fountain Valley School District, Fountain Valley, California; Cerebral Palsy Center-Schneier Communication Unit, Syracuse, New York; Goldwater Memorial Hospital, New York, New York; Sparks Center for Developmental and Learning Disorders, Birmingham, Alabama;

Good Samaritan Hospital and Medical Center, Portland, Oregon; Memorial Hospital Assistive Device Resource Center, South Bend, Indiana; Hugh Macmillan Medical Centre, Toronto, Ontario; Glenrose Rehabilitation Hospital, Edmonton, Alberta; Communication Systems Evaluation Center, Orlando, Florida; and Montana Center for Handicapped Children, Billings, Montana.

Multidisciplinary Team

Nonvocal physically handicapped individuals exhibit a wide variety of abilities and disabilities. As a result, it is critical that there be a multidisciplinary team approach in dealing with this population. The ultimate team would consist of a speech-language clinician, an occupational therapist, a physical therapist, a social worker, a psychologist, a rehabilitation engineer, educational personnel, parent or primary caregiver, appropriate medical personnel, and representatives from the agency responsible for funding. This is not intended to be an all-inclusive team; therefore, access to other professionals for consultation is suggested.

Referrals

Initial referrals to the various sites can come from parents, school personnel, primary caregivers or any one who feels the individual could benefit from an ACS. Once a referral has been made, some of the sites send out referral forms which have certain criteria that must be met before an appointment is given. Although examples of what the sites

consider important in establishing eligibility were provided, specific criterion levels were not given. Information used in establishing eligibility include: specified age ranges, residency information, educational information, whether or not the client is unintelligible when speaking to unfamiliar listeners, if the client becomes frustrated during communicative interactions, and whether or not an obvious gap between receptive and expressive language skills exists. Such information would primarily determine whether or not the client meets eligibilty requirements of the specific institution and provide some idea as to whether or not an ACS would be beneficial and/or appropriate. Once eligibility has been established, the request for more specific information is the next step.

Pre-Evaluation Intake

Some of the service providers outlined very specific and thorough pre-evaluation intake procedures while others simply provided outlines of information needed for the overall assessment process and did not specify "pre-evaluation" necessities. Information requested on the more thorough intake forms include:

1) identifying information
2) services that have been and/or are currently being provided (eg. speech, OT, PT, psychology)
3) medical information
4) current perceptual, physical, academic, psycholinguistic and cognitive abilities

5) feeding information

6) communication skills and needs

7) the activities of daily living the client can do and those he/she has difficulty with

8) what type of assistive devices the client currently uses

(e.g. wheelchair, tray, augmentative communication devices,

glasses, hearing aids)

9) the client's and/or primary caregiver's perception of the client's communicative status and needs.

These forms are most routinely filled out by educators and/or primary care providers. If therapeutic services are being provided, some sites send out very specific forms to be filled out by the professional rendering the service. The more thorough and comprehensive the intake information, the more time the on-site evaluators have for equipment experimentation.

The members needed for the on-site evaluation are directly influenced by how comprehensive and current the intake information is. For example, if the information provided is current and thorough, there may be no need for formal assessment of cognitive, auditory, or visual abilities. Regardless of when and where the information came from, there is definite and consistent agreement as to what information is vital to the entire process.

Motor Ability

Information on various aspects of the client's motor abilities is critical in determining appropriate augmentative devices. Range of motion, strength, endurance, speed, accuracy, reliability, consistency, control, the ability to cross midline, and whether or not the client is ambulatory are all extremely important in the assessment process. Optimal positioning information and information pertaining to the presence of primitive reflexes is suggested. The status of the client's tone also deserves attention. Questions that need to be addressed include what the predominant tone is (i.e., hypertonic or hypotonic), to what extent that tone effects control, access ability and endurance, whether or not stabilizing devices improve control, and how the chosen device and positioning requirements will effect the tone. This information is important when talking about what body part can be used to access the device, positioning options, size of device and where the device should be placed.

Oral-Motor Ability

Oral-motor functioning supplies important prognostic information regarding the potential for functional speech and what chance the client has to use his/her voice as part of the overall communication system. Assessing the overall structure of the oral mechanism with attention given to symmetry, tone, control and extraneous movements of the neck, face and mouth is suggested. Identification of

primitive oral reflexes (e.g., rooting, suckling, biting) and/or abnormal response activity (e.g., tongue thrust, excessive drooling, jaw clenching) must also be made. Persistance of such behaviors may interfere with respiration, phonation, resonance and/or articulation and therefore provide important prognostic information.

Perceptual/Sensory Ability

Perceptual abilities are vital in the overall decision making process. Selection of an appropriate symbol system, display size and determination of possible indication methods (e.g., directed eye-gaze or scanning) is very dependent on the client's visual abilities. Information regarding visual discrimination, figure ground, visual fields, "visual exploration" for objects in the environment, visual localization, visual tracking of specific objects in the environment, and convergence is necessary. The client's ability to be oriented in space so that spatial relations are understood is also important. For example if the client is not able to comprehend information presented in the two-dimensional form, the type of symbol system chosen will need to be three-dimensional (i.e., tangible objects). The client's ability to adjust to various textures (i.e., whether the client demonstrates tactile defensiveness), will impact the decision-making process. If switch use is an option and the client is tactually defensive, consideration as to the texture of the surface and the type of feedback the switch has needs to be considered.

Information about hearing acuity is critical when deciding what type of input and output modes are most appropriate. For example, if a system making use of synthesized speech is a possibility, a hearing impairment would affect the NVPH client's ability to monitor the output.

Cognition

Cognitive information is critical in determining whether or not the client is an appropriate candidate for an augmentative communication system. As mentioned previously, if the client is functioning at the Piagetian Stage 6 of cognitive development, he/she should have the ability to use symbolic representation when communicating. This is not to say that a child at Stages 4 or 5 may not be capable of developing language, but children in Stage 4 or 5 would be limited in what they could use their language to talk about. For example, in order to discuss ideas and concepts that have happened or may happen in the future, the child must understand that words or symbols can be used to represent those ideas and concepts. If the child is in Stage 4 or 5, he/she has not yet fully developed that understanding. Therefore, if a child is at the Piagetian Stage 6 of cognitive development, the chances of a successful and expandable ACS are enhanced. Development of symbolic representation emerges during Piaget's Sensorimotor Stage 6. It is that symbolic representation that is vital to the development of a functional and expandable communication

system. If an individual has the ability to represent his or her world with symbols, the symbols can be used to represent thoughts or ideas he/she may have about that world. Having the more advanced symbolic representation (i.e., the ability to use Bliss rather that photographs) will allow for more flexibility and expansion of the system by providing a higher level of abstraction. Input and output methods as well as type of display will all be influenced by cognitive ability. Specific skills and functioning levels to look at include awareness, localization, attending, memory, turntaking, mental age, and level of abstraction.

Current academic skills, specifically reading, spelling and sound-symbol association, as well as academic potential, are other areas needing attention during the assessment procedure. Cognitive and academic skills influence every aspect of the decision making process. These skills determine the potential for growth as well as the complexity level of the ACS chosen. Vocational options are highly dependent on the client's academic potential. Although addressing vocational options may not be an immediate concern during the evaluation, some considerations for future vocational needs must be made.

Psycholinguistic Ability

The importance of the client's psycholinguistic abilities is obvious. At what level are the client's receptive and expressive language skills? Does the client demonstrate significantly stronger receptive skills when

compared to his/her expressive skills or does a flat profile exist? With a flat profile, chances for successful system implementation may be reduced.

Another very important consideration is the client's pragmatic skills. How does he/she use current communication skills in the environment? Having this information will influence the type of symbol system chosen, the type of vocabulary needed, as well as areas that may need specific intervention once the system is implemented.

Skills of Daily Living

Practical information in reference to the client's skills of daily living as well as daily needs is also important. Is the client ambulatory, what are his/her overall hygiene needs, and does the client have the ability to operate environmental controls? It is important that the ACS chosen does not interfere with the client's current functional skills. For example, if the client is ambulatory, it is important that the ACS chosen allows for as much movement as possible. Information regarding typical communicative exchanges (i.e., when opportunities arise, where they arise, and the typical audience present during the exchange) is necessary when deciding on the most appropriate system. This information should not be assessed only in the home environment but in the social, educational and vocational environments as well.

General Communication Needs

Finally, the most important area needing attention, which in reality is influenced by all of the areas mentioned above, involves overall communication needs of the client and the potential communication partners. What are the goals of the client and the family in terms of communication skills? Is the client mobile and how varied are the communication situations in reference to audiences, locations, topics? The most critical information needed during the assessement which ultimately determines success of an entire system includes attitude toward augmentative communication from the client as well as communication partners and the level of motivation to implement the system from all those involved. If a client goes through an entire assessment procedure and is fit with the most appropriate and functional system possible, system use will not be effective if the environment does not accept the device/devices and/or if the client and communication partners are not motivated to use the system.

Device Selection

Once the data has been collected, the various system options are addressed. Blackstone (1986) provides a list of considerations to use when selecting appropriate devices: portability, simplicity of operation and set-up, reliability, durability, applicability, versatility, feedback options, speed potential, correctability, social

acceptance, maintanence requirments, hard copy options, and cost.

There are a variety of options to consider when deciding on a system. No two clients present the same needs for a system, therefore, device selection is highly variable. The information presented in the literature was consistent in advocating the use of any and every skill the client has for communication and that no one device should be the only method used.

Regardless of the equipment being introduced, it is suggested that the professionals make systematic modifications and collect data explaining how those modifications facilitate or compromise client functioning.

If the client has enough control and is able to produce consistent and reliable movements, he/she may be a candidate for a device that could be directly accessed by pointing with his/her finger. Regardless of the device or devices introduced, certain manipulations may be made. For example, if a communication board is being introduced, the angle of the board, the size of the grids and symbols on the display and the placement of the board on the tray can and should be manipulated. Various types of indication methods should also be examined and compared (e.g., eye gaze, head pointer, finger pointer, chin pointer). When various modifications are made, it is suggested that information regarding how those modifications affect the client's range of motion,

speed, and accuracy be obtained. It is also suggested that observations of the amount of overflow movement associated with the response be made.

If the client is unable to consistently produce the "fine-tuned" movements on his own, indirect selection would be another option. Indirect selection would involve some type of interface between the client and device (i.e., switches). For example, if the client has the ability to produce consistent large motor movements, he/she could activate a switch when the desired choices are presented. Switches can also be sensitive enough such that the smallest, most subtle movements can activate an augmentative communication device. A switch simply takes the large, unrefined movement or a small barely noticable movement and activates the augmentative device. There are a variety of switches available commercially that can make use of a variety of movement patterns. Micro-switches can make use of very small muscle movements; eye blink or eye brow switches can be activated by eye movement. Some switches make use of microphones such that the sound of swallowing will activate the switch. There are puff-and-blow switches and tongue switches that can be used. For larger movements, hands, elbows, heads, knees, and feet can activate switches. The options available for switch activation seem endless. If an individual has any consistent movement pattern, it is almost guaranteed that there is a switch that would be appropriate for use.

When experimenting with switches, it is vital to have positioning and mounting information. In determining the most optimal positioning and mounting sites, things to address include how well the client initiates, sustains and releases contact with the switch, and how those specific actions affect tone, abnormal reflexes and primitive postures.

In determining the type of switch, the client's perceptual characteristics are important. For example, if the client is tactually defensive, he/she may be resistive to various textures on the interface surface. Different switches also provide different types of feedback. For example, some switches are such that the client can "feel" the activation and some provide auditory feedback as well as tactile feedback. If the client happens to be hearing impaired, the type and amount of feedback needed will vary and thus needs to be manipulated during the experimentation process.

Once a device has been chosen, a trial usage period in various environments is suggested. The purpose of this trial period would be to see if the basic communication needs of the user and his/her environment are being met. If major flaws in the system appear, they need to be addressed. In reality, continuous assessment of the effectiveness of the system needs to be done such that the changing needs of the user and his/her environment are met.

Recent advances in technology have greatly increased the augmentative communication device options for the NVPH population. Client's can make use of electronic devices that produce voice output, or they can access computers by using expanded keyboards or switches and produce written output. Because there are so many devices available, the decision making process is difficult. One of the most important factors needing attention, however, is the device's flexibility and adaptabilty to the changing needs of the user.

During the assessment, the needs of the environment in which the system will be introduced must be given attention. When the device is chosen, the individuals who will be interacting with the client need information. Therefore, when the final recommendations are made, appropriate training for the user as well as the communicative partners must be addressed. Funding options must also be provided to the client and his/her family or whoever is responsible for payment.

The initial assessment procedures hope to determine the most appropriate device or devices, the most appropriate method of accessing the device, optimal positioning information, the most appropriate symbol system, funding needs and options available, training needs for the user and the communication partners in his/her environments, and the future needs of the client and his/her environments.

CHAPTER 4

INTERVENTION

Due to the complex needs of the NVPH client and the dynamic nature of the communication process in general, it is difficult at times to decide when assessment ends and intervention begins. With the growth and maturity of the client comes the need for appropriate modifications of the ACS to ensure that the client's changing communication needs are satisfied.

There was little information regarding intervention procedures from the service providers listed earlier. Sparks Center for Developmental and Learning Disorders and Fountain Valley School District did provide some appropriate information. Additional information was gathered from sources found when reviewing the literature.

In determining where intervention needs to focus, Buzolich (1987b) suggested that the clinician or a trained observer go to the client's environment and collect data to answer the following:

1) number of communication opportunities
2) number of communication exchanges
3) number of initiations and responses by the NVPH individual
4) number of yes/no responses
5) number of communication breakdowns
6) repair methods used in the case of the breakdown
7) turn-taking behaviors of the NVPH individual.

Buzolich indicated the data collection could be done using video tapes, audio tapes or on-line transcription.

The issue of data collection with the NVPH population was addressed in the literature. Data collection is one of the most difficult aspects of the intervention procedure with NVPH clients (Blackstone, 1986). When implementing programs with this population, very little time is spent in controlled therapy settings. When the device is initially being introduced or when new symbols or vocabulary words are being added is when one-on-one therapy may be warranted. When situations like this exist, data collection is easier. However, the majority of the training with this population will be in unstructured, natural settings which do not always provide clear-cut ways to collect data. Another point is that the speech-language pathologist cannot realistically expect to be able to consistently follow the client into his/her various environments. Therefore, it is suggested that one of the client's primary communication partners be taught how to keep various types of data and how to facilitate the various types of communicative aspects the NVPH client is targeting (Buzolich, 1987b; Light and Collier, 1987; Dashiell, Hanson, Hinchcliffe, and Hunt, 1987; Higgins and Mills, 1986; and Beukelman and Yorkston, 1978).

Higgins and Mills (1986) provide ideas on how to go about implementing a "buddy system" for intervention with the NVPH population. They advocate a 4-step procedure. They

suggest the professional go into the environment and observe not only the communication skills of the NVPH client but also the communication skills and tendencies of the individual chosen to be the "buddy" as the initial step. Once the observations have been made and targets established, the initial training is done. This initial training would be done in a controlled, fairly structured environment so that the process can be monitored and immediate feedback can be given. This initial training not only involves working on specific communication targets for the NVPH individual but also involves monitoring and data collection skills of the "buddy". After the initial training is completed, the client and his/her "buddy" go into the natural unstructured environment and "experience" communication. The final step in the process involves re-training in those areas where breakdowns occurred and the repair strategy used was unsuccessful. Once that has been done, Higgins and Mills state the speech-language clinician's role would be that of a consultant and provider of follow-up as needed.

It is vital to the success of the system that the environment be accepting of and involved in the use of the system. Inservices are suggested as a way to introduce an ACS to the environment. Information regarding care and maintanence of the device or devices, device use, requirements of the user as well as the receiver, device potential as well as limitations, and funding concerns are

all issues that need to be addressed (Higgins and Mills, 1986; Dashiell et al., 1987; Blackstone, 1986; and Silverman, 1980). Suggestions to enhance and facilitate a "healthy" attitude of the environment include 1) providing inservices on equipment function, maintenance, limitations and abilities, and 2) providing information on how to be a communicative partner with an individual using an ACS (Blackstone, 1986). Another suggestion comes from a program at the Los Angeles Unified School District which states that "preparing" the environment as far in advance as possible such that they are not all of a sudden faced with implementing an ACS is helpful. By doing this, appropriate planning can be done, anxieties may be settled and questions can be addressed before panic sets in.

Symbol System Selection

The information discussing symbol system selection, vocabulary development and syntax was taken primarily from information provided by Sparks Center for Developmental and Learning Disorders and from Fountain Valley School District.

Once the device has been chosen, it is primarily the speech-language pathologist's responsibility to choose an appropriate symbol system. After the initial assessment, a symbol system may have been suggested but only time will tell whether or not the symbol system chosen is appropriate for the client. As mentioned earlier, the client's cognitive level of functioning is very important in determining appropriate symbol systems. For example, if the

client is a low functioning adult, simple line drawings may be more successful than Rebus symbols. If the client has good cognitive skills but is very young, tangible objects may be the most appropriate starting point. As the child develops the symbol system too can move to a more abstract level. It is not uncommon to change the symbol systems in order to better meet the needs of the client. It is also important to consider the needs and abilities of those individuals with whom the NVPH individual will be communicating. The individual choosing the symbols should keep in mind that these symbols have to communicate as much information as possible. Therefore, choosing symbols that have a broader semantic meaning is encouraged. When experimenting with various symbol systems, it is suggested that the vocabulary represented by the symbol be as functional and developmentally appropriate as possible.

Vocabulary Selection

When a satisfactory symbol system has been chosen, development of an appropriate vocabulary follows. Suggestions regarding vocabulary selection and development primarily stress that the words selected be developmentally appropriate, functional and highly motivating such that early experiences are successful. Methods of obtaining appropriate vocabulary may involve information from the parents, client, primary caregivers, and educational personnel in an interview situation. Observing the client in his/her school, home, and social environments to

determine the types of topics that are discussed is a way to aid in the vocabulary selection process. In reality, guidelines to be followed when increasing vocabulary for the NVPH individual are similar to those used in establishing vocabulary for a vocal, non-physically handicapped individual. The primary difference would be in the way the vocabulary is presented. The NVPH client requires modifications as a result of his/her handicapping condition.

At this point, the intervention has dealt with the symbol system which in part will replace the spoken word and the vocabulary which addresses the semantic aspect of the communication system. There are two other areas that need to be addressed: syntax and pragmatics.

Syntax

The ability to use the chosen symbol system such that messages are transmitted in an acceptable rule-governed manner requires skills in syntax. For example, if the client is using a communication board, symbols may be arranged in a Fitzgerald Key format. This format requires nouns and pronouns to be placed on the far left of the board followed by verbs; adjectives and adverbs; and direct objects. This not only is used to promote the transmission of grammatically correct messages but also trains left to right visual scanning which is vital to acquistion of reading skills. Here again, once the modifications due to the handicapping condition are dealt with, intervention

procedures will be similar to those done with vocal, non-physically handicapped individuals.

Pragmatics

Pragmatics was the area most extensively addressed in the intervention literature and is probably the area that will require the most extensive intervention with the NVPH population. Nonvocal individuals traditionally are passive communicators. Buzolich (1987a) devised a fairly comprehensive pragmatic protocol which looks at the following:

1) Speech acts which involve analysis of speech act pairs (i.e., the client's and the communication partner's ability to take either the speaker or listener role in the conversation) and the analysis of the variety of speech acts.
2) Topic information which involves selection, introduction, maintenance and change of the topic.
3) Turn-taking skills which involve repair and revision skills, pause time, the ability to obtain speaking turns, how the individuals signal it is time for the "turn" to take place, how interruptions or overlaps are handled, type of feedback, adjacency pairs, contigency information, and finally quantity and conciseness of the communication.
4) Vocabulary selection and use (e.g., how appropriate and specific the lexical selections are)
5) Stylistic variations.

6) Paralinguistic aspects which include intelligibility, vocal intensity, vocal quality, prosody and fluency.

7) Nonverbal aspects which include physical proximity, physical contacts, body posture, limb movements, gestures, facial expression and eye gaze.

When using this protocol, it is suggested that both the NVPH client and his/her communication partner's pragmatic behaviors be assessed. This makes sense when one considers the importance of the communication partner in regards to the success of the implementation of the ACS.

Suggestions for dealing with inappropriate or non-existent pragmatic skills vary. The most appropriate manner in which to address pragmatics may be through direct realistic experience and not demonstration or drill activities. This very issue was introduced previously when the discussion of data collection was presented.

Once the pragmatic goals have been chosen, it is suggested that the individual gradually increase the number of people he/she interacts with instead of immediately going into a large group. Initial interactions within role playing situations are suggested. Although this is somewhat sterile, the situation use in the role playing activity should be as familiar and functional for the client as is possible. Using familiar individuals, involvement in small then larger group activities and ultimately interactions with unfamiliar individuals in the environment is also an

option. It is very important to the success of the intervention process that the goals set be very functional and realistic. Therefore, placing the focus of intervention with the NVPH population on overall communication skills and not specific speech and language skills is critical.

CHAPTER 5

MONTANA CENTER FOR HANDICAPPED CHILDREN: PROTOCOL REVIEW

The Montana Center for Handicapped Children, MCHC, conducts augmentative communication clinics monthly. Personnel involved in these clinics include a clinic manager, social worker, occupational therapist, speech-language pathologist, the client and various support people involved with that client.

The clinic manager at MCHC primarily acts as a "behind the scenes" man whose primary responsibilities involve handling the referrals, obtaining the necessary background information and funding for the evaluation, and scheduling the appoinments and the follow-up process. He is not directly involved in the on-site evaluation. The initial referrals come from a variety of sources including school districts, social services, parents, foster parents, home trainers or physicians. Once a referral has been made, the clinic manager sends out a patient history form for the primary caretakers as well as forms which give the Center permission to obtain information needed to determine appropriateness of the referral. The type of information requested includes:

1) Academic information. If seeking academic information is appropriate for the client, MCHC has a specific school intake form that is sent to the classroom

teacher. Areas addressed on the form include handwriting, written and oral language, speech, spelling, reading and math. Behavior is another area addressed and questions pertaining to social behavior, consistency of performance, attention and independence or lack of such are presented.

2) Medical information. This includes physical history, growth grids, consultation reports, surgical reports, admission summaries and dismissal summaries.

3) Social history

4) Speech/language therapy reports

5) Physical therapy reports

6) Occupational therapy reports

7) Nutritional assessment

8) Audiological evaluation

9) Other (eg., types of adaptive equipment the client uses).

When the information is returned to the Center, the clinic manager notifies the social worker, speech/language pathologist and occupational therapist. These individuals then review the information and determine if the referral is appropriate, inappropriate or if more information is needed. If they feel the information is adequate and the referral is appropriate, the clinic manager is notified and an appointment is set up.

The on-site evaluation takes place in one day and begins with a meeting of all professionals involved in the assessment, the client and those individuals who accompanied

the client to the evaluation. During this initial meeting, introductions take place and there is an informal question and answer period which involves everyone. The therapists generally ask for information they did not obtain from the initial intake procedure as well as ask for clarification and/or expansion on certain areas they feel important. An area the speech language pathologist generally addresses at this point includes environmental needs and the needs of daily living.

After the initial meeting, the primary caretaker or caretakers meet with the social worker and the therapists do their evaluations with the client. The social worker discusses needs and concerns the caretakers may have about the client's needs and how those needs affect the environmental situation. Funding for equipment is handled by the social worker but the funding for the evaluation itself is handled by the clinic manager.

There is generally more than one individual accompanying the client to an augmentative communication clinic so when the primary caretaker is with the social worker, the other individuals may be present at the disciplinary evaluations. This is oftentimes very helpful to the therapists because they are able to ask questions about typical behaviors, and things that are motivating to the client that may be helpful in eliciting desired behaviors. These other individuals may also be able to tell if suggestions being made are realistic for use in the

client's environment.

Specific information obtained during the disciplinary evaluations varies depending on the needs of the client and his/her environment. When the therapists and social worker review the initial intake information, they will not accept the referral if most of the information regarding pscycholinguistic skills, cognitive skills, perceptual/sensory skills, oral-motor skills and motor skills has not been provided. It would be unrealistic to have to do such thorough testing on an individual in one day. The therapists do some informal interacting with the client to get a feel for the level of functioning and if specific formal testing is indicated, it is done during that time. The occupational therapist generally obtains information regarding range of motion, existence of abnormal postural reflexes, and positioning information. Together with the speech/language pathologist, cause-effect concepts may be tested using switches. For example, does the client realize that his/her motor movement can cause something to happen in his/her environment? Again, the type and amount of specific testing done at this point varies and the therapists use their professional judgement to determine whether or not testing is necessary.

Following the initial assessment, the client gets a break. At that time, the members of the clinic team meet and discuss their findings and make some initial recommendations. Such recommendations may include the

method of access most appropriate to the client, device options available, symbol system suggestions, recommendations regarding positioning (if appropriate), and any types of support the family may need in dealing with the NVPH individual.

When the client returns from the break, the remainder of the assessment time involves trying out specific equipment. At this point, the issues addressed revolve around various pieces of equipment and whether or not the equipment being tried makes optimal use of the skills the client possesses. Specific information obtained may include:

1) the positioning needs of the client, for example, how the equipment being tried affects such things as range of motion and changes in the overall tone of the client (i.e., does activation set off abnormal reflex patterns?), and wheelchair mounting considerations if the client is non-ambulatory.
2) the ability of the client to directly access the equipment via pointing or by switch activation.
3) the complexity and size of the symbol system selected as well as the size of the grids needed to display the symbols,
4) the type and amount of feedback needed for switch use as well as information regarding tactile defensiveness towards the switch if switch use is an option,

5) the possibility of the client's wheelchair serving as a solid mounting place for the equipment or whether modifications need to be made,

6) the reactions of the client and the other individuals present to the devices being tried and how willing they seem to introduce such devices into their environment,

7) the ability of the potential user to understand the synthetic speech if it is an option.

When the equipment trials are completed, the clinic team meets again and formulates a list of final recommendations. After that has been completed, the individuals receiving the services meet with the team and the recommendations are discussed and questions are addressed.

The follow-up procedures are primarily done at the request of those who received the services. For example, if after the on-site evaluation, one of the caregivers had a question, they would contact the Center for assistance. There are instances where specific follow-up appointments are scheduled for care providers who were not at the on-site evaluation. The Center does, however, have a system where they send out a postcard to individuals seen at the various clinics and ask if they were satisfied with the services. MCHC is now in the process of reorganizing that system such that questions regarding follow-up needs are specifically stated.

CHAPTER 6

PROTOCOL COMPARISONS:

LITERATURE REVIEW vs. MCHC

In comparing procedures most commonly done by the various service providers in the United States and Canada to what is routinely done at the Montana Center for Handicapped Children, few differences were noted.

In terms of the referral mechanism, MCHC does not have a specific referral form that prospective clients or their primary caregivers need to fill out. The Center simply takes the referral, does what is necessary to obtain the pertinent information, reviews the information, and then makes the decision regarding appropriateness of the referral.

The type of information requested by the Center and the other service providers is very consistent. The only difference found was in how specifically each area is addressed. For example, all service providers request information about the client's needs in his/her environment. Some of the questionnaires present open-ended questions while others take the same idea but break it down into questions such that an either/or decision needs to be made. Some service providers have specific, very thorough questionnaires for the various disciplines. For example, if the client had received occupational therapy at one point, a form would be sent to the specific therapist for completion. MCHC does not routinely use such specific forms.

Information regarding the timeline and actual services delivered during the on-site evaluation was not available in the review of the service providers. This was not suprising due to the extreme variation of the needs and abilities of the NVPH population. However, it was indicated that equipment trials are routinely done on the day of the evaluation and information regarding the personnel involved during the assessment is available.

It was indicated that a desirable team for an augmentative clinic would include a speech-language pathologist, occupational therapist, physical therapist, social worker, psychologist, rehabilitation engineer, educational personnel, parent or primary caregiver, and representatives of the agency or agencies primarily responsible for funding. This was listed as a "desirable" team but no service providers indicated this as being the routine team constituency. MCHC routinely has the occupational therapist, speech-language pathologist, social worker, clinic manager, and the client. There are always other individuals who accompany the client to the evaluation but their identity and their motivation for being there varies. Some of the individuals who have accompanied clients include parent or primary caregiver, speech-language pathologists, classroom teacher, home trainer, group home personnel, and/or social services representatives.

Specific information pertaining to follow-up procedures was also not available in the review. MCHC does have a

questionnaire that is routinely sent out to clients; they are in the process of making the questionnaire more specific such that specific needs can be addressed. The professionals involved in the assessment make it known during the final conference that they are available should any problems or concerns arise.

Some differences do exist in the way referrals are done, the way information is obtained, and the composition of the assessment team members. Although these differences are evident, it appears that there is a high degree of consistency regarding what information is needed and how that information needs to be used in determining what is most appropriate for each client. It became exceedingly obvious how flexible all the individuals involved with the NVPH population must be in order to best meet the client's needs.

The intervention procedures implemented with the clients who have been assessed at MCHC do not directly involve the speech-language pathologist on the assessment team. Intervention is done by private clinicians or school speech-language pathologists and the Center speech-language pathologist may be used as a consultant.

MCHC: Effectiveness of Protocol

To determine effectiveness of the protocol implemented at MCHC, the clinic team members, parents of children who received services, classroom teachers, classroom aids, and speech-language pathologists working with NVPH children who

were seen at the Center were asked informal questions regarding strengths and weaknesses of the services provided. The clinic staff provided some suggestions they felt would improve the quality of services as well as what they felt were the strong points of the services they provide.

The clinic manager felt that more augmentative communication devices for trial use would be beneficial. Although MCHC does have a fairly complete equipment library, some of the newest devices and options for the existing devices are not available. For example, the new voice chips for the Real Voice, the Touch Talker and the Light Talker as well as the new sythesized voice device called the All-Talk are not a part of the current equipment inventory. The clininc manager also stated that more advertising about the clinic and what it has to offer was also needed. He did feel the referral process was working well, the timeline of the on-site evaluations was appropriate and that the team involved was sufficient in meeting the needs of the clients.

The social worker indicated a psychologist on staff would help in the event that the intake did not provide sufficient information pertaining to cognitive abilities and behavioral characteristics. She also felt a more consistent follow-up procedure would be appropriate.

The occupational therapist stated that having a rehabilitation engineer available would be very helpful and would promote coordination of services. She indicated the need for more thorough intake information, specifically if

the client had received therapy. She also stated that this particular clinic was informal and that that informality was necessary for such an evaluation. She felt the one day timeline was appropriate.

The speech pathologist also indicated a psychologist would be very helpful during the on-site evaluations. The area she was primarily concerned about was the area of follow-up. She stated that the biggest reasons an augmentative communication system fails may be due to attitude of the receivers in the environment, or a mismatch in terms of the device and the cognitive abilities of the client. Therefore, if appropriate follow-up procedures are not a routine part of the process, it may be too late to salvage the system. She felt the referral and intake procedures have been appropriate up to this point.

According to this information, formulation of "therapy-specific" intake forms, more thorough follow-up procedures, increased access to various types of augmentative communication equipment and a clinic staff psychologist would be desirable.

Although the remainder of the individuals questioned are in some way involved with an individual who received services from the Center personnel, their comments were directed more towards the intervention aspect of the ACS and not the direct assessment aspect.

The special education classroom teacher questioned had a 13 year old child with cerebral palsy who made use of a

clinician-made communication board, vocalizations, facial expressions, and a Touch Talker for communication. Her comments were directed more towards the Touch Talker and its use than the other modes of communication to which the student had access. She felt the Touch Talker did not have a functional use in her classroom but she felt it did have potential. Problems she had with this device as it pertained to her needs and the student's needs included:

1) Use of Blissymbols. She was unfamiliar with the system and most listeners in the student's environment were also unfamiliar with the symbol system.
2) The vocabulary stored in the device was not functional.

She also provided suggestions that would facilitate use of an ACS in a child's environment. Suggestions given included:

1) In order to make the system functional, it must be used consistently.
2) When the device is first introduced to the classroom, an inservice regarding capabilities of the device would be helpful.
3) To find situations in the classroom where the device could be functional, it would help if a speech-language pathologist would observe and make suggestions as appropriate.

She also stressed the importance of total communication

and that NVPH individuals need to make use of everything they have for communication.

A student teacher who worked in the same classroom with the same child was also questioned. Again his comments were directed toward the Touch Talker. He was very positive about the device. The areas that concerned him were that the Touch Talker lacked spontaneity and that the voice was hard to understand. He felt that an inservice at the initial stages of implementation would be helpful.

The speech-language pathologists questioned were both public school clinicians. Their biggest concern in dealing with this population involves the overwhelming amount of time it takes to meet the needs of the children. There is very little direct contact needed but the time it takes to assess the appropriate environments, establish the appropriate symbol system and vocabulary as well as teach those in the environment what it takes to be a communication partner of a ACS user, is staggering. If a school clinician has just one NVPH individual on her caseload, she has little time for anything else. There were two other issues that concerned these clinicians. One involved the resistance she was faced with when trying to introduce an augmentative communication device (specifically a Touch Talker) into the classroom setting. The other was the lack of interaction between the ACS user and his/her peer group.

There were two parents questioned. One mother specifically provided information regarding the assessment

procedure. She felt it was the most thorough examination and provided the most useful, practical information than any other services she and her son had received. The other mother commented mostly on what it takes to have an ACS succeed because her son has had a very difficult time in getting his ACS functional. Her son is using a Touch Talker and she feels that in order for it to succeed in his environment, it has to become a part of him, that is, it always has to be where he can access it. She also indicated that the environment needs to provide as many opportunities for it to be used as possible.

The information obtained from informal conversations with the various individuals is not comprehensive enough to come to any absolute conclusions. It does seem that the assessment procedures implemented at MCHC are effective. However, concerns that did arise pertain more to the implementation of the system once it has been chosen rather than to the assessment procedures. The concerns vocalized by those interviewed were also addressed in the intervention literature. For example, the need for consistency of use, the need for environmental acceptance and education about the device, the necessity for appropriate symbol systems and vocabulary selection, were common concerns which surfaced in the interviews as well as in the literature.

To add to the information regarding the difficulty of intervention with the NVPH population, a case study will be presented.

A Case Study

Jason is a 13 year old male with cerebral palsy. He is non-ambulatory and is unintelligible due to dysarthria. Jason's primary means of communication involve directed eye gaze, various facial expressions, gestures, vocalizations, minimal use of a clinician-made communication board and minimal use of a Touch Talker.

Jason's vocalizations are unintelligible to a novel listener even when the context is known. Therefore, it was recommended that he use an augmentative communication device that would provide output that could be understood by Jason's communication partners. A clinician-made communication board was assembled and large color photographs were the initial symbols used. Jason progressed to detailed line drawings, simple black and white line drawings and then to traditional orthography. When written words were his symbol system, it was noted Jason had difficulty accessing the appropriate lexical items. At that time, Blissymbols were introduced and it was determined that Jason was better able to recall Blissymbols than written words. The Touch Talker was introduced with a Blissymbol display to supplement the other modes of communication to which Jason had access.

This past year Jason attended a special education classroom for one-half day at MCHC and was mainstreamed into a 5th grade regular education classroom at Washington School for the remainder of his day. He was provided with a full

time aid during the time he was at Washington school. Attempts were made to introduce the Touch Talker into both classrooms and were unsuccessful. Reasons suggested for the lack of success included a vocabulary that conveyed basic survival needs for Jason (eg., thirsty, hungry, hurt, identifying information) and which did not lend itself to conversational communication, lack of topic specific vocabulary for academics, lack of appropriate communication partners, and lack of external assistance from the environments. Use of the Touch Talker at home was also not successful due to limited opportunity for usage. Various meetings were set up between the speech pathologists and classroom teachers from both schools, Jason's mother, and the personal aid to hopefully make suggestions and appropriate changes such that the Touch Talker would become a more functional tool for Jason. Progress was limited.

Jason will be making an important move in regards to his educational placement in the Fall of 1988. It is critical for his academic and social success that he have a functional communication system. Over the summer months, Jason's Touch Talker and clinician-made communication board will undergo modifications such that he has access to more appropriate vocabulary. The Blissymbol system is going to be replaced by picture symbols on the Touch Talker and it will be re-programmed. This decision was made primarily because of the increased potential of picture symbols for lexical expansion. It was also made because of the resistance to

and unsuccessful use of the Touch Talker with the Blissymbol display. Jason will primarily be using the Touch Talker in his home environment over the summer and his mother is motivated to provide as many opportunities for usage as possible. She realizes the potential the Touch Talker has for Jason in the social as well as the academic arenas and wants to do everything she can to make the device functional.

Jason's system has undergone and will continue to undergo modifications as his communication needs change. Changing symbol systems and modifying vocabulary as needed were both discussed previously. Having appropriate communication partners as well as an accepting, motivated environment was also discussed. When looking at the circumstances surrounding the unsuccessful use of Jason's Touch Talker in his environments, it is obvious how critical accepting, motivated and educated communication partners are for successful implementation.

When looking at the changes that have been made, and the obstacles that have hindered the implementation procedures, it appears that the inolvement by the individuals at MCHC have been appropriate. The device selection appears to be appropriate, symbol systems have been modified to meet Jason's changing needs, and follow-up meetings were scheduled to address any concerns involved personnel had regarding the system. The main "weak link" in Jason's situation appeared to be the lack of acceptance in

his environments. A possible way to alleviate this would require MCHC personnel to provide more inservices for the individuals in the various environments. Even though education and information may help individuals better understand the ACS, success relies heavily on the attitude of those individuals in addition to an appropriate knowledge base.

CHAPTER 7

CONCLUDING REMARKS

Non-vocal physically handicapped individuals are just that-individuals. This population is complex and very diverse, which prevents the development of one specific protocol that will successfully meet their needs. The physical problems and how those problems affect communication are in themselves complicated, but, in addition to that, the complexity and diversity of the communication process itself adds yet another hurdle that must be overcome. The review of the various service providers and literature addressing service delivery for this population acknowledges the complexity of the clients. In terms of assessment procedures, there was consistency regarding what type of information is needed and how to use that information in determining optimal systems for the client. The literature available on intervention discussed syntax, semantics and pragmatics. The focus, however, was on pragmatics and not just the pragmatic skills of the NVPH individual but his/her communication partners as well. Follow-up procedures were addressed but received very little attention.

In general, the information obtained addressed service delivery adequately with the exception of follow-up procedures. There is no definitive data available that addresses effectiveness of services delivered. Possible

areas needing attention may include rate of symbol acquisition, techniques most effective in teaching various access methods, and ways to enhance introduction of the ACS into the environment. In a profession that provides services to the general public, accountability is very important and data regarding effectiveness of services is necessary. However, due to the diversity of the population, it would be difficult, but not impossible, to find a group with enough similar characteristics upon which to do formal studies.

There are many variables that have an effect on the success or lack of success in implementing augmentative communication systems. It appears that even if the most appropriate ACS is chosen (e.g., the most appropriate access method, input and output modes, symbol system, and vocabulary) without an accepting, willing environment, the system has little chance of success. If there is one area that needs more attention when dealing with this population, it would be how to deal with the negativistic attitudes in the environments. Motivation and acceptance are critical components necessary for successful implementation.

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