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The Power of Sign: Enhancing Oral Communication with Young Children with Typical Hearing

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THE POWER OF SIGN: ENHANCING ORAL COMMUNICATION WITH YOUNG
CHILDREN WITH TYPICAL HEARING.

by

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Bachelor of Science, Northern Illinois University, 2009

A Research Paper

Submitted in Partial Fulfillment of the Requirements for the
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RESEARCH PAPER APPROVAL

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A Research Paper Submitted in Partial
Fulfillment of the Requirements
for the Degree of
Master of Science
in the field of Communication Disorders

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During the 1960's and 1970's, sign language was explored as a possible bridge to speech for children who could hear, but for various reasons did not speak or spoke very little (Brereton, 2008). Sign language is a visual communication system which relies on the person's use of gestures (hand shapes, body orientation, movement of the hands, arms or body), and facial expressions to express their thoughts to convey meaning (Tolar, Lederberg, Gokhale, & Tomasello, 2007). Movement is a natural way for young children to learn and interact; sign language promotes communication and language acquisition without initially relying on the use of verbal/auditory elements.

Sign language uses a system of manual hand gestures, facial expressions, and other body movements as the means of communication (Barnes, 2010). There are many different sign language techniques available that can be used separately or in combination. For the purpose of this paper, sign language will encompass an overall method of communication, which can include gestures, baby sign, ASL, Sign Exact English, etc. and can be adapted and modified depending on the child's needs/abilities in individual cases.

Sign language can be used in multiple ways. When movement and signs are incorporated in communication, children are better able to remember what they have heard (Simpson & Lynch, 2007). This helps children to increase their receptive and expressive language. According to Simpson and Lynch (2007), sign language provides opportunities for participation for children with disabilities; this can improve self-concept as a communicator and decrease the development of learned helplessness. The most reported reason for choosing to use sign is to

improve the clarity of parent-child communication, thereby reducing the child's possible frustration at not being able to get their thoughts, needs, or desires across (Ingersoll, Lewis, & Kroman, 2007).

Sign language can be used with a variety of populations from typically developing infants, children with autism or developmental disabilities like Down syndrome, Cri du Chat syndrome, and cerebral palsy. Toth (2009) reported that children with autism, cognitive disabilities, and language disorders have demonstrated improved communication skills with the use of signs. Sign language provides a way for these individuals to communicate needs, wants, desires, or thoughts when speech is not possible. Through sign, children have an easier time expressing their needs and having them met. Sign language is visual and easier to utilize for preverbal children and individuals with disabilities (Barnes, 2010).

Speech language pathologists (SLPs) may gain insight and form treatment techniques to be used with pre-verbal or non-verbal populations by studying the usefulness of sign language. According to Simpson and Lynch (2007), sign language incorporates the natural tendency to gesture and gives gesturing a purpose, which is an effective way to communicate. Most people use their hands to express themselves as well as their voice (Barnes, 2010). Thus, sign language accesses a person's innate predisposition to gesture.

The benefits of using sign language early in a child's life could help make an impact for SLPs, parents, and the children themselves. Sign helps decrease frustration and stress for the child by increasing the intelligibility of intended

messages/requests (Vallotton, 2011). In giving the child a way to express what they want, temper tantrums and other communication breakdowns should decrease and family/caregivers will feel more confident that they are meeting the child's needs. SLPs can utilize sign language as a building block with various populations in adaptive strategies that work toward oral communication.

The purpose of this paper is to explain how sign language is used to enhance oral communication with young children with typical hearing. A variety of populations will be discussed such as typically developing infants, children with developmental disabilities, and autism. Finally, an explanation of how SLPs use sign language as a stepping stone to oral communication will be described.

Sign Language for Non-Deaf Children, Infants

"Preverbal children can communicate intentionally and explicitly through gestures" (Vallotton, 2011, p. 116). Preverbal children are capable of communicating their own desires, emotions, and thoughts through infant signs that they have invented or learned from caregivers (Vallotton, 2011). Therefore, through infant sign language, infants reveal their personalities in their own context through everyday interactions. Young children may throw temper tantrums as a result of a feeling of frustration because they are not able to verbally express themselves. Barnes (2010) discussed the idea that sign language reduces such frustration because it gives the infants an opportunity to identify important objects, express needs, and describe how they feel.

Before infants verbalize, they can use signs to express emotions such as sad, mad, scared, and happy, and feelings such as cold and hurt (Vallotton,

2011). Such expression enhances or accelerates the process of forming bonds or attachments. A study by Vallotton (2011) followed twelve toddlers over a period of three months, filming them during episodes of naturally occurring distress, during separation, diapering, and conflict between peers to determine if the infants were able to communicate emotions when under distress with the use of sign language. Vallotton (2011) concluded that when very young children are themselves experiencing a strong emotion, they may have trouble articulating those emotions. However, when sign is combined with oral communication, communication breakdowns between the adult and infant occurred less.

During Vallotton's study (2011), one particular infant was able to communicate fear through sign. Ellie is a 15 and a half month old who stared at a large dog with her eyebrows slanted inward. She signed 'dog' and pointed to it. Her caregiver said, "Yes, it's a big dog." Ellie took a couple of steps towards the dog and stopped. She signed 'dog' and 'scared'. Her caregiver said, "The dog scares you? It's ok, this dog is nice," and she stroked the dog. Ellie continued to stare at the dog while the caregiver continued to stroke the dog and verbally saying, "nice doggie". Finally, Ellie walked slowly to the dog and poked it with her index finger. She waited. Finally, after looking at her caregiver, Ellie gave the dog a hug with a smile.

Ellie initiated a conversation about her feelings and her caregiver was able to respond to her fear. The caregiver understood what Ellie was feeling and then provided reassurance both verbally and by touching the dog herself to show that the dog was gentle. In the end, Ellie used signs to describe her fear in the

moment and was able to interact with the dog. According to Vallotton (2011), as Ellie began to use her words as she grew up, she began to use signs less. However, when she had intense emotions and could not use her words, she used sign to express her emotions.

Ellie's results were consistent with Barnes (2010); her results showed that infants, 24 months of age, who were using sign language, scored similarly to 27 or 28 month olds and generated longer, more complex utterances than their peers. Barnes (2010) also reported that, on average, 36 month old infants using sign scored almost a full year ahead of their average peers; babies at 96 months averaged 12 points higher in IQ than their non-signing peers (Barnes, 2010). Sign language provided an avenue to strengthen articulation and build intelligence for normally developing children.

Therefore, through sign language, toddlers may begin to participate in choosing what they want to do and what they want to talk about (Barnes, 2010). This allows communication to strengthen the bond between caregivers and children by extending the time that the adult and infant spend together attending to the same interests. Thus, attachment and bonding develops through the use of sign language.

Another way that sign language enhances communication is through eye contact. Barnes (2010) reported that sign language helped to improve eye contact and sign required the infants to learn that communication is a rewarding, reciprocal experience. This is important to understand because as the child is developing, he or she will want to communicate and sign language provides an

early opportunity for this. The use of eye contact through sign language leads to a decrease in frustration and communication breakdowns, which in turn, strengthens bonding/attachment of the child to a caregiver.

Family Perspective

Families of babies state that it is frustrating not being able to understand what their infant or child is thinking or wanting to express (Barnes, 2010). Infant signs enhance the ability of caregivers and preverbal children to share meaning. Signing also reduces the frustration that results in children-adult relationships from ineffective communication (Vallotton, 2011). For example, if an infant is hungry, he or she can communicate this, the parent gets food, and the infant will be satisfied, while the parent will be able to build confidence that he or she is meeting the infant's needs. Infant signs actually help children build knowledge of internal states. Thus, infant signs are a simple, yet effective, way to enhance relationships between preverbal children and their caregivers

Other studies have shown a similar pattern of results and time-frame in the use of early-childhood signing. Pizer, Walters, and Meier (2007) described the way in which three families from Texas used signs with their children. According to the authors, the families chose to encourage sign as a way for socially appropriate behavior. None of the families had prior contact to sign language before the study. Some of the signs used in the families were: drink, snack, book, more, all done, down, stop, no, please, and thank you.

The parents introduced sign into family communication when their children were between 8 and 13 months old. The children's use of sign peaked during

their second year of life, fell off, and eventually disappeared entirely after the children turned two and their speech became increasingly fluent (Pizer et al., 2007). The study suggests that children (hearing or non-hearing) who acquire natural sign language as their first language tend to produce their first signs earlier than speaking children produce their first words (Pizer et al., 2007), which supports the results of Barnes (2010).

Overall, the parents felt positive about their decision to sign and believed that the practice had improved early communication in their families. According to Pizer et al. (2007), many individuals believe that baby signs might delay spoken language acquisition. However, the study done by Pizer et al. (2007) has shown that the signs used during the early stages in language development generally disappeared several months later in favor of speech.

The clinical implications for the studies done by Barnes (2010) and Pizer et al. (2007) include evidence that sign language helps improve expressive and receptive language in young children. For example, sign language accelerated spoken language development. The children who were taught to use sign performed better on both expressive and receptive language tests than children who had not been encouraged to learn such gestures (Pizer et al., 2007). Also, according to Pizer et al. (2007), the combination of sign language and spoken language not only helped gross motor abilities, but also brain development and bonding/attachment to their caregivers.

As seen in Ellie's story, signing infants often reveal cognitive and social skills at a much earlier age than most development research has previously

suggested (Vallotton, 2011). “It is possible that signs allow us to see skills we would not otherwise see until children are using words, but it is also possible that signs enhance development of social and cognitive skills” (Vallotton, 2011, p. 129). If typically developing children use sign and successfully build up their oral communication skills, children with disabilities could experience similar success.

Applications of Sign Language

Autism

The use of sign language as an alternative form of communication is justified when considering that approximately thirty percent of people with autism are functionally mute and that even after years of intensive speech training, only about half of these individuals acquire spoken language (Nunes, 2008).

Individuals with autism have difficulty with expressive and sometimes receptive language (Toth, 2009). Sign language helps as it has visual and gestural characteristics, so this can be used as a valuable tool for children with autism. Individuals with autism are more receptive to visual communication than spoken. This is evident with the popularity of the use of the PECS system, for example.

The Picture Exchange System (PECS) is a form of augmentative and alternative communication (AAC) that uses pictures instead of words to help children communicate (Toth, 2009). Toth (2009) reported that “the combination of sign language with pictures, makes it easier for the children to develop language skills than using words alone (pg. 87)”. Sign language is suggested to serve as a mediating system for speech for certain individuals and may even improve verbal articulation with time (Nunes, 2008).

There is some evidence of comparative benefit of sign language over PECS for communication use (Tincani, 2004). Tincani (2004) compared PECS and sign language training for children with autism. Two participants were chosen from a public elementary school. They were chosen because of their inability to use functional speech. The results of the study concluded that for both of the participants, sign language training helped to produce a higher percentage of vocalizations than did the PECS system (Tincani, 2004). This study provides evidence that simultaneous communication training in teaching sign language and speech produces favorable communication outcomes for children with autism, although generalization is limited due to a small number of participants.

Both sign and spoken input boosts early language development and helps children progress with the use of spoken language. In children with autism, gesture imitation has been found to be highly correlated with concurrent language ability as well as predictive of language development six months later (Ingersoll, Lewis, and Kroman, 2007). Teaching sign language imitation improves language and social outcomes and should be an important focus of early intervention programs.

Ingersoll et al. (2007) examined sign acquisition through gesture imitation in a study that included five boys with autism. The five boys, ages 34-49 months, were trained to imitate sign language and produce sign in generalized environments through prompting. The therapy sessions consisted of free play where the SLP modeled a specific gesture and provide a verbal prompt related to

the child's play up to three times, every minute on average. If the child imitated the gesture, the SLP praised him and allowed him continued access to the play materials. If the child did not imitate after the third model, the SLP physically prompted the child to imitate the gesture and then provided praise. For example, if the child placed a doll in a bed, the SLP might model placing a finger over his or her lips and say "Shh, baby's sleeping."

The results showed that spontaneous gesture imitation ability was maintained and continued to generalize to novel environments after one month (Ingersoll et al., 2007). Also, naïve strangers rated the children as using more appropriate imitation, gestures, play, social engagement, and language during treatment, which indicates that sign language intervention led to socially valid changes in the children's social-communication skills (Ingersoll et al., 2007).

Ingersoll et al. (2007) found that the children's use of spontaneous gestures was associated with their language age; children with lower language ages use more spontaneous descriptive gestures. In addition, two of the children who made little gains in their spontaneous use of signs had the highest expressive language age at intake. This finding is consistent with previous literature on typical development that suggests that as children age, they rely less on gestures and more on spoken words (Ingersoll et al., 2007). Therefore, children without higher level expressive language skills are more likely to pick up signs. Overall, this study suggests that children with autism can improve their language as a result of sign language exposure.

The usefulness of moving from imitation to forming requests is evident in a study done by Buffington, Krantz, McClannahan, and Poulson (1998). The researchers taught four children with autism, between the ages of four and six years old, to combine sign language and verbal responses to request certain objects. The results of this study suggested that teaching children with autism to use sign leads to improvements in the quality of their social communication, such as an increased number of gestures, which overtime lead to increased verbalizations. Thus, sign language functions as a communication bridge, leading to spontaneously generated signs.

Carbone and Sweeney-Kerwin (2010) examined the effects of combining manual sign language with a prompt delay and verbal prompting on the production of verbal responses in non-verbal children with autism. The SLP selected six target signs for each participant based on a reinforcer effectiveness assessment, the items were either edible, toys, or movies. The sessions were conducted twice a day, with about fifty trials where the target items were presented in a random order. Each trial began with the SLP holding a desired item at the child's eye level to signal the availability of the reinforcer. If the child wanted the item (e.g. reached for it), but did not use a manual sign within five seconds or signed incorrectly, the SLP initiated a prompt sequence for the target that began with a gestural prompt followed by verbal prompt (e.g. stating what the item is).

The children who participated in the treatment demonstrated an increase in the number of verbal responses that accompanied the signs for all three

participants (ages 4-6 years) (Carbone & Sweeney-Kerwin, 2010). The findings of this study support the conclusion that prompt delay and verbal prompting can be implemented with sign language to produce an increase in verbal responses in children with autism who only have a few verbal responses (Carbone & Sweeney-Kerwin, 2010).

Verbal prompting, which provides the child with a verbal instruction, model, or cue for a desired response (Maurice, Green & Luce, 1996), provides a route to fully verbal spontaneous utterances (an independent response without an immediate model) (Maurice, Green, & Luce, 1996). Bartman and Freeman (2003) used a combination of sign language and verbal prompting to teach a two year old with autism to request four preferred items. The first sign was mastered in 34 sessions, the second sign in 21 sessions, and the third sign in 12 sessions, and the fourth sign was mastered in only nine sessions. In addition, overall observations suggested the toddler began to echo the name of the item she was signing for. Although this was a lengthy process, the emergence of verbal imitation suggests a link between teaching sign language explicitly and emergence of verbal productions by a child with autism.

Individuals with autism struggle with expressive language, but may be able to use sign language as a communication tool. The above studies demonstrated that sign language leads to improved quality of communication, both by improving functional communication with sign usage and by encouraging verbal communication. With evidence that sign language can be used with this

population, other populations with language acquisition difficulties similar to autism might also benefit from it.

Children with Developmental Disability and Sign Language

Cri du Chat syndrome

Cri du Chat syndrome (CCS) is a rare genetic disorder with an estimated incidence between 1 and 15,000 births (Erlenkamp & Kristoffersen, 2010).

Erlenkamp and Kristoffersen (2010), state that children with CCS might have an intellectual disability, short attention span, hyperactivity, and/or aggression can also occur. Erlenkamp and Kristoffersen (2010) reported that all aspects of expressive and spoken language development are delayed in individuals with CCS. However, receptive language is significantly better than expressive language.

The study done by Erlenkamp and Kristoffersen (2010) was conducted with two girls who have Cri du Chat syndrome. The first participant was 11 years old and the second participant was 14 years old for the two recording sessions. The participants were video recorded in a familiar school room with a familiar teacher. The teacher presented the child with a folder containing pictures of everyday life items (clothes, fruits, and toys) and asked the participant to name the items in the pictures. If the child replied without using a sign, the teacher asked her if she also knew the sign and could produce the word using sign. Erlenkamp and Kristoffersen (2010) analyzed the intelligibility of the signs from the subjects.

The results of the study showed that most of the answers were given in sign and speech. Both participants produced a combination of sign and speech, although sometimes required prompting. One of the girls had to be encouraged to use combinations of sign and speech for intelligibility reasons. Erlenkamp and Kristoffersen (2010) reported that intelligibility increased overall when visual and auditory input was used together. Both participants scored better on isolated sign intelligibility than on isolated speech intelligibility. The authors also reported that “when sign and speech were produced together, the interaction between word and sign narrows down the range of possible targets of reference (as motor development can impair sign and/or speech)” (Erlenkamp & Kristoffersen, 2010, p. 244).

Intelligibility was greatly increased when sign and speech were combined (Erlenkamp & Kristoffersen, 2010). Both participants were able to improve their intelligibility by 45% over a 3 month period and after the study was done, both continued to use the combination of sign and speech production to communicate. This study also has clinical implications as the combination of sign and speech could be used for other populations to help improve overall intelligibility. .

Cerebral Palsy

Roy and Panayi (1997) discussed the concept that the more severe the physical impairment of the child, the less desirable it is to place demand on the neuro-motor system during the act of communication. The results of this concept are that the physicality of expression is reduced to a minimum and the child is not challenged to express himself/herself orally. The popularity of this perception is

evident through the increasing use of high tech devices that ignore the neuro-motor nature of communication (such as the Ipad); however, Roy and Panayi (1997) argued that there are very good reasons for encouraging the use of gestures for communication for people with severe speech and motor impairments.

Roy and Panayi (1997) suggested that gestural ability lies more or less dormant in at least a proportion of people with severe speech and motor impairments due to cerebral palsy. Roy and Panayi (1997) stated that “as the development of technology advances towards the ability to just push a button to get what you want, the need to re-examine gesture as part of a multimodal total communication strategy for AAC becomes all the more compelling (p. 68).” The authors are suggested that children with CP are not being challenged or pushed because the SLPs are looking for an easy solution for therapy. Therefore, it is important for SLPs to not dismiss the child’s potential and choose the easy route of a high-tech device, but rather to evaluate the child’s abilities and determine if sign language can be used to bring forth and exercise the neuro-motor structures that are dormant.

In the same study, the authors reported that children with CP were able to produce a variety of signs in response to verbal stimuli without training (Roy & Panayi, 1997). The encouraging results also showed that the expressive abilities of these children were above and beyond that which was regularly observed in everyday settings. The study done by Roy and Panayi (1997) indicated a genuine potential for the development of gestural responses in nature, number,

and quality. Sutherland, Gillon, and Yoder (2005) found that among those with cerebral palsy, 57% used low-tech AAC devices, with 36% using sign language as compared to high-tech devices. Once again, the idea that the SLP needs to examine all of the abilities (without either focusing on or dismissing the disabilities) of the client is crucial.

Individuals with cerebral palsy face a multitude of speech and motor impairments. Due to this, many SLPs might assume that a high tech device will be the best fit for the individual. However, further investigation should be done. Roy and Panayi (1997) and Sutherland et al. (2005) found that low tech devices, such as sign language can be used as an appropriate AAC device. Other populations, such as children with Down syndrome might find sign language as a beneficial communication tool.

Down syndrome

Children with Down syndrome often experience language learning difficulties. Expressive language, especially, is delayed often resulting in gaps between understanding a message and expressing one's needs (Bird, Gaskell, Babineau, & Macdonald, 2000). The ability to use gestures is a strength for children with Down syndrome compared to their receptive and expressive language skills (Capone & McGregor, 2004). Children with Down syndrome benefit from the use of gestures and spoken words when combined.

In a study by Capone and McGregor (2004), nine children with Down syndrome between the ages of 7-18 months were provided with bimodal input (sign and spoken words) for a target vocabulary at least twice a week. The

results showed that the children were able to use signs in combination with spoken words to meet their communication needs and decrease frustration levels. The children focused longer on tasks and more often completed tasks successfully when gestures and spoken words were combined (Capone & McGregor, 2004).

Signing can become a supportive, augmentative system rather than an alternative to speech. Studies have shown that signing does help, not only by acting as a bridge to speech, but as a form of communication in its own right (Clibbens, Powell, & Atkinson, 2002). Children with Down syndrome are often regarded as individuals who need to use signs as a step on the developmental path towards speech use (Clibbens et al., 2002). Clibbens et al. (2002) reported that children with Down syndrome learned different words in sign and speech, and that there was a sign advantage early in vocabulary development. These findings suggest that early sign language exposure enhances children's communicative ability in an important developmental period.

Foreman and Crews (1998) found that the combined uses of an unaided and aided communication system to facilitate early communication in children with disabilities significantly increased scores on intelligibility and speech production. An unaided communication system is a method of communication that does not need any technology to communicate (e.g. sign language) as compared to an aided system (e.g. Ipad) that does need technology (Roy & Panayi, 1997). The Foreman and Crews (1998) study provided evidence that the

combined use of signed and spoken words boosted early language development for children with Down syndrome.

Another example of the power of sign language was demonstrated by Launonen (2002), with a young man with Down syndrome, Eric. He used sign language and spoken words as his way to communicate. He used total communication, which consisted of speech, manual signs, gestures, and lively facial expressions. Speech was his primary way to expressive himself. However, if he did not feel like he was understood, which happened frequently, he used sign language to effectively express himself (Launonen, 2002). Eric's mixture of sign and speech provides evidence of how sign language can help augment communication when one is not being understood. Sign language provided Eric a way to clarify his thoughts and express himself when an oral breakdown occurred.

The developmental path is often delayed for children with Down syndrome; and sign language serves as a communication mechanism to either replace or augment verbal communication. A study done by Caselli, Vicari, Longobardi, Lami, Pizzoli, and Stella (1998) described three developmental stages in sign and vocal production when analyzing expressive communication in children with Down Syndrome. In the first period, children will use more signs than words. In the second period, children will produce the same number of signs as words. Finally, in the third stage, the number of words used by children with Down syndrome increased significantly while the numbers of signs

progressively decreased. Therefore, sign language is used as a stepping stone in the path of developing speech.

Clibbens (2001) observed 44 children with Down syndrome and 46 typically developing children. Clibbens (2001) compared children with Down syndrome and typically developing children and their use of sign to determine its effectiveness. The children played with toys and looked at picture cards as a method of learning sign language over a two month period. The mothers of the children were the primary teachers of sign, so that generalizations would occur in novel environments. For the children with Down syndrome, the total vocabularies, both signed and spoken, were greater than those of the typically developing group (spoken only).

At 17 months, the vocabularies of children with Down syndrome contained twice as many signed as spoken words. By 26 months, there was a significant spurt in the spoken words of the children with Down syndrome and the number of signed words decreased. Clibbens (2001) suggested that the children with Down syndrome showed an early advantage for signing and that signs significantly increased their communicative ability during an important developmental period, but fell off when spoken words were mastered.

Parents often express concerns that sign language may prevent or hinder development of verbal language, that the children might “give up” on verbal expression, that learning sign language is hard, and finally, that there is a stigma of using sign language in a speaking world (Foreman & Crews, 1998). However, the opposite is true. Without AAC, children with speech/language delays (like

children with Down syndrome), who often understand much more than they can verbally express, sometimes become frustrated and resort to unacceptable means of communication (Foreman & Crews, 1998). These might include tantrums and screaming, violence, or giving up the effort to communicate overall.

But by enabling the child to communicate through sign language, the child can be empowered to use his or her own communication abilities. Much of the frustration experienced by young children with communication difficulties is eliminated by the ability to name a desired toy, food, or activity (Foreman & Crews, 1998). Clibbens (2001) also found that providing a substitute for speech in young children, such as sign language, helped reduce frustration and challenging behaviors. It also facilitated improved interaction patterns, which also improved speech development (Clibbens, 2001).

Children with Down syndrome likely are delayed in the area of expressive language; however it has been found that these individuals benefit from the usage of sign. For this population, as well as the other populations mentioned, the combination of sign and spoken words provides clinical approaches targeted at improving the overall intelligibility for an individual child and decreases frustration and/or problem behaviors.

Clinical Implications

When beginning to teach sign language, the SLP should use signs of items/objects that are highly motivating to the child and begin by using those items to request these items/objects (Branson & Demchak, 2009). In regards to pace, the authors found it most beneficial to follow the child's lead (Branson &

Demchak, 2009). The SLP should be structured in his/her choice of which signs to teach and keep specific data on progress and which signs are or are not working.

There are many different signs for the same word from various sources. Therefore, it is important to choose the sign that appears to be the most functional for the child to sign (Capone & McGregor, 2004). However, it is also important to incorporate verbal language along with the sign. Another strategy that Capone and McGregor (2004) suggested is to get all adults involved with the child to learn all the signs and use those signs with the child. It is important not to isolate sign language with just the SLP or the parents, but also to involve other family members, teachers, or possible peers to increase the likelihood of generalization.

In order to increase the likelihood that generalization will occur, the SLP should determine if the child responds to using objects and/or pictures to learn signs (Branson & Demchak, 2009). Ultimately using both objects and pictures is critical in generalization of the skill. For example, a child may understand the sign for “truck” with a toy truck, but may need a picture to recognize that the same sign is also used for a full-size truck. The SLP also needs to make sure that the child understands how to make the gestures that comprise the individual signs (Branson & Demchak, 2009). In doing this, the SLP is verifying that the child understands how to make and use the sign before he/she can expect the child to spontaneously produce it.

Finally, once the child understands how to use sign language, it is important to expand the child's ability to combine two or more signs (Capone & McGregor, 2004). For example, if the child signs "juice", the SLP can sign and verbally say "open juice". The SLP should always keep the primary goal in mind, which is communication (Capone & McGregor, 2004). Therefore, if a child is unable to produce ASL or Sign Exact English, for example, the SLP must be prepared to modify hand shapes/motions. The goal must be to accommodate the child's physical range of motion and ensure that all caregivers involved know the modified hand shape/sign.

Overall, the importance of assessing if the child will benefit from sign language intervention should be the first step in determining if sign language is appropriate (Roy & Panayi, 1997). There are some individuals and/or populations (due to cognition, motor skills, and socio-communicative factors and desire to communicate) that will not be able to use sign language successfully. Roy and Panayi (1997) further concluded that motor deficits decrease the likelihood that sign language will be successful and recommended other communication strategies (e.g., Dynavox or GoTalk). The SLP needs to examine all of the abilities of the client to determine whether and when sign language will be an appropriate communication modality.

Conclusion

Evidence suggests that teaching sign language to infants, toddlers or individuals with disabilities does improve oral communication. Many of the studies have shown that sign language helps facilitate verbal language rather

than hinders it. It helps prevent communication breakdowns (easing frustration). Sign language offers infants a mode of communicating needs or wants, which strengthens a bond between parents/caregivers. Finally, sign language leads to bilingualism in ASL, which has known cognitive benefits.

Sign language helps increase intelligibility for children when sign is combined with speech. It increases early language development, brain growth, and motor skill acquisition. Also, it incorporates the natural tendency to gesture and gives gesturing a purpose, which is an effective way to communicate. Overall, sign language provides participation opportunities for children with disabilities and infants. This improves self-esteem as a communicator and decreases the development of learned helplessness.

Future research questions still need to be addressed. The SLP should examine the usefulness of sign language in the future now that more advanced technology is available (e.g. Ipad). Studies should examine the effectiveness of integrating the technologies with sign language to develop intervention strategies that make use of both high tech and low tech devices. Further research should also be done in regard to the populations with gross motor deficits and how sign language can help or impede communication. Much of the literature indicates that a child needs to be “ready” before sign language becomes an appropriate mode of communication; however, what exactly constitutes that an individual child is “ready” is not clearly defined. Finally, further research is required in order to see which populations benefits most from sign language and which populations benefits least.

Sign language and language development are intrinsically linked and sign language serves many functions as children acquire verbal language. Sign language may facilitate language learning (Capone & McGregor, 2004).

Attention to a child's gesture development provides evidence of symbolic development, aid in prognosis regarding persistent language impairments, and guide developmentally appropriate intervention goals (Capone & McGregor, 2004). Overall, observing a child's pre-intervention gestures provides a glimpse into his or her world and these gestures can be targeted for oral communication.

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