A Case Study of Global Apraxia

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Abstract:

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The purpose of this project is to conduct a case study by comparing research findings to my sister, Michelle, who has global apraxia. My goal is to learn more about this disorder and understand how apraxia has affected her life. To complete this project, I read all of Michelle’s medical files, interviewed her parents, her speech pathologist, and Michelle herself. I then researched apraxia through documented case studies and compared the findings to Michelle’s experience with apraxia. Through my research, I found that many individuals struggle with the same issues as Michelle. I also found that the different therapy techniques that Michelle’s speech pathologist used were also found to be effective for other individuals with apraxia. My research on this topic taught me how challenging daily activities can be for those with apraxia. This research will help me to be a better speech language pathologist because I now have a better understanding of apraxia.
Background

This case study will compare the research findings of Michelle, who has apraxia, to reported research findings. Apraxia can be defined as “A neurological disorder characterized by loss of the ability to execute or carry out skilled movements and gestures, despite having the desire and the physical ability to perform them” (Landis, 2010). There are approximately twenty-nine different forms of apraxia. Some common types of this disorder include: buccofacial, limb-kinetic, ideomotor, ideational, verbal, and occulomotor apraxia (Landis, 2010). Buccofacial apraxia is a disorder of the facial muscles that involves an inability to carry out movements of these muscles on command. Another form of this disorder is ideomotor apraxia, which is the inability to make the appropriate movements as a reaction to verbal commands or statements. Ideational apraxia involves the incapability to sequence activities with multiple movements. Last, occulomotor apraxia is a disorder in which it is difficult for the eyes to move upon command (Landis, 2010).

The focus of this case study will be on verbal and limb-kinetic apraxia. Those who struggle with apraxia of speech will have problems coordinating the movements of their mouth for speech, whereas those who struggle with limb-kinetic apraxia will have trouble executing purposeful skilled movements (Landis, 2010).

Michelle is a sixteen-year-old who has been diagnosed with global apraxia. This diagnosis includes apraxia of speech and of the limbs. Michelle’s parents noticed at a young age that she was behind developmentally. By two years of age, Michelle spoke only about five words. As a result, she began speech therapy. She continued in therapy for ten years and made significant progress throughout that time period. Many different styles of therapy were used to help Michelle make developmental progress. Among these were altered diets, sensory integration, The Listening Program (Doman, 2011), and The Wilbarger Protocol (Kopfmann, 1996). Having completed speech therapy, Michelle continues to make progress because of her hard work.

Birth to Three Years

Birth History

Michelle is the third child of four. During pregnancy, Michelle’s mother suffered from stress due to her mother’s recent diagnosis of cancer. Michelle’s mother also had many urinary tract infections during the second trimester. They were treated by antibiotics and then resulted in premature labor at thirty-four weeks. Michelle’s mother was treated for this episode of early labor with medication to stop the labor. Michelle was born five weeks later. After birth, Michelle had difficulties with regulating her temperature. She was then placed in an incubator for twelve hours. She and her mother were sent home after two days in the hospital.
As Michelle continued to develop, her parents began to notice delays in language and other areas. Her mother remembers that Michelle was a “thin, cold baby,” who failed to gain any weight. At fourteen months, Michelle was twenty-nine and a half inches long and nineteen and a half pounds compared to her birth weight of seven pounds twelve ounces and birth length of nineteen and a half inches. As a result, Michelle had thyroid testing but the results were within normal limits.

Developmental History

Motorically, at ten months, Michelle began to crawl; she proceeded to walk at fifteen months. By two years old, Michelle began to run and jump. However, these actions were not fluid, appearing uncoordinated and clumsy. Also, at three and a half years, Michelle became toilet trained.

Michelle’s parents became concerned about Michelle’s lack of language at eighteen months. At ten-and-a-half-months, she was able to say “mama” but had added only four more words by the time she was two. At other times, Michelle would produce a word but not say it again for months. She was unable to produce any word combinations until three years of age. During this time, she would often relapse back to babbling. In addition, Michelle would minimally make eye contact during speech but was very socially interactive.

Because of Michelle’s communication delays, she would often get frustrated, which caused her to cry often. Along with her language delay, she was also unable to point to objects due to her inability to sequence the movements of her body. Michelle’s mother has often expressed that she wishes they would have taught Michelle sign language to make communication less frustrating.

Michelle was tested several times during this stage in her life by a pediatric and adolescent neurologist. At two years and seven months, Michelle was found to have a moderate delay in receptive and expressive language skills. The evaluation determined that she had gross motor skills that were developmentally appropriate for her age. However, most of her developmental skills were thirty percent below her age level, specifically in fine motor and language skills. Michelle was also diagnosed with a mild separation anxiety disorder at this time. At two years of age, Michelle began speech therapy sessions because her parents were told by her pediatrician that they needed to wait until she was two before they could receive any help.

Three to Six Years

At three years and four months, Michelle was evaluated at the Cleveland Clinic. Due to her language delays and poor socialization, she was thought to have pervasive developmental disorder (PDD), which is a developmental brain disorder in which there are impairments in social interaction and communication skills (Landis, 2010). Results of this evaluation also showed that Michelle had several strengths. She was able to identify colors, name items and
pictures, complete puzzles, hold a crayon, and build a block tower. She also demonstrated understanding of prepositions. Along with these strengths, she showed weakness in counting, relating verbal stories, comparing, sequencing, and understanding someone else’s perspective.

At age four, Michelle was assessed at Rainbow Babies and Children’s Hospital. They documented that Michelle tended to resist any changes in her routine. It was also noted that she tended to ritualize behaviors when she was tired or stressed. In loud environments and other over stimulating situations, Michelle often got overwhelmed and desired close contact or certain textures on her skin, such as touching certain fabrics or having her hair brushed. In this assessment, the results showed that Michelle functioned between a two and three year old age level in language and comprehension, even though she was slightly over four years old at the time.

Michelle was tested for allergies at age six to see if diet had any correlation with her language delays. The results indicated that she was allergic to twenty-four different foods. This was a major obstacle for her and her family. For one year, her entire family went on a special diet that eliminated any food that could be an issue. These foods were slowly re-introduced back into Michelle’s diet and she did not react to any of them. A re-test indicated no allergic reactions.

Six to Twelve Years

Kindergarten

Michelle attended a small private school in her hometown for kindergarten through sixth grade. Prior to elementary school, she attended speech therapy twice a week. Therapy then was reduced to once a week when school began. Michelle’s speech pathologist used a client-centered play therapy approach called DIR/Floortime (Greenspan & Wieder, 2011) and sensory integration in her sessions.

DIR stands for therapy that is developmental, individualized, and relationship-based. This approach aims to follow the child’s natural emotions and interests in therapy, while still challenging the child in intellectual, social, and emotional skills. DIR also emphasizes the valuable role of parents in therapy, due to their emotional relationship with their child (Greenspan & Wieder, 2011). Sensory integration is a technique that helps individuals become aware of their environment through their senses. This form of therapy has proved to be extremely effective for Michelle.

Other methods that were used in therapy were The Listening Program (TLP) (Doman, 2011) and the Wilbarger Protocol (Kopfmann, 1996) or brushing therapy. The Listening Program is a supplement to therapy that entails the client listening to psychoacoustically modified music. This program is designed to stimulate the auditory processing system. By doing this, it allows the brain “…to better receive, process, store and utilize the valuable information provided through the varied soundscapes in our lives such as music, language and the environment in which we
live” (Doman, 2011). This program helped Michelle calm down after experiencing an overwhelming situation.

The other supplement that was used with Michelle is called the Wilbarger Protocol, which is a brushing therapy. This method was used to help Michelle with her sensory problems. It involves applying deep pressure to the legs, feet, back, arms, and palms with a specified brush. Following the brushing are joint compressions, which should be administered to give the client proprioceptive input (Kopfmann, 1996). The speech pathologist also used therapy time to properly teach Michelle’s mother how to administer therapy at home to continue Michelle’s progress. She sent home daily exercises such as mouth strengthening activities, language games, blowing exercises, Wilbarger Protocol, and The Listening Program. Michelle attended speech therapy with the same therapist from the time she was six, until she graduated at twelve years of age.

First Grade through Sixth Grade

At the end of kindergarten, Michelle was assessed and it was determined that she was now eligible for special education services. Following this assessment, she began to see an interventionist the following year, who provided additional help to Michelle during the school day. An Individualized Education Plan was also created to help Michelle receive the modifications and accommodations she needed for school. Michelle was removed from her classroom to learn most of her core subjects with the interventionist. With this specialist, Michelle was introduced to a reading mastery program. At that time, she was reading at a pre-school level. Also at this time, Michelle was participating in a program called Kent State University’s Movement and Leisure Skills Program. This was designed to provide individualized physical education to Michelle.

At the age of 6, the Clinical Evaluation of Language Fundamentals-3 (CELF-3) (Semel, Wiig, & Secord, 1995), The Goldman-Fristoe Test of Articulation-2 (Goldman & Fristoe, 2000), and Verbal Motor Production Assessment for Children (VMPAC) (Hayden & Square, 1999) were administered to assess Michelle’s receptive and expressive language, articulation, voice, fluency, and pragmatic language skills. On the CELF-3 (Semel, Wiig, & Secord, 1995), Michelle received a standard score of 94 in the receptive portion, a standard score of 88 in the expressive part, and a total language score of 90, which indicates language functioning within one standard deviation of the mean. The results also showed that she has a mean length of utterance (MLU) of 4.6 words.

The Goldman Fristoe Test of Articulation-2 (Fristoe & Goldman, 2000) assessed Michelle’s speech sound production. On this test, she scored a 77, which corresponded to the 4th percentile for her chronological age. The VMPAC was used to further assess Michelle’s speech and showed that her speech production problems were due to issues in focal oromotor control, sequencing sounds, and speech characteristics. Michelle was re-assessed at age nine using a
This assessment involved Michelle saying lists of isolated words. She scored within the average range compared to other children her age. On a different subtest, Michelle was given short passages with words randomly deleted. She was to use context clues to determine the missing word. On this subtest, she scored in the low average range, because she was unable to use strategies to determine the missing word.

At the age of twelve, she was assessed again with the Wechsler Individual Achievement Test-II (Wechsler, 2001). The evaluation still showed a low average score with reading words in isolation and decoding nonsense words. Her ability to read orally was more advanced than her comprehension of the materials. Michelle showed strength in spelling, scoring in the average range for her age. Written language was reported to be a challenge for Michelle; her score was in the low average range. Oral expression also showed to be in the lower average range. Overall, this assessment showed Michelle’s strengths to be in basic reading skills, written language (spelling), and oral expression.

In 2001, Michelle was seen again by a developmental pediatrician. However, he did diagnose her with oral-motor apraxia and an anxiety disorder. However, he found no evidence of pervasive developmental disorder.

Twelve Years to Present

After sixth grade graduation, Michelle was homeschooled for junior high and high school. Her parents wanted to give more individualized attention to her in hopes that she would improve her grade level. Not only did she increase her ability to complete school work, but her anxiety level also decreased, due to working in the comfort of her own home. This new school environment allowed Michelle to learn in a way that was best for her. She has learned that she best comprehends information when it is read out loud. Home schooling allows her the flexibility to read anything she needs out loud. I asked Michelle about reading to herself compared to reading out loud. Without hesitation, she said reading out loud is much easier. When she does have to read silently, she is unable to comprehend what she reads.

Michelle’s IEP has continued to be updated every year, with the help of a special education teacher that is close to the family. Specific goals were written to help Michelle take full advantage of her learning experiences. For math and science, Michelle is to have her lesson individually taught to her so she can successfully understand the material. Another goal includes attending her church youth group weekly and volunteering three times a year for social communication. Assessments have also been administered by a certified teacher. These evaluations determine if there is any area in her educational program that needs to be altered or modified. In addition to these assessments, a parent administered test, called the California Achievement Test, has also been completed with modifications per her IEP. To ensure her grade level, the test was given twice in two different grade levels, the current level and one grade
lower. These tests showed that Michelle is no more than two grade levels below her current grade in some academic areas.

In 2010, Michelle’s parents were concerned about her anxiety level because it appeared to be increasing dramatically. They returned to the developmental pediatrician for additional input. This led to more assessments, administered in two separate sessions due to her anxiety. The tests used for this assessment were the Wechsler Adult Intelligence Scale-4th Edition (Wechsler, 2008), Leiter International Performance Scale-Revised (Roid & Miller, 1997), Woodcock-Johnson III Tests of Cognitive Abilities (Woodcock, McGrew, & Mather 2001b), and Woodcock-Johnson III Tests of Achievement (Woodcock, McGrew, & Mather, 2001a). During these assessments, Michelle often needed the test instructions to be spoken out loud or repeated. The results of the Wechsler Adult Intelligence Scale-4th Edition (Wechsler, 2008) showed that Michelle had low overall cognitive scores compared to other children her age in verbal abilities, working memory, defining words, answering questions, repeating sentences, and mental math. However, she had an average cognitive score in processing speed and in coding, as well as a high average score in symbol search. The other tests also showed low overall scores in most of the sections. The doctor documented that Michelle’s verbal intellectual abilities were somewhat better than her nonverbal intellectual abilities. He also noted that her academic achievement is better than expected given her intellectual abilities. He credited her achievements to her very hard work as well as her mother’s goal to maximize her education opportunities. Since this time, much talk has occurred about college and job opportunities. Her parents’ goal is to ensure that Michelle is able to function and succeed in her environment.

Relevant Research Findings: Global Apraxia

Evidence of Motor Programming Deficits in Children Diagnosed with DAS categorizes apraxia as a disorder that is caused by a range of “(a) a disturbance localized at the level of phonological representation; (b) the phonological encoding process; (c) the generation of a phonetic program up to the motor planning, programming, and execution levels; and (d) the generation and utilization of frames” (Nijland & Maassen, 2003). The authors of this article conducted a study to determine whether or not motor-programming problems are associated with apraxia. The participants of this study were five children with Developmental Apraxia of Speech and five children who spoke normally. Each of these children was between the ages of 5 years and 0 months and 6 years and 10 months. Speech material in this study involved two-word utterances with CV syllables. These utterances were either spoken with a bite block clenched between the participant’s teeth or without the bite block. After the participants were told the phrase, they were asked to repeat the utterance. If the participant was unable to produce the utterance correctly, they were permitted a second attempt. The results showed that both groups of children were unable to completely compensate for the bite block, however, the children with DAS had more difficulty than the group without DAS. The researchers felt this difference was the first indication that the children with DAS had disturbances in motor planning in normal speech. It was also noted that the bite block made the children with DAS sound like the children
without DAS, therefore indicating motor programming issues. (Nijland & Maassen, 2003). This association of apraxia and motor programming issues is evident in Michelle. She often has trouble planning out her actions and then carrying through. However, she is a very hard worker, so this challenge for her is not always noticeable.

On The Listening Program website (Doman, 2011), case studies can be found about clients’ successes with this form of therapy. One child used The Listening Program (TLP) to help with his dyspraxia and coordination disorder. He was also found to have sensory integration problems and sensory defensiveness. This therapy helped him make gains in all the areas in which he struggled. It also eliminated his sensory defensiveness. TLP was chosen to provide him with more input into his vestibular system to help his posture and balance, as well as improve attention and organization. This program was used via CD player and specific headphones. By completing this program, the client now displays the equilibrium responses needed for balance. He also has shown improvement in his vestibular and proprioceptive input, posture, and visual motor skills. (Doman, 2011).

Drastic results via The Listening Program were also seen with Michelle. This form of therapy was used for four week periods at a time. Michelle’s parents began to use this program for her because of her high anxiety in overwhelming and frustrating situations. Her parents were able to see the results of TLP within one week of use. They noted that Michelle would “get more organized” and would not be as easily overwhelmed and frustrated.

Motohide Miyahara and Isabelle Mobs wrote an article titled Developmental Dyspraxia and Developmental Coordination Disorder. In this article, they correlate apraxia with forms of clumsiness. Within this association, clumsiness can be characterized by “poor fine and gross motor skills, kinesthesis, balance, gait, and difficulty in learning new sequential movements” (Motohide & Mobs, 1993). It is also noted that children with apraxia are usually able to learn simple movements such as walking, running, tossing, swimming, etc. However, these movements are usually performed without grace. These children tend to have much greater difficulty in performing more complicated movements such as dancing, skating, sewing, tennis, and overhand throwing (Motohide & Mobs, 1993). Further along in the article, it is stated that children with apraxia are also believed to have various motor problems as well. It is thought that these children are often the “motor incoordinate” type (Motohide & Mobs, 1993). These children have a “…history of delay in learning to talk and walk and of lack of nicety of balance and consequent frequent falls and of indecision in the choice of the right or left hand in using the knife, fork, and spoon, all of which speak for a definite delay in decisive dominant control of the motor mechanisms” (Motohide & Mobs, 1993).

Most of these reported research symptoms of clumsiness, difficulties in complicated movements, and motor problems are evident in Michelle. As a young child, she was delayed in her fine and gross motor skills and today these are areas that are still difficult for her. Many of these areas also prove to be a challenge for her due to proprioception issues. Michelle has often
have difficulties with being aware of her body in space. This can be shown in drawings that she
drew as a young child. The people in her pictures often had arms to the floor and very large
hands that were disproportional to the rest of the drawing. Other times, she would often leave out
one side of the picture. Because Michelle has problems sequencing movements, she has
difficulty performing complex movements such as swimming or skipping. In addition, balance is
also an issue, which makes riding a bike challenging.

**Overall Findings and Reactions**

The purpose of this case study was to compare research findings to Michelle, a
sixteen-year-old girl, who has global apraxia. From my research, I have learned that Michelle’s
experience with apraxia is not unique only to her. It is not uncommon for individuals with
apraxia to struggle with motor planning, sensory awareness, organization, balance, and anxiety. I
have learned that individuals with apraxia may struggle with anxiety because of overwhelming
situations, the inability to motor plan, or a lack of sensory awareness. This project has helped me
to better understand what those with apraxia must live with every day. I have such a great respect
for Michelle because she constantly overcomes challenging situations and aims to succeed in her
environment.
Reference List


