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Autism Spectrum Disorder: A Case Study of Mikey

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Abstract

This paper describes Autism Spectrum Disorder (ASD) including diagnostic criteria, suspected causes, prevalence, comorbidities, and influences on client factors. A hypothetical case study is presented to give readers an illustration of what someone with ASD might look like. Possible treatment based on evidence and selected frame of references will be given for the hypothetical client. This paper is not all inclusive of the role of occupational therapy in the treatment of Autism Spectrum Disorder, but gives an illustrative example.

Keywords: Autism, occupational, sensory, child, ASD, PEOP, CBT, ASI, STAR Method, A SECRET, Hippotherapy, Social Skill, sensory profile, revised knox play scale

Introduction

With a rise in Autism Spectrum Disorder (ASD) diagnoses (Centers for Disease Control and Prevention, 2015) it is important that clinicians are acquainted with strategies to enrich client's lives and increase their occupational performance. With regards to the holistic occupation based treatment of individuals with ASD, there is not an abundance of research that provides evidence-based solutions, aside from sensory-based approaches. There is also a lack of research describing the large role of occupational therapy treatment in ASD care. This hypothetical case study aims to describe diagnostic criteria for ASD, suggested causes, prevalence and incidence, impact on client factors, comorbidities, and will end with a case study that describes a typical pediatric client with common characteristics of ASD and includes insight on evidence-based evaluation and treatment to improve functioning for the client, caregivers, and family.

Diagnostic Criteria for Autism Spectrum Disorder

Autism Spectrum Disorder is a disorder that may affect many aspects of an individual's life. A diagnosis of ASD can vary in severity and symptoms. According to the American Psychiatric Association's Diagnostic and Statistical Manual (DSM-V), a diagnosis of ASD must exist in early development, generally before age 6. In addition, when diagnosing ASD, it is necessary to be certain to not misdiagnose ASD, by first ruling out the diagnosis of intellectual development disorder or global developmental delay. A diagnosis of ASD always includes the following aspects:

Persistent current or past behavior across a variety of settings with shortfalls in emotional and social exchanges, nonverbal communication, as well as forming, upholding and comprehending relationships.

Specific, repetitive activities, hobbies and actions that include stereotyped movements, rituals or inflexibility, extreme abnormal interests, and/or problems with sensory reactions.

The DSM-V also declares the level of severity (ranging from one to three). A severity of one indicates that a child “requires support” and a severity of level three indicates that the individual “requires very substantial support” (American Psychiatric Association, 2013). To summarize, ASD can cause many concerns, and can considerably impact an individuals functioning in numerous aspects of life.

Autism Spectrum Disorder Background

Suspected Causes of Autism Spectrum Disorder

The exact cause of ASD is currently unknown, but there are many theorized causes. These causes range from genetic factors to environmental factors to neurological abnormalities. This paper will discuss some examples of the hypothesized theories, but it is not an all-inclusive list, and will not fully explore each topic.

Genetics. Numerous studies have found links between ASD and genetics. Genetic etiology is supported by the statistic that every twin study focused on ASD found that monozygotic twins have a higher co-occurrence of ASD (Geschwind, 2011). This cause is also supported in a study by Bolton and his colleagues, who found that relatives of individuals with ASD have a significantly higher risk of also having the disease than the general population (Bolton, et al., 1994). Although there is evidence to support a genetic cause of ASD, according to

Abrahams and Geschwind, "...the most common genetic forms account for not more than 1–2% of cases" (2008). Therefore, genetics could significantly contribute to some cases of ASD, but it is suspected that it is in combination with a variety of other causes.

Environmental. Several researchers have examined various environmental combinations to determine the cause of ASD. Parental age at the time of birth is a risk factor that increases as each of the parent's age advances. Conditions at the time of birth may also contribute to increased risk factors such as low birth weight and age of gestation (Kolevzon, Gross & Reichenberg, 2007). On that account, environmental factors at the time of gestation and birth may be causes of ASD.

Neurological abnormalities. Various researchers have been focused on finding a neurologic link to the cause of ASD. A study published in 2012 aimed to study the anatomical structures in the brains of female children. This study concluded that in the left superior frontal gyrus, the female children with ASD had more gray matter than the control group of female children. The study also revealed that the females with ASD had a more complex circuit of increased cortical volume (Calderoni, et al., 2012). Piven, Saliba, Bailey and Arndt concluded that in individuals with ASD the cerebellar volume is enlarged compared to individuals without ASD, possibly contributing to the cause of the disorder (1997). The number of Purkinje cells found in the brains of those with ASD has been discovered to be significantly low, contributing to possible causes of ASD (Rivito et al., 1986). Finally, decreased activation of the frontal lobe has been found in individuals with ASD as well (United Kingdom Medical Research Council, 2001). In summary, increased gray matter, cortical and cerebellar volume, as well as decreased Purkinje cells and activation of the frontal lobe can all attribute to the cause of ASD.

Prevalence and Incidence of Autism Spectrum Disorder

The number of diagnoses of ASD is increasing at a rapid rate. According to a population-based estimate by the Centers for Disease Control, 14.7 children out of 1,000 children in 11 communities in the United States are identified to have ASD. The same study states that a diagnosis of ASD is four and a half times more common for males than females, with a prevalence of one in 42 boys compared to one in 189 girls. Children who are Caucasian have a 50% higher rate than Hispanic children of being diagnosed with ASD, and a 30% higher rate than African American children. The average age when a child is first diagnosed with ASD is near the age of four (2010). Caucasian males are the most likely to be diagnosed with ASD.

Impact of Condition on Client Factors

As ASD is a broad disease, the impact on client factors ranges for each individual diagnosed with the disorder. It is important to understand ASD's influence on these client factors as they can greatly affect performance skills and occupations.

Sensory system. As said by Dawson and Watling, the sensory system serves as a compass for one's body and guides children through development. Individuals with ASD do not have difficulties with perceiving sensory information, rather they have hard times processing the information, causing them to react abnormally (as cited in Shangraw, 2012). Prizant, Wetherby, Rubin, Laurent & Rydell state that children with ASD are known to often rely on their visual processing skills in order to cope with the symptoms of ASD (as cited in Shangraw, 2012). Although it is likely for these visual processing skills to be intact, most children with ASD have a deficiency integrating details of a figure into a whole (Deruelle, Rondan, Gepner & Tardiff, 2004). Children with ASD frequently struggle with auditory processing. According to Kientz & Dunn, children tend to be over responsive to some common noises, while they may not respond to other common noises. These children also have mixed responses to vestibular sensations (as

cited in Shangraw, 2012). According to Williams, Dalrymple & Neal, numerous children with ASD exhibit patterns of inappropriate smelling of objects as well as attachment and extreme avoidance of certain smells (as cited in Shangraw, 2012). Thus, although children with ASD rely on strong visual processing skills, these children may have issues with other visual functions, as well as auditory, vestibular and olfactory processing.

Mental function. Attention deficits are a widespread implication for individuals with ASD (American Psychiatric Association, 2013). The memory of those with ASD is increasingly negatively affected as the complexity of the tasks/routines increases, according to Minshew and Golstein (2001). Although cognitive impairments do not occur in every individual with ASD, a low IQ rate affects roughly three fourths of the ASD population (American Psychiatric Association, 2013). Lord and McGee summarize that children with ASD often have problems playing with toys appropriately and symbolically and generalizing concepts (as cited in Shangraw, 2012). Gordon states that children's ability to use executive functioning skills in learning are also negatively impacted when they have ASD (as cited in Shangraw, 2012). Attention, memory, and cognitive issues may be a consequence of ASD.

Digestive system function. Children with ASD often report gastrointestinal problems such as gastritis or reflux (Levy et al., 2007).

Urinary function. Although urinary functions are not normally impaired in ASD, as Ruble and Dalrymple state, children who have significant cognitive issues or sensory issues may struggle with toilet training (as cited in Shangraw, 2012).

Gross and fine motor skills. Generally, children with ASD have some degree of motor impairments. Rapin, Dawson and Watling, argue that motor joint laxity, clumsiness, apraxia, toe-walking, and hypotonia, along with issues in hand-eye skills, speed, praxis, imitation,

posture, balance, and problems with skilled movement have been noted in children with ASD. Motor stereotypes are typical for children with ASD, made evident by hand flapping, pacing, running in circles, spinning, flipping light switches, and sometimes self-injurious behaviors like biting, hitting, or head banging ASD (as cited in Shangraw, 2012). These motor impairments and stereotypes can negatively impact children's occupational performance.

Comorbidities

Sensory Processing Disorders. Although Sensory Processing Disorders (SPD) and ASD are individual disorders, they share many similar symptoms. As discussed in the sensory system subsection of this paper, individuals with ASD face numerous sensory issues. In a study by Tomcheck and Dunn, it was concluded that 95% of their sample population of children with ASD had some degree of SPD (2007).

Food selectivity. Closely tied with SPD, children with ASD may have mild to severe issues with food selectivity. Sometimes misinterpreted as children who are picky eaters, food selectivity is an aversion to certain foods, drinks and medicine due to their appearance, taste, smell, and/or tactile sensation. This selectivity can affect children's social and home life, as well as result in nutritional deficiencies and missed medications. According to a narrative literature review by Cermak, Curtin and Bandini, many studies link a high prevalence of food selectivity and children with ASD, although it is difficult to conclude the scale and impact of the problem with the current research (2010).

Attention deficit/hyperactivity disorder. Several symptoms of ASD and attention deficit/hyperactivity disorder (AD/HD) overlap, making this disorder a common comorbidity with Autism. As noted in the mental functions subsection of this paper, children with ASD

frequently have attention deficits. According to research done by Matson, Rieske, and Williams, “recent estimates of AD/HD within the ASD population have ranged from 20 to 70%” (2013).

Obsessive-compulsive disorder. Obsessive-compulsive disorder (OCD) also shares some similarities with ASD such as stereotypical or repetitive motor movements. In a 2006 study, 37% of children with ASD additionally met the criteria at the time to be diagnosed with OCD (Leyfer et al., 2006).

Anxiety. Anxiety is a disorder where an individual feels excessive and uncontrollable worry and/or fear. Some symptoms of anxiety include restlessness, fatigue, concentration issues, irritability and sleep disturbances (American Psychiatric Association, 2013). The symptoms of anxiety can cause issues for a child’s home, school and social life. White, Oswald, Ollendick, & Scahill found that various studies have shown a percentage of 11% to 84% of children diagnosed with ASD suffering from life impairing anxiety (2009).

Case Study

History

Mikey is an eight-year old male who was diagnosed with ASD with a severity requiring substantial support at age four by his pediatrician. Mikey is in third grade and has seen an occupational therapist through his public school system for the past two years. Mikey has difficulty maintaining social interactions and engaging in age appropriate play with his peers and sibling.

Reason for referral

Mikey’s parents have expressed that he is having difficulty with his morning routine, causing behavioral issues. When Mikey has these issues his entire day is thrown off, resulting in trouble concentrating on schoolwork and increasing difficulties interacting with his peers

throughout the day. Mikey's parents would like a home evaluation and recommendations from an occupational therapist in order to allow him to better function, especially during the mornings. Mikey's family would be willing to purchase accommodations to better help Mikey function, and would commit to occupational therapy treatment outside of the school.

Evaluation Procedure

Three home visits were conducted to observe the child on the weekend mornings as well as in the morning and at night on a school day. The Sensory Profile (Dunn, 1999) and the Revised Knox Play Scale (Knox, 1974) were conducted.

Evaluation Results

Caregiver interview and observation. Mikey's parents revealed that Mikey will sometimes scream when he is awakened by noises in the house such as the blender, his alarm clock, or his sister crying. They have found that Mikey has a difficult time waking, getting ready for school, interacting with peers, and completing coursework during these days. They have also stated that Mikey has trouble sleeping through the night and he frequently appears fatigued but is unable to nap during the day. Mikey was observed to crave proprioceptive input, as evidenced by flopping on the floor, and demonstrating poor motor coordination. Mikey was unable to engage in interactive play with his three year old sister, and when asked to share toys with her, he ignored the request. When observed during play, Mikey was preoccupied with a single spinning toy, engrossed in ritualistic, repetitive play with the object. Mikey was observed turning the lights on and off repetitively in his room for several minutes before transitioning into a different room.

Sensory Profile. On the Sensory Profile (Dunn, 1999) Mikey scored as a “Probable/Definite Difference” in sensory registration, sensory seeking, and sensory avoiding sections.

Revised Knox Play Scale. Mikey was found to be at the developmental level of a 12 month old for the cooperation subsection, which assessed his ability to socialize positively with individuals during play, in the Revised Knox Play Scale (Knox, 1974). He scored within the 24-month age level for imitation, which is mimicking aspects of a situation, and humor subsections, which assesses the child’s ability to tell jokes and understand humorous events. In the sections of Interest (attention to the occupation) and Dramatization, which is Mikey’s ability to fantasize and imagine himself in another role, Mikey’s score was consistent with that of a 30 month old. Manipulation of Objects, specifically fine motor skills, was scored at the development of a 36 month old, while Gross Motor (play involving the whole body) and Type of Participation (social engagement during play) were at the level of a 48 month old. Finally, Purpose, which is the goal directedness of Mikey’s play, was scored at a level of a 60 month old.

Treatment Plan

After evaluating Mikey, it was determined that he has delays in play skills related to attention, registration, and sensory processing.

It is recommended for Mikey to receive intensive treatment from an occupational therapist outside the school to work on management of symptoms in order to enhance his participation in occupations. If possible, it is recommended that Mikey see this occupational therapist at home, in order to provide treatment in the least restrictive environment. The following are examples of what an occupational therapist will focus on during treatment with Mikey, and some outside referrals that the occupational therapist may recommend.

Long-term goals. After speaking with Mikey's school occupational therapist and his parents, the occupational therapist came up with the following two long-term goals for Mikey.

Mikey will demonstrate improved sensory modulation as evidenced by waking and following morning routine without crying and throwing self on floor with assistance from parents for one verbal and/or visual cue for each step of the routine by week four.

Mikey will participate in goal directed, cooperative play with parents for at least one hour a day with three verbal and/or visual cues from parents in order to stay on task by week four.

Treatment session. After Mikey's home evaluation visits were complete, he began seeing the occupational therapist five times a week for 45-minute sessions. The following theoretical frameworks were used to develop a treatment plan specially designed for Mikey. A description of each framework used is followed by an example of treatment.

Model of practice used- PEOP. According to, Christansen & Baum (as cited in Brown, 2014) the PEOP model is a model that focuses on four main elements. The first element is the person, which includes values, interests, skills and life experiences, as well as cognitive, physiological, spiritual, neurobehavioral and psychological aspects of an individual. The next element is the environment. This includes the physical and cultural environments, as well as social support and systems. Occupation in this model encompasses actions, which are observable behaviors, and tasks, which are actions with a common purpose. Occupational performance is a convergence of the above three elements, and changes as these elements change. The PEOP is a holistic model, which is used frequently by occupational therapist.

Frames of reference used – Cognitive Behavioral Theory. The cognitive behavioral theory is based on psychology's behavioral theories (Cole, 2012). This theory focuses on adapting how a person thinks. When using this approach, one analyses situations, responses, and emotions. This approach is used frequently for individuals with mental disorders. The Alert Program, How does Your Engine Run is one example of a cognitive behavior strategies for treatment of Sensory Processing Disorders (Williams & Schellenberger, 1997). In this program, children are taught to identify their arousal level as high (e.g. out of control, anxious, upset), low (e.g. sleepy, unmotivated, feeling lazy) or just right (e.g. able to attend to tasks and behave appropriately for the situation). Then, they are taught strategies to get their arousal level back to just right. For example, during a interaction when Mikey and his sister were playing near each other, the sister starts to scream, and Mikey runs and hides in the corner of the room, which in turn makes the sister scream louder. When using this model the occupational therapist would sit with Mikey and identify his arousal level and the reason why he left to go sit in the corner. Then they would determine some planning strategies to avoid this in the future, in order to facilitate adaptive skills into Mikey's normal routine. For example, Mikey might be taught language to ask his sister to stop. Or, he might be encouraged to move calmly to an identified "safe" and quiet place where he can go when he gets overwhelmed.

Sensory Integration theory. Sensory Integration Theory was used to remediate some the sensory processing challenges Mikey was experiencing. In Sensory Integration theory, children are exposed to sensory stimuli at a level of a just right challenge in order to facilitate increasing competent processing of this information. In theory, when a child is processing sensory input more effectively, they are able to produce adaptive behavior that is appropriate for the situation. Several occupational therapists have used Sensory Integration Theory to develop and

operationalize treatment strategies that can be used with children with ASD. The following is a description of each approach with an example of how it could be used to address Mikey's challenges.

Ayres Sensory Integration (ASI). According to, Ayres (as cited in Parham & Mailloux, 2010) Sensory Integration is the "organization of sensation for use." ASI intervention is designed to concentrate on engagement in occupation in order to encourage the involvement of the client in everyday situations of their life. There are six principles used to guide ASI. The first guiding principle is the fact that adaptive responses are elicited from systematically used sensory input. The second principle is that adaptive responses cannot be made without registration of meaningful sensory input. Thirdly, the development of sensory integration is contributed to by an adaptive response. Fourth, a child's general behavioral organization is enhanced by an improved organization of adaptive responses. Fifth, more advanced and complex patterns of behavior involve associations of more primitive behaviors. The last principle is that the more a child's activities are directed by their intrinsic drive, the greater the prospective for the activities to advance neural organization. ASI is a strategy many pediatric occupational therapy clinicians use to treat individuals with sensory processing disorders. For instance, during an individualized treatment session in the occupational therapy sensory gym, the occupational therapist organizes the room so Mikey has multiple choices planned out by the therapist to play with during the session. The occupational therapist only leaves toys down that will be able to be graded to facilitate adaptive responses to sensory stimuli in the environment such as sound

and proprioceptive input. For Mikey, the therapist might hang a platform swing and place a ball on the swing with a basketball hoop nearby. The therapist might encourage Mikey to sit on the swing while throwing the ball at the hoop. During this activity, he would be practicing his equilibrium response by slowing and grading the amount of force needed to throw the ball as well as adjusting for changes in depth perception as the swing moves.

A SECRET Clinical Reasoning Model. In addition to Ayres SI, the OT might use A SECRET clinical reasoning model to address Mikey's difficulty with sensory modulation (maintaining a calm/alert state for participation in every day activities) (Miller, Fuller, & Roetenberg, 2014). This clinical reasoning model was developed by researchers and occupational therapists at the Sensory Treatment and Research Foundation (Miller, Fuller, & Roetenberg, 2014). The acronym A SECRET cues the therapist to attend to multiple areas described below when addressing sensory dysfunction. Parents are taught this clinical reasoning model so they can practice these strategies at home.

A. Attention. Occupational therapists use strategies to facilitate optimal attention to task for children with Sensory Processing Disorder. In Mikey's case, the occupational therapist created a picture schedule in order to help Mikey with understanding what is expected of him while transitioning to different tasks, and during these tasks.

S. Sensation. Occupational therapists choose sensory experiences that provide input for optimal arousal. During treatment, Mikey was introduced to a weighted blanket and a weighted vest. The proprioceptive

input gained from these therapeutic devices allowed Mikey to better attend to the task and regulate his emotions. Mikey's parents were given these devices to help calm Mikey in the morning, and while completing homework in the afternoon. Mikey also seemed to be calmed by devices that vibrated during play sessions, so the occupational therapist made sure to use these in her treatment sessions, and recommended them to parents during their play sessions.

E. Emotional Regulation. Occupational therapists often use strategies to help a child regulate difficult emotions. The "How Does Your Engine Run" program (described above) provides an example of this.

C. Culture and R. Relationships. Occupational Therapists often help caregivers understand a child's behavior as a response to discomfort with the sensory environment and not something that the child is choosing to do to be disruptive. This reframing allows for the family to approach their child with compassion and try multiple avenues to facilitate more appropriate behavior. For example, Mikey's mother comes to a treatment session and states that she is fed up with Mikey. While running into the convenience store, Mikey had a temper tantrum because he was not allowed to wait for his mother in the car as she usually lets him. She described that he kept screaming "too loud!" After a discussion with the occupational therapist, the mother realized that Mikey's Sensory Processing Disorder caused the tantrum, and it was not just Mikey displaying bad behavior. A second example is during a treatment session,

the therapist set up toys around the room, in sight of Mikey but out of reach, in order to facilitate relationships. When the therapist entered the room with Mikey, she asked him to look around and pick which toys he wanted to play with first. When Mikey chose a toy, he was asked to lead the therapist to the toy and point to which toy he wanted. The therapist made sure to include toys that facilitated interaction between the therapist and Mikey as she played throughout the session with Mikey.

E. Environment. Environmental modifications can be a powerful way to impact functioning. Some environmental modifications made by the occupational therapist include reorganization of Mikey's room, a new alarm clock that starts soft and gradually gets louder to wake Mikey up, and adding sound absorbing materials (such as foam) to Mikey's space in order to decrease echoing. The following is an example of Mikey's family adapting the environment. "We examined the room we were in, which was the kitchen, for a potential stressor to Mikey. Finally, Grandma noticed her Keurig was still on, and decided to turn it off. Mikey started to calm down a bit. Turns out, he was stressed out by the bubbling noise the Keurig kept making to keep the water warm." In this example, Mikey's mother used the A SECRET model in order to modify the environment to facilitate participation in social occupations.

T. Task. Evaluating a task that a child is having trouble completing and providing recommendations for making the task easier for the child is an important way occupational therapists help to increase functioning for

children with sensory challenges. This model was at work during a treatment session where Mikey was completing an obstacle course in order to increase his sensory modulation and motor coordination. During this task, Mikey was fatiguing when he was halfway through the course. The occupational therapist determined that the specific reason Mikey was fatiguing was due to the ladder he had to climb up. The occupational therapist then adapted the task by shortening the length Mikey needed to climb in order to make him successful with the task.

In addition to the treatment techniques used by the OT with Mikey and his family, some outside referrals were recommended. These included Hippotherapy and Group Based Social Skill Training Programs.

Hippotherapy. Hippotherapy (HPT) involves the use of equine movement in order to provide therapy. When used for twelve weeks, once a week for 45 minutes, HPT has been found to improve adaptive behaviors, postural control, and participation in occupation for individuals with ASD (Ajzenman, Standeven, & Shurtleff, 2013).

Group-Based Social Skill Training Programs. Group based social skill training programs are therapist lead groups where other children with the same diagnosis, or similar diagnoses are lead through a training program to improve social skills. These groups can happen in the school or clinic. Strong evidence supports the use of these programs for intervention. Studies have shown an increase in social skills, autistic behaviors, and increased positive interactions have resulted from the use of these groups (Tanner, Hand, O'Toole, & Lane, 2015).

Discussion

The occupational therapy recommendations were made on the basis of the chosen frames of references, and model of practice, as well as on evidence. The occupational therapist did the above research in order to guide her care and plan with Mikey. While sensory treatment is critical for one with ASD, it is not the only thing occupational therapists bring to the table when treating individuals for ASD. Much evidence exists for the use of sensory treatment approaches, but it is vital that occupational therapists begin to research and document the use of other techniques in treatment that are within our scope in order to preserve the holistic nature of occupational therapy, and to treat our clients with the best care.

Conclusion

In conclusion, ASD is a very broad condition that can impact many factors of a child's life. It is important that occupational therapists consider the client holistically, and base their treatment off of evidence-backed interventions. There are a wide variety of treatment approaches that can be considered, and while sensory-based interventions are important, clinicians must supplement these approaches with other methods that are not sensory based.

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