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Occupational Therapy and Treatment of Sensory Issues Related to Autism Spectrum Disorder: A Literature Review

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Occupational therapy (OT) is a form of therapy which focuses on the importance of engagement in occupations or meaningful activities and tasks. Participation in occupations is essential for physical and mental well-being (Taff et al., 2017). OT is commonly utilized to treat a wide range of neurological disorders including autism spectrum disorder (ASD). OT has been proven successful when used to treat sensory processing issues related to ASD (Pfeiffer et al., 2011). Despite this, applied behavior analysis (ABA) is the most common ASD intervention (Welch & Polatajko, 2016). ABA and OT are not regularly used in conjunction to treat ASD due to differing views on the effectiveness and validity of both therapies. However, similarities exist between the therapeutic approaches and beneficial outcomes of both respective therapies could yield even more success when used simultaneously to treat ASD.

The symptoms of ASD differ from person to person, suggesting the idea of a "spectrum." The *Diagnostic and Statistical Manual of Mental Disorders* defines autism as deficits in communication skills including the ability to converse verbally, gesture, maintain eye contact, and understand relationships (American Psychiatric Association, 2013). The manual also outlines symptoms such as hyper fixation, repetition of behaviors, persistence on sameness, and adoration or animosity towards sensory stimuli (American Psychiatric Association, 2013). These symptoms may hinder one's ability to participate in activities of daily living. They may also be disruptive or harmful in some cases, including behaviors like kicking, yelling, and hitting. Because of this, those with autism may require constant care and support which can greatly impact their families lives. ASD may also include intellectual or language impairment and comorbidity with other neurological conditions (American Psychiatric Association, 2013). In

fact, 83% of those with ASD have an additional developmental disorder (Hodges et al., 2019). Gastrointestinal disorders, sleep disorders, obesity, seizures, anxiety, attention deficit hyperactive disorder, obsessive compulsive disorder, and mood disorders all commonly occur in those with autism (Hodges et al., 2019). As stated above, the severity and occurrence of these symptoms are highly variable.

ASD may be influenced by both environmental and genetic factors. Research by Hodges and colleagues (2019) states that abnormalities in cerebral structure, the limbic system, extra-axial fluid levels, or frontal and temporal lobe cortical levels can have an impact on development of ASD. The aforementioned data suggests that genetic factors contributing to autism are exemplified by the increased likelihood of developing ASD for those with autistic siblings and even more so, monozygotic twins. Despite this, ASD is very genetically variable due to variants found in over 700 genes in those with autism (Hodges et al., 2019). Another possible explanation could be drawn from the fact that men are four times more likely to develop autism than women (Panerai et al., 2020), indicating a link between biological sex and ASD. Prenatal, perinatal, and postnatal environmental factors also play a role, as increased parental age and maternal history of autoimmune disease can lead to a higher risk of ASD in children (Hodges et al., 2019). Further, premature births have been correlated with autism in many cases (Hodges et al., 2019). Because of the many possible factors and determinants, the exact causes of ASD are unknown and there is still much room for discovery within this area of autism research.

One in every 59 children between the ages of six and eight are on the autism spectrum (Panerai et al., 2020), making evaluations crucial for this age group. Hodges and colleagues (2019) state that beginning at routine pediatric medical screenings, physicians look for early signs of ASD including lack of eye contact, sharing, language, social skills, gesturing, and name

recognition. The research suggests that at 9, 15, and 30 months old, parents and physicians should monitor developmental milestones in children. Additionally, at 18 months and again from 24-30 months, autism specific screening is necessary (Hodges et al., 2019). During these screenings, the Modified Checklist for Autism in Toddlers and the Survey of Wellbeing in Young Children may be utilized. Signs of ASD in preschool-aged children can include little to no engagement in pretend play, odd or hyper-focused interests, and body rigidity (Hodges et al., 2019). Later, signs in school-aged children may involve difficulty in comprehending emotions and interest in peers without the ability to communicate or interact (Hodges et al., 2019). Individual Education Programs can also be useful in children older than three (Hodges et al., 2019). Therefore, a wide range of evaluative techniques are utilized to detect ASD starting at a very young age. Early intervention is greatly suggested to provide ample support for families and those on the autism spectrum.

Sensory processing involves the intake and interpretation of stimuli from one's environment. During pediatric medical screenings, The Sensory Profile by Dr. Winnie Dunn, is regularly used to diagnose and determine how individuals respond to sensory stimulation (Perez et al., 2019). Sensory inputs can be auditory, olfactory, gustatory, visual, tactile, vestibular, or proprioceptive (Perez et al., 2019) and these do not occur independently (Schaaf & Nightlinger, 2007). For example, visual and auditory inputs can be processed concurrently. The ways in which individuals react to sensory stimuli are categorized into four different areas: seeking, avoiding, sensitivity, and bystander (Perez et al., 2019). These categories help medical professionals identify abnormalities in sensory processing.

ASD often includes some form of sensory issue, commonly called sensory processing disorder (SPD). In fact, in the entire population of children with ASD, approximately 90% have

some sort of difficulty with sensory processing (Perez et al., 2019). SPD can be grouped into three different categories: sensory modulation disorder, sensory-based motor disorder and sensory discrimination disorder (Panerai et al., 2020). Each of these categories corresponds with different ways of receiving and responding to sensory inputs. However, data suggests that children who have SPD, regardless of the type, have decreased enjoyment of day-to-day activities, lowering their overall quality of life (Perez et al., 2019). This may be correlated with the fact that sensory stimuli can be very distracting for those with SPD and can inhibit them from recognizing and acknowledging social cues (Perez et al., 2019). SPD causes difficulties in the participation of daily life due to alterations in the processing of sensory stimuli. This leads to poor social functioning in those with SPD.

Treatments and interventions of ASD can occur in a plethora of settings, utilizing different techniques. However, ABA is viewed as the "gold-standard" ASD intervention. This is due to extensive data showing significant reductions in symptoms of ASD and achievement of patient goals in comparison with other treatment methods (Welch & Polatajko, 2016). ABA uses principles of operant learning to encourage socially adaptive behaviors (Nielsen et al., 2019). ABA therapy may include behavioral assessments involving positive reinforcement (praise, rewards, treats), shaping (encouraging components of a behavior), fading (reducing involvement and prompts to increase independence), extinction (removing reinforcement that maintains an unwanted behavior), punishment (consequence to reduce problem behavior), and differential reinforcement (reinforce acceptable alternative to behavior) (Nielsen et al., 2019). With these methods and through empirical evidence, ABA has remained a pillar of ASD treatment.

While ABA is, as stated above, the gold standard of ASD intervention, other treatment methods are also commonly used. Cognitive-behavioral therapy is employed in the treatment of

many different neurological disorders. Research by Nielsen et al. (2019) demonstrates that this type of therapy reduces anxiety, increases independence, and improves daily living skills in patients with ASD. Further, pharmacological treatment is mostly viewed as a subsidiary treatment for ASD (Nielsen et al., 2019). This style of treatment, as suggested by the data, is often used to target symptoms like insomnia, impulsiveness, mood-swings, inattention, anxiety, depression, obsessive and repetitive behaviors. There are currently no medications available that treat the core social skills deficits associated with ASD. However, out of all children with ASD, 45-75% are medicated via psychotropics (Nielsen et al., 2019). In addition to these forms of treatment, parent training is often applied to all different types of interventions. Coaching of family members is shown to help increase social skills in kids with ASD (Nielsen et al., 2019). Thus, as autism is a spectrum, a spectrum of treatment methods can be used to target each patient's unique symptoms.

On the spectrum of treatment approaches is sensory integration therapy (SIT), the most common treatment for SPD. Brentani and colleagues (2013) state that SIT is the treatment method most often practiced in an OT setting. The research also outlines ten crucial guidelines for SIT:

- Child safety
- Opportunities to obtain tactile, vestibular, and/or proprioceptive sensory stimulation to support self-regulation, sensory awareness, or movement
- Appropriate levels of participant alertness
- Challenge to postural, ocular, oral, or bilateral motor control
- Novel motor behaviors and efforts to organize movements in time and space
- Preferences in the choice of activities and materials
- Activities that are not too easy or too difficult
- Activities in which the participant experiences success
- Support for intrinsic desire to play
- A therapeutic reliance. (Brentani et al., (2013)

These guidelines help foster an environment of trust between the practitioner and the patient while ensuring the right amount of challenge. Creating a safe atmosphere while pushing patients to experiment with sensory stimuli is the goal of SIT. Therapists who specialize in SIT adapt their approach to adequately meet these guidelines and accommodate their patient's unique goals.

There are multiple methods of integrating OT-SIT into treatment of sensory issues related to ASD. Ayers SIT is the most cited and applied method of therapy in OT literature (Schaff & Nightlinger, 2007). Ayers SIT involves the following guidelines in particular:

- Arrange the room to entice engagement
- Ensure physical safety
- Present sensory opportunities
- Attain and maintain optimal arousal levels
- Tailor activities to present the just right challenge
- Ensure that activities are successful
- Guide the self-regulation of behavior
- Create a playful context
- Collaborate in activity choice
- Foster therapeutic alliances. (Lang et al., 2012)

On top of these guidelines, Roley et al. (2007) notes that it is crucial to identify preferred sensory stimuli to use as a reward during treatment and unfavorable sensory stimuli to avoid or address. Activities used during therapy should be rewarding and enjoyable for patients while still challenging the sensory system. Utilizing SIT properly is essential to achieving goals and favorable outcomes.

While the above guidelines can be seen throughout SIT settings, there are a variety of approaches to this type of therapy. Roley and colleagues (2007) firstly explain that a patient-focused approach to therapy can target specific behaviors by adding or removing environmental cues that elicit the behaviors. The research also states that targeting positive behaviors during therapy has been proven to increase quality of life and improve academic performance. On the

other hand, the data indicates that cognitive-focused approaches to treatment emphasize the fact that some children with SPD do not accurately receive feedback from their bodies during tasks and, therefore, cannot draw on past experiences when editing and developing new motor plans. Biomechanical approaches can also be integrated, which mainly address muscle tone, postural strength, and stability. The research goes on to explain that environmental-focused adaptations can also be applied to therapy and involve increasing sensory stimulation by adding things to the environment such as fidget toys and wobble cushions. Finally, parent-mediated interventions incorporate coaching and help provide consistency by encouraging home-based reinforcements (Roley et al., 2007). While each of these approaches are differing and can be individually applied, it is common for therapists to employ aspects of each.

OT-SIT yields significant results through the achievement of goals involving sensory issues related to ASD. Patient and parent goals are often related to undesired autistic mannerisms, independence, social, and motor skills. Systematic research by Lang and colleagues (2012) indicates that the use of SIT to treat children with autism is correlated with significant reductions in disruptive behaviors related to ASD. In addition, an SIT patient's mother explains her son's experience: "His improvements in sensory processing allowed him to participate in age-appropriate activities more successfully, complete self-care activities independently, socially interact with family and peers more effectively, and perform more successfully in school" (Pfeiffer et al., 2011). Through SIT, reductions of unwanted autistic mannerisms related to SPD allow for improvements in other areas of therapy. For example, SIT may address proprioceptive and vestibular sensory inputs which help individuals to sit up and sit still (Schaff & Nightlinger, 2007). These are foundations for any goals and skills related to academics and motor control.

Thus, SIT helps patient's reach their goals related to ASD by increasing tolerance and integration of sensory inputs.

Differences between ABA and OT are prevalent within the field's literature. When treating patients with autism, most OTs use components of SIT. However, Welch and Polatajko (2016) explain that in ABA literature, SIT is often presented as a form of alternative medicine. ABA-centered literature also suggests that there is limited evidence that supports sensory-based therapies. Some practitioners, the research indicates, believe that OTs have a broader analysis of ASD due to consideration of sensory issues, social skills, motor control and executive functioning. Comparatively, the study states that there is little reference to ABA in OT-focused literature. However, when ABA is mentioned in OT literature, it is often criticized for not considering generalization and client goals in treatment strategies (Welch & Polatajko, 2016). Through analysis of the respective literature, it is clear that there is divergence between the ways in which ABA therapists and OTs treat ASD and patients in general.

Despite the differences in treatment styles and oppositional viewpoints, there are also similarities between ABA and OT. Both OT and ABA literature highlight the importance of a strength-based approach to therapy rather than just working on eliminating unwanted behaviors. Both types of therapy involve collaborative decision-making between practitioners and patients. OT and ABA also both highlight the importance of educating and coaching teachers, parents, and siblings (Welch & Polatajko, 2016). Furthermore, there are benefits to integrating the two therapeutic styles. Principles of ABA can be implemented in sensory-based OT by regulating the timing of sensory input strategies (Welch & Polatajko 2016). For example, sensory inputs should be applied when the patient is first showing signs of an unwanted behavior rather than when they are actively demonstrating this behavior (Welch & Polatajko, 2016). Sensory-based OT

methodologies can be utilized to address repetitive movements, aimless running, aggression, and self-injurious behaviors (Welch & Polatajko, 2016). These behaviors are correlated with SPD and can interfere with a child's ability to engage in all types of therapeutic activities (Welch & Polatajko, 2016). Therefore, principles of OT-SIT could be implemented in other forms of therapy, including ABA. With that being said, shared viewpoints between ABA and OT suggest that integrating both forms of therapy could yield significant benefits.

The complexity of both SPD and ASD are matched with a wide range of treatment approaches. ABA is the most frequently used intervention for ASD in general. Yet, OT-SIT is the most used approach for treatment of sensory issues related to autism. Research exemplifies the benefits of both treatment styles for different individuals. However, the respective literature does not often acknowledge the efficacy of the other therapy. Despite this, it may be even more beneficial to integrate both ABA and OT-SIT rather than implementing the therapies individually. More research is necessary to explore the efficacy of this method. Yet, by using components of OT-SIT in conjunction with ABA or vice versa, patients may acquire benefits from both therapy styles.

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