Preparing for kindergarten using a sensory integrative approach: a case study

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Preparing for Kindergarten Using a Sensory Integrative Approach: A Case Study

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Note: This document describes a Capstone Dissemination project reflecting an individually planned experience conducted under faculty and site mentorship. The goal of the Capstone Experience is to provide occupational therapy doctoral students with unique experiences whereby they can demonstrate leadership and autonomous decision-making in preparation for enhanced future practice as occupational therapists. As such, the Capstone Dissemination is not formal research.
Abstract

It is now reported by the Centers for Disease Control that one child out of 150 is diagnosed with autism (Centers for Disease Control, 2007). With this alarming rate it is imperative that occupational therapist find appropriate intervention strategies to help these children succeed. This case study report describes occupational therapy services delivered to a five year old male who was diagnosed with autism at the age of 32 months. This particular boy had made great strides in his functional level with therapy, however still needed to increase his skill level before he began kindergarten in the coming fall to perform at a level similar to his peers. This case study describes the use of the sensory integrative model of practice to deliver occupational therapy services needed to increase performance in functional tasks that the child will be expected to do when he enters kindergarten.

Introduction

Background Information

Jay is a five year old male child who lives with his parents and younger brother in a suburban area home. He was born four weeks premature; however no early infancy complications were noted at that time. Jay was a typical developing toddler until approximately 32 months, at which time his mother stated that he lost his ability to express himself verbally with no further development in language skills. At that time Jay was diagnosed with autism. Primary impairments noted at that time were generalized weakness, hypotonia, and a generalized decrease in coordination skills.

Jay participated in occupational and speech therapy in CHIP (Clinical Home Intensive Program) at Mercy Children’s Pediatric Center in February of 2006, just a few months after the
initial diagnosis of autism. CHIP consisted of a four day per week program and lasted four consecutive weeks, which included intensive occupational and speech therapy sessions. The interventions Jay received at CHIP was tailored to his individuals needs and consisted of one-to-one and small group interventions. Jay made considerable gains in sensory regulation, social skills, motor planning, play, and language. After Jay was discharged from the CHIP program his parents decided to continue occupational and speech therapy on a weekly one-to-one basis at Mercy Children’s Pediatric Center.

In addition to occupational and speech therapy, Jay also participated in an applied behavior analysis program, took vitamin supplements, utilized visual schedules (Picture Exchange Communication System), participated in social skills groups, and church programs. When Jay first began therapy, he wore foot orthotics to improve his mobility and wore corrective lenses. Jay has also participated in research studies; however no outcomes were noted based upon the measures. Jay will begin school this coming school year at a public school in a regular classroom environment.

Model of Practice

The model of practice that was utilized in this occupation was Ayres sensory integration (SI) model of practice. Ayres stated that sensory integration is simply the organization of our sensations for our use (2005). Problems with sensory integration can form problems with perception, behavior, and learning. The goal of occupational therapists using SI is to facilitate the development of function and skill through integration of the sensory systems (Kimball, 1999). Praxis, or motor planning, is thought to be an individual’s most important organizational function (Kimball, 1999). Praxis occurs when the child is able to integrate the sensory input at the subcortical level successfully (Ayres, 2005). The sensory integration at the subcortical level
Preparing for Kindergarten allows the cortical or higher centers of the brain to process more complex and specialized information for tasks such as motor planning, academic learning, activity level, and behavior (Kimball, 1999). Children with dyspraxia have a problem with the interaction of their sensory system; therefore these children may need extra sensory input to achieve a registration for successful motor planning (Kimball, 1999). Integration of information from all sensory systems is needed for motor planning to occur (Miller-Kuhaneck, 2004).

**Scientific Evidence for MOP**

Research done in the past by Ayres (1972, 1978) found positive changes in the children’s motor, academic, and language use after an sensory integration (SI) based treatment was utilized. Similar findings were found by Ottenbacher, Short, & Watson in 1979. Much research has been done since then to look at the effectiveness of SI therapy on children, however few studies show statistical evidence that proves or disputes Ayres earlier findings (Miller, Coll, & Schoen, 2007).

Case-Smith and Bryan (1999) completed a single subject research design and found that five children with autism made gains in play and engagement when using a sensory integration approach. In a more recent study, Miller, Coll, and Schoen (2007) found that SI may be an effective treatment for children with autism. However, further studies using the same methods used in this study need to be completed to prove the effectiveness of SI. Recent research on parents views on sensory integration therapy also have been completed and show positive regards to the approach (Cohn, Miller, & Tickle-Degnen, 2000; Cohn, 2001). Parents stated they noticed an increase in their child’s social participation, perceived competence, and self-regulation.

**Rationale for this MOP with this Case**
Jay had impairments in fine motor manipulation, imitation, ideation, initiation, and execution of postures and of functional occupations such as using a tripod grasp with writing tools. Jay also demonstrated hypotonia in his trunk and limbs, toe walking related to tactile defensiveness, gravitation insecurity, and decreased balance; all which can be attributed to dysfunction in his sensory processing ability. These impairments affected his functional outcomes globally.

**Initial Evaluation and Goals**

Jay was given the Peabody Assessment (Folio & Fewell, 2000) when he first began therapy to look at his fine motor skills. The Peabody is a standardized assessment that looks at the child’s gross and fine motor skills up to the age of five. The assessment is composed of six subtests that measure the interrelated motor abilities that develop early in life. Reliability and validity have been determined empirically. Grasping and visual motor integration is considered the fine motor skills area on the Peabody. Jay’s overall score was at the 5% rating for fine motor skills, which reflects a poor rating. Other clinical observations noted at this time was that Jay had low tone, joint laxity, toe walked, demonstrated gravitational insecurity, a decrease in balance was noted, his movements were often labored and planned, his ability to imitate others was low, and he displayed sensory registration deficits. His mother also noted that Jay processed information very slowly and preferred sedentary activities.

Winnie Dunn’s Sensory Profile (2006) was also completed by Jay’s parents when Jay first started attending therapy programs. The Sensory Profile is a parent questionnaire that assists the therapist by gathering sensory information about the child sensory processing and how his or her sensory needs affects home and school functional performance. The Sensory Profile revealed that Jay demonstrated definite differences in oral sensory processing, modulation of movement,
oral sensory sensitivity, and preferred sedentary activities. The Sensory Profile also made note of probable differences in behavioral outcomes due to sensory processing dysfunction and being emotionally reactive due to sensory dysfunction. During the initial evaluation and during therapy sessions it was also noted that Jay was very withdrawn and shy, had a hard time separating from his mother, was visually distracted, and cried often. Jay’s mother reported that those behaviors were typical.

**Goals (8/17/07)**

1. Jay will motor plan “dance” movements to phonics programs.
2. Jay will complete moderately difficult parquetry patterns.
3. Jay will demonstrate increased speed in fine motor manipulation (buttons).
4. Jay will demonstrate a mature tripod grasp.
5. Jay will cut out a circle with scissors maintaining line boundary.

**Current Evaluation and Goals (3/8/08)**

Peabody Re-assessment given on 3/8/08 revealed that Jay had increased his visual motor integration rating to above average, however Jay still had a below average rating for grasping. In addition to the Peabody, other clinical observation were made at this time and included: a decrease in bilateral coordination, hand-eye coordination, and motor planning. Jay also needed frequent cueing to use a correct grasp for writing utensils.

**Goals (3/8/08)**

1. LTG: Jay will cut out a circle with scissors maintaining line boundary.
   a. STG 1: Jay will hold scissors with appropriate grasp and use non-dominant hand to stabilize/assist to cut straight and curved lines 100% of the time with no cues.
b. STG 2: Jay will cut using criteria used in STG 1 to cut out a 3 inch circle while maintaining line boundary within ¼ inch of line for ¾ of the circle independently.

2. LTG: Jay will write his name with a tripod grasp without prompt.
   a. STG 1: Jay will write his name with visual prompt and Min. V.C. for correct grasp 100% of the time.
   b. STG 2: Jay will use tripod grasp 100% of the time while writing with chalk on the chalk board with no cues.

3. LTG: Jay will demonstrate appropriate motor planning skills, including ideation, initiation, and execution, to complete a novel task without prompts.
   a. STG 1: Given a racket and a ball, Jay will demonstrate the ability to hit the ball with the racket 3 out of 4 times with no cues.
   b. STG 2: When given a bean bag and target, Jay will be able to hit target with bean bag 50% of the time with no cues.

**Justification of Goals**

Jay will be starting school this coming year and the goals set for him reflect age appropriate skills he will need to enter school at a functional level similar to those of his peers. Children with motor planning deficits also may have difficulties with social development because of the inability to follow play scenarios with their peers (Miller-Kuhaneck, 2004). If Jay began school at a lower functional level than his peers, this could have a negative effect on his self-esteem and confidence.

**Intervention**
Interventions Used with Jay:

Jay’s main occupation during his therapy sessions was play. Examples of occupations that were used with Jay include: board games, crafts, obstacle courses, building models and forts, and playing with play dough. Through these occupations, all of Jay’s goals were addressed. In addition, Jay’s sensory processing difficulties were addressed by using a variety of textures, occupations that involved imitation, planning, and execution of motor tasks, and a variety of suspended equipment. With increased sensory input from these occupations, Jay also demonstrated an increase in positive behavioral and emotional outcomes during and after treatment. Jay was not as withdrawn and shy during therapy sessions and was able to separate from his mother easier.

Occupational Analysis of One Treatment Session

To address Jay’s occupational therapy goals using the models of practice, the occupation of making play dough figures was chosen. The occupation also had a motor planning component of carrying the play dough on a tray through two rooms to reach Jay’s desired location. This occupation provides tactile and proprioceptive sensory input that will help Jay develop the body percept he needs to achieve his goals of using scissors and writing utensils age appropriately. Adding additional weight to the tray Jay was carrying also gave him proprioceptive input that helped him understand his body scheme. Continuous tactile input is important in keeping the brain organized for motor planning tasks (Ayres, 2005).

Form

The occupation of “making play dough figures” took place in a large room that was separated into two smaller rooms by an observation room. Room one consisted of a small red table and 4 different colored chairs, a medium sized tote filled with containers of play dough,
plastic tools that could be used to manipulate the play dough, carpet, a tire trampoline, and a cupboard filled with games, craft items, and other educational material. Located in the second room was a ball bath, a variety of suspended equipment hanging from the ceiling, large mats under and around the suspended equipment, shelves filled with puzzles, sensory toys, and musical instruments, and carpet on the floor. Two occupational therapy students were also present in the room, one sitting on either side of Jay.

Changes

The original occupation was to have Jay make a pretend lunch for the occupational therapist, who was located in a room down the hall, and carry that lunch to her on a tray that would be similar to the one Jay would be using a school in the coming future. When the occupation was explained to Jay he seemed to have no interest in making a pretend lunch for the occupational therapist. Instead of making a pretend lunch it was decided to make a variety of objects that Jay thought the occupational therapist would like to look at and carry those objects to her on the lid of a tote. The tote lid was used in place of the lunch tray because it is smaller and weights less than a lunch tray. Jay has a tendency to act out when he believes he can not accomplish a task. It was predicted that having a smaller tray would make the occupation more enjoyable and appealing to Jay because he would be successful.

Occupational Performance

The occupation that was to be completed was explained to Jay. The occupational therapist was pretending to be hungry for lunch. Jay was asked if he would like to “make” lunch for the occupational therapist out of the play dough. Jay looked interested in playing with the play dough as displayed by his continuous gaze toward the colorful containers and the smile on his face. Jay stated that he just wanted “to play with the play dough”. It was then suggested to
Jay that maybe he could make some animals, bugs or other figures and take them to show the occupational therapist. He smiled and very quietly said, “Yes”.

Jay was able to name and visually scan and locate the colors of play dough he wanted to use for this occupation. Jay demonstrated difficulty opening some of the containers but overall was able to independently open approximately half. Jay required minimal verbal cueing to open containers. Jay was able to use a variety of tools to manipulate the play dough with minimal cuing. Jay demonstrated age appropriate sensory processing while playing with the play dough. Jay used scissors to cut the play dough, a rolling pin to smooth out the play dough, and shape pressers to make a variety of figures out of the play dough. Jay demonstrated age appropriate strength to accomplish these tasks. Jay was independently able to imitate simple figures made by therapist with play dough and showed pleasure in creating figures on his own. By the end of the session, Jay was able to open all play dough containers independently.

When Jay was done making the play dough figures he wanted to show the occupational therapist his accomplishments. After placing his objects one by one on the lid of the tote, Jay stood up from his chair and picked up the tray with both hands. He slowly turned towards the door and began walking towards the door, keeping his eyes on the lid. Jay was able to navigate his way through both rooms, over mats and around many obstacles, with moderate verbal cuing for safety. Jay hesitated frequently throughout the task when attempting to navigate around objects located in the two rooms that included a tire trampoline, floor mats, and cupboards.

Once Jay reached the occupational therapist, he stopped, smiled, and held up the lid so that the therapist could have a closer look at what he had made. When asked if he made the figures, Jay nodded “yes” while still smiling. Jay then turned around to walk back towards the table. On his way back, Jay required only minimal verbally cuing for safety, and it was observed
that Jay looked at where he was going instead of down at the lid, displaying an increase in his motor planning ability. Jay also walked with increased speed on the way back to the table. When he reached the table, he put the lid down while still smiling, and sat back down in his chair and proceeded to flatten the figures and put the play dough back into the containers.

**Meaning and Purpose**

Jay did not see this occupation as a chance to improve his body awareness, or fine and gross motor tasks, but rather as an opportunity to play by creating figures out of play dough. In addition to playing, he also saw this as an opportunity to see how playful the therapy student could be. Jay also saw this play occupation as a way to show others his ability to be creative and he desired to please the occupational therapist and the student.

**Assessment Information**

During the occupation, Jay demonstrated improvements in the fine motor control that was required to create play dough figures and increased grip and pinch strength to open the play dough containers. Jay also demonstrated age appropriate hand-eye coordination to pick up the figures and carry the play dough figures through a crowded room. Jay showed the necessary motor planning skills required to carry the figures through two rooms around many different obstacles. Jay also showed age appropriate tolerance to a variety of sensory input with no behavioral or emotional behaviors. In addition to working toward the goals, Jay also showed an adequate ability to imitate others play dough creations. Being able to imitate others shows that Jay has the ability to visually perceive the motor actions and was able to transfer that information to a planned motor act. Effective motor planning is built on successful imitation skills (Ayers, 2005).

**Compensations**
Initially, Jay was not strong enough to open some of the play dough containers since the containers had not been used in awhile. By the end of the occupation however, Jay demonstrated the ability to open all of the containers, including the containers that had not yet been opened. Although Jay used humor, he sometimes uses humor inappropriately as a way to mask his inability to successfully accomplish a task.

Initially Jay had difficulty imitating figures made by the therapy student and used humor as a defense mechanism and did not want to complete the occupation. He would attempt to imitate the therapy student actions, but once he began to experience difficulty, he pretended to “destroy” the figures. Jay had difficulty operating the play dough press. Jay was shown to place the large piece of play dough in the press and push the press together with both hands to make a shape. Jay was unable to imitate those actions at first and used the table to push on one side of the press while he pressed on the other with moderate verbal cuing. However, as the session progressed, Jay did demonstrate appropriate imitation and bilateral coordination skills to use the press.

Re-synthesis

If the occupational form were to be re-synthesized it would be recommended that the occupation be made more of a challenge for Jay. In grading up the occupational form, the therapist could use a different sized tray, place heavier objects on the tray, and change the course Jay would have to walk on to incorporate more obstacles he may come into contact with on a daily basis in preparation for improved safety, efficiency, balance and self-confidence at school. The occupational therapist could also introduce more novel play dough tools for Jay to experience and have Jay try to imitate harder figures to see if he is able to successful plan and
execute those motor planning skills. By increasing Jay’s motor planning skills, Jay will be able to successfully participate in more play occupations with his peers.

By re-synthesizing the occupation, the therapist would be able to see if Jay was able to generalize the skills he learned in the first occupation to a similar occupation. Jay needs to be able to generalize his fine and gross motor skills to many different tasks in order to function successfully in a school environment with typically developing peers. Practicing these skills and showing Jay how to use his sensory input to assist with motor skills may help him perform novel motor tasks in the future successfully.

**Outcomes**

**Goals Achieved**

Goals for this particular intervention included increasing Jay’s sensory awareness, fine motor coordination, and strength to increase his skills for cutting and writing. Jay was able to demonstrate age appropriate strength and fine motor coordination for the task. Increasing Jay’s motor planning ability was another goal of this occupation. The proprioceptive and tactile input he received from the occupation helped his body organize itself to a point where he was able to adequately imitate others and demonstrate adequate ability to perform an age appropriate motor task.

**Improvements**

Since having his initial evaluation in February of 2006, Jay made significant improvements overall. His fine motor rating was at the 5% when he first began therapy. At discharge Jay had an above average score for visual motor integration. Jay still had a below average for grasping, however it is possible that if Jay saw more meaning in the task he would have tried harder and his grasping score would have been age appropriate.
Jay’s ability to process sensory information also improved. Jay shows age appropriate behavior and emotion to a variety of sensory input. It was also observed that Jay only exhibited toe walking when he was in a hurry, showing an increase in tactile and proprioceptive awareness. Jay was also able to organize his sensory input which helped to improve his bilateral fine motor coordination. By improving these skills, Jay was able to demonstrate improved social and play skills. However, Jay’s improved social and play skills was typically only demonstrated with his younger brother, the therapists, and his parents. It was observed and reported that when Jay was in community settings with other children he preferred to play with his brother or alone.

**Inferred Meaning and Purpose**

Overall, Jay saw therapy as a playful experience that could increase his skill level. It is inferred that Jay participates in therapy to please not only the therapists but also his parents. It can also be inferred that Jay wants to be liked by his therapists and therefore performs to the best of his ability at the tasks proposed to him.

**Client’s reflection on progress**

Jay was able to transition from activity to activity without any behavioral or emotional difficulties. Jay readily participated in all occupations that were asked of him, which he previously was hesitant in when he first began therapy. Jay was also able to transition to different therapists without any behavioral or emotional difficulties.

Jay’s parents also repeatedly stated they were pleased with the progress Jay had made in therapy. Jay’s parents also work with him daily at home to implement what is learned in the therapy sessions. Seeing that Jay was doing so well in therapy, his parents decided that he no longer needed outpatient occupational therapy services.
Conclusion

Discharge

It is recommended that Jay begin school based occupational therapy when he begins school this coming year. School based occupational therapy will help address any new functional limitations Jay experiences in the school environment. Jay will experience a variety of new sensory processing and motor learning challenges when school begins. Sensory processing difficulties and being able to perform novel motor tasks will continue to be an area of concern for Jay. However, with continued exposure to tactile, vestibular, and proprioceptive input, Jay’s ability to perform motor planning occupations will increase. With frequent exposure and practice with novel motor planning occupations, Jay’s skill and comfort level will also increase to a point where Jay will independently expose himself to novel occupations with his peers.

In the past, Jay’s parents also have been given handouts for home programs that deal with sensory dysfunction that could be used in the future if need be. It is also recommended to Jay’s parents that Jay continues to experience novel tasks to increase his skill and confidence level for when he enters school. Examples of novel tasks that can be done with his parents are roller skating, throwing various sized and textured balls in containers, riding a scooter board in different positions, or even learning a new dance (the chicken dance).
References


