

# **A Collaborative Approach of Occupational and Lovaas Therapies for Autistic Spectrum Disorders**

Katy George and Erin Foley

Faculty Sponsors: Peggy Martin, Clinical Science Department  
Occupational Therapy, Deborah Dougherty-Harris, Clinical Science  
Department Occupational Therapy

## **ABSTRACT**

The purpose of this study was to determine if occupational therapy combined with Lovaas therapy was more effective in treating fine and gross motor skills and sensory processing deficits in a child with autistic spectrum disorder, than Lovaas therapy alone. The subject was a four year old child diagnosed with autistic spectrum disorder who was enrolled in Lovaas therapy through Wisconsin Early Autism Project. He was assessed with the Peabody Developmental Motor Scales and the Sensory Profile. Test scores were compared after a seven week control period where Lovaas alone was provided and after a seven week intervention period where Lovaas and occupational therapy sensory integration activities were provided in combination. Results showed no overall significant changes in fine and gross motor skills and sensory processing skills, however there were areas of improvement in a few of the sub-systems measured. The significance of this study is that it points to an increased need for the exploration of the areas of occupational therapy intervention with and without collaboration for children with autism and autistic spectrum disorders.

## **INTRODUCTION**

Autism is a developmental disorder, characterized by impairments in three main areas of function, including social interactions, communication, and restriction of activities and interests. Autistic spectrum disorders are similar to autism in the areas of impairment but specific diagnostic criteria are not met. Impairments may present as lack of social relationships, delay or lack of language, lack of symbolic and imaginative play, and presence of stereotypical behaviors. There is great variability in the expression of characteristics experienced with each individual (Siegel, 1996).

Occupational therapists can play a vital and important role in the lives of children with autistic spectrum disorders by intervening in a number of ways. Some of the areas that occupational therapy can address are sensory processing, fine and gross motor activity, and play. The occupational therapy frame of reference for this study was in the area of sensory integration. Sensory integration is the neurological process that organizes sensation from one's own body and from the environment and makes it possible to use the body effectively within the environment (Fisher, 1991). Sensory integration activities improve a child's sensory processing capabilities. Observational studies of sensory integration therapy have shown

improvements in the areas of eye contact, learning, self-injurious behavior, stereotypic responses, hyperactivity, communication, motor skills, and other areas (Maurice, 1996).

Watling, Deitz, et. al. (1999) published the results of a survey regarding the current practice of occupational therapy for children with autism and autistic spectrum disorders. Practitioners surveyed were considered to be competent in treating these children. The results show that over 90% of practitioners use sensory integrative techniques and positive reinforcement. Over 70% of the therapists treated fine and gross motor skills. 100% of the therapists indicated that they treat sensory processing frequently or always.

Another treatment approach for children with autism and autistic spectrum disorders is behavioral early intervention. Lovaas therapy is one of the most recognized types of behavioral intervention. Lovaas therapy has an intensive nature, as participants receive 30-35 hours of therapy per week. It is a home-based, early intervention program that targets the three main deficit areas seen in these children. The focus of treatment is on teaching small, measurable units of behavior in a systematic format. Each step is taught on a one-to-one basis through presentation of a specific, consistent cue or instruction. Prompting may be required to achieve an appropriate response that is rewarded with positive reinforcement. Trials are repeated many times until a child can independently perform a task. The program is individually tailored to meet the needs and pace of the child. These skills are eventually incorporated into the natural environment to promote learning from a variety of settings. A study done by Lovaas and colleagues of children receiving different forms of early intervention, found that children who received intensive behavioral therapy for a large number of hours every week over an extended period of time had the best outcome cognitively, academically, and socially (Lovaas 1993).

There have been many effective approaches to education and treatment programs specifically designed for young children with autistic spectrum disorders. According to a study by Dawson and Osterling in 1997 (Maurice 1996), effective programs share six common elements:

1. Curriculum content that addresses ability to attend to elements of the environment, imitate others, use and comprehend language, play appropriately with toys, and interact socially with others.
2. Highly supportive teaching environments and generalization strategies.
3. Predictable and routine classroom environments.
4. A functional approach to behavioral problems.
5. A planned transition from preschool to elementary school.
6. Family involvement.

Occupational therapy and Lovaas behavioral therapy for early intervention meet these criteria to be effective programs for children with autism and autistic spectrum disorders. These approaches have different methods of treatment strategies, however, they both achieve the goal of increased function through development of appropriate behavior, social communication, and play skills. Many aspects need to be considered in early intervention programming, such as environment, duration, and intensity. There are many advantages of early intervention, but a specific effective strategy has not been defined. Little research has been done on treatment methods and early intervention programs. Watling, Deitz, et. al. (1999), state that since 1967, a search of professional literature finds only six studies relating to occupational therapy and autism. It was found that none of these studies described the nature of occupational therapy intervention or evaluation that was applied. It should be noted that definitive research is difficult to achieve due to the variance seen in cases of autistic spectrum disorders and in defining specific standards for diagnosis and treatment (Siegel, 1996).

A study done by Schwartz and Sandall (1998) attempted to explore effective early intervention programs for children with autism and autistic spectrum disorders. Case studies of three children who received school-based early intervention showed substantial development in academic progress. The program applied was a blend of early childhood education, special education, and applied behavioral analysis. The emphasis was to identify individual needs and match them with effective strategies for achievement. Positive outcomes were achieved through collaborative strategies, but more information is required on the best practice of early intervention services.

The purpose this study is to explore intervention programs used to treat children with autism and autistic spectrum disorders. The goal of this study was to improve motor skills through the use of sensory integration activities. It is hypothesized that a combined approach of occupational and Lovaas therapies will improve the fine and gross motor skills and sensory processing skills in a child with an autistic spectrum disorder. This collaboration of two effective treatment strategies will prove to be important in the early intervention treatment planning for children with autism and autistic spectrum disorders.

## **MATERIALS AND METHODS**

The subject of this study was a four-year old, male child diagnosed with an autistic spectrum disorder. He presented with deficits in the areas of fine and gross motor skills and sensory processing skills. He was enrolled in Lovaas therapy through Wisconsin Early Autism Project and was not receiving occupational therapy services. He was assessed with the Peabody Developmental Motor Scales (PDMS), a fine and gross motor performance test which has a test-retest reliability of .99 for the fine and gross motor scales, and the Sensory Profile parental questionnaire to assess sensory history. A sensory history can obtain information about a child's sensory processing skills and can be used in planning treatment. This assessment tool was used to gain information on sensory processing deficit areas for sensory integrative treatment and for assessment of improvements in processing skills. These tests were chosen for their high reliability, ease of administration, pertinence to the study, and familiarity of the tool by the investigators.

The PDMS and Sensory Profile were administered to establish a baseline in fine and gross motor skills and sensory processing skills. This was followed by a control period of seven weeks of Lovaas therapy without occupational therapy intervention. The PDMS and Sensory Profile were administered as a post-test to determine if there were any changes in the areas of interest. This was followed by an intervention period in which occupational therapy sensory integrative activities were incorporated into Lovaas therapy for seven weeks. These activities were designed to prepare the nervous system for a more efficient motor response so the child may efficiently and comfortably interact with the environment. These activities were provided prior to fine and gross motor activities. Activities provided proprioceptive input through joint compression, deep pressure rubbing of the skin, mattress play, heavy muscle work, and motor activities such as climbing, pushing, and pulling. These activities were demonstrated by the investigators, who are therapists on the child's team, to the other four Lovaas therapists on the team. Each therapist was instructed to provide the sensory and motor activities during the child's regular therapy sessions. The activities were done intermittently throughout the three daily sessions for 5-10 minutes per session. A second post-test of the PDMS and Sensory Profile was administered to see if there were any significant changes during intervention. Scores from the three trials were compared to assess functional change.

## RESULTS

The PDMS was analyzed using the Proportional Change Index (PCI) as introduced by Worley in 1983. This is an equation that factors out a child's normal developmental growth over the intervention period. A PCI score greater than 1.0 indicates that the child developed at a greater rate during intervention than the estimated rate of development during pre-intervention. A PCI score of 1.0 indicates that a child developed at the same rate during intervention as the estimated rate of development during pre-intervention. A PCI score less than 1.0 indicates that a child developed during intervention at a rate less than the estimated rate of development during pre-intervention. The equation for determining PCI is:

$$\frac{\text{developmental gain}}{\text{time in intervention}} \text{ divided by } \frac{\text{pretest developmental age}}{\text{pretest chronological age}}$$

(Ottenbacher, Johnson, et. al. 1988).

Gross motor test scores are: pre-intervention PCI=-2.06, post-intervention PCI=.624. Fine motor test scores are: pre-intervention PCI=3.853, post-intervention PCI=3.957.

Sensory Profile results were determined by examining areas related to sensory processing and sensory modulation, these include: vestibular processing, visual processing, touch processing, multisensory processing, sensory processing relating to endurance/tone, modulation related to body position/movement, modulation of movement affecting activity level, modulation of sensory input affecting emotional responses, and modulation of visual input affecting emotional responses and activity level. A 95% confidence interval was calculated to compare scores in these areas to determine if changes made were due to measurement error or actual functional progress. Significant functional change was seen in two of the nine assessed areas. Progress was seen as a score above the confidence interval in the areas of vestibular processing during the control period and sensory processing related to endurance/tone in the occupational therapy intervention period.

## DISCUSSION

No significant change in fine and gross motor skills was found with occupational therapy intervention. However, fine motor rate of development did continue at an accelerated rate, and gross motor rate of development, while still not occurring at a normal rate, did accelerate with occupational therapy intervention. There was no significant change in overall sensory processing. However, there was progress in two sub-areas. Progress in the area of vestibular processing during the control period cannot be clearly explained. Progress related to endurance and tone during the occupational therapy intervention period can be linked to the treatment activities that were designed to prepare the nervous system for a more efficient motor response.

As stated by Watling, Deitz, et. al.(1999), there has been limited research on the nature of occupational therapy intervention and evaluation for children with autism and autistic spectrum disorders. Therefore it is difficult to compare these findings to occupational therapy intervention and evaluation techniques that are proven to be effective in assessing children of this population. Although there were no significant changes in the assessed areas of fine and gross motor and sensory processing skills, there was significance to this study. Its relevance as a pioneer study in the areas of occupational therapy intervention and collaboration for autism and autistic spectrum disorders may lead to further study and collaboration in this area.

## LIMITATIONS

There were several limitations to this study that may have factored into the test results. The time frame of occupational therapy intervention that was incorporated into Lovaas therapy sessions may not have been long enough or intensive enough to produce significant results. Another limitation is the use of a one-subject convenience sample. External factors such as illness and enrollment in school during the intervention period may have added extra stress affecting his performance. A true single case study design would provide more control for external factors over time. The PCI and Sensory Profile could be limiting factors as they assume that development occurs in a linear fashion. Parental report used in the Sensory Profile may be a limitation due to the environmental influences on the parent at the time of the test. Recommendations for further study are to expand the sensory integration frame of reference in treatment to include auditory, visual, vestibular, and oral stimulation. It is also recommended to include a variety of occupational therapy frames of reference over a longer time period. Another suggestion is to increase the intensity of occupational therapy intervention. Lastly, more single case research is needed in this area with the use of a true single case design. Occupational therapy collaboration with the Lovaas program should be encouraged with other disciplines being brought in as needed.

## ACKNOWLEDGEMENTS

Family and child for their participation in this study.  
 Wisconsin Early Autism Project  
 Deborah Dougherty-Harris, M.S., OTR  
 Peggy Martin, M.S., OTR

## REFERENCES

- Fisher, A., Murray, E., Bundy, A. (1991). *Sensory Integration: Theory and Practice*. PA: F.A. Davis Company.
- Gresham, F., MacMillan, D.L. (1998). "Early Intervention Project: Can its Claims be Substantiated and its Effects Replicated?". *Journal of Autism and Developmental Disorders*, 28, 1: 5-12.
- Herin, L.J., Simpson, R.L. (1998). "Interventions for Children and Youth with Autism: Prudent Choices in a World of Exaggerated Claims and Empty Promises". *Focus on Autism and Other Developmental Disabilities*, 13, 4: 194-212.
- Kientz, M.A., Dunn, W. (1997). "A Comparison of the Performance of Children With and Without Autism on the Sensory Profile." *American Journal of Occupational Therapy*, 51, 7: 530-536.
- Lovaas, I.O. (1993). "The Development of a Treatment Research Project for Developmentally Disabled and Autistic Children". *Journal of Applied Behavior Analysis*, 4: 617-630.
- Maurice, C. (1996). *Behavioral Intervention for Young Children with Autism*. Austin: Pro-Ed.
- Ottenbacher, Johnson, et. al. (1988). "The Significance of Clinical Change and Clinical Change of Significance: Issues and Methods". *American Journal of Occupational Therapy*, 42, 3: 156-163.

- Restall G., Magill-Evans, J. (1994). "Play and Preschool Children with Autism". *American Journal of Occupational Therapy*, 48, 2: 113-119.
- Schwartz, I., Sandall, S. (1998). "Outcomes for Children with Autism". *Topics in Early Childhood Special Education*, 18, 3: 132-144.
- Sheinkopf, S.J., Siegel, B. (1998). "Home Based Behavioral Treatment of Young Children with Autism". *Journal of Autism and Developmental Disorders*, 28, 1: 15-22.
- Siegel, B. (1996). *The World of the Autistic Child*. Oxford: Oxford University Press.
- Watling, Deitz, et. al. (1999). "Current Practice of Occupational Therapy for Children With Autism". *American Journal of Occupational Therapy*, 53, 5: 498-504.