2010

Effectiveness of sensory integration for children diagnosed with Autism Spectrum Disorders using a group therapy approach.

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Effectiveness of sensory integration for children diagnosed with Autism Spectrum Disorders using a group therapy approach.

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Effectiveness of sensory integration for children diagnosed with Autism Spectrum Disorders using a group therapy approach.

Prepared by: Jennifer Owen, OTS (owen8193@pacificu.edu)

Date: November 8, 2010

CLINICAL SCENARIO:

“Autism Spectrum Disorders (ASD) are a group of developmental disabilities that can cause significant social, communication and behavioural challenges.” (Center for Disease Control) The Center for Disease Control (CDC) estimates an increase of approximately 33% for 8 year olds diagnosed with ASD from 2002 to 2006. With this population on the rise, it is important to give careful thought to the best treatment for people diagnosed with ASD. Both effectiveness and cost need to be taken into account when discussing treatment options. Since ASD’s are disorders that affect the social and communication areas of occupation and are frequently addressed by occupational therapists, it makes sense to consider group treatment as an option in therapy.

FOCUSSED CLINICAL QUESTION:

How does a group treatment model utilizing a sensory integration approach work for children with Autism Spectrum Disorder (ASD)?

SUMMARY of Search, ‘Best' Evidence appraised, and Key Findings:

- A total of 5 research articles investigating sensory integration therapy for people with ASD were analysed by this writer.
- This study looked at the implementation of a Sensory Integration Treatment Protocol in a preschool classroom setting with children with pre-primary impairments (In the young child, 3-6 years of age, Autistic Impaired is under this heading.) It compared the control group which consisted of a classroom of children engaging in common preschool activities and the experimental group which consisted of a classroom of children who received a combined hour of vestibular, proprioception, tactile and oral motor activities. All the children were given the DeGangi-Berk Test of Sensory Integration and the Miller Assessment for Preschoolers before and after the intervention as a way to measure change. The children in the intervention group scored higher relatively than the children in the control group.
- While this study is by no means exhaustive, it provides a place to start asking other related questions perhaps coming to conclusions that will be very supportive and therapeutic for
children diagnosed with ASD. Especially when one considers that social interaction and communication are areas of great struggle for someone diagnosed with autism along with tactile defensiveness, sensory impairments, and speech and language impairments.

- Another study looked at how sensory integration treatment would affect frequency of mastery play, non-engaged behaviours and both peer and adult interaction on children with autism. The study found an increase in mastery play by all participants and a decrease in non-engaged behaviours by all but one participant.
- A third study investigated how the use of weighted vest, a common tool used by occupational therapists for children diagnosed with ASD, affects attention to fine motor tasks and self-stimulatory behaviours. All of the participants in this study increased their attention to a fine motor task during the intervention phase.
- The forth study looked at involving multiple children in occupational therapy sessions in an occupational therapy clinic. The children received one hour of occupational therapy per week for blocks of six to eight weeks. The therapists reported increased willingness to try new activities based on the social aspect of providing therapy in this way.
- The last study was interested in understanding if using a sensory integration-based occupational therapy intervention with children with ADS directly before tabletop activities changed how the children engaged in those tabletop activities. While the objective results were inconclusive subjective data did indicate positive results from the intervention.

**CLINICAL BOTTOM LINE:**
People diagnosed with ADS have struggles with social interaction and communication as well as often having atypical sensory processing and motor difficulties. Treating only the sensory processing and motor issues without bringing in the social interaction and communication part of the disease seems to inadequately address the issue. This CAT strives to understand how an occupational therapist could combine all of these goals into one treatment session. Treating the young child in a classroom setting allowing for proper sensory stimulation and constructive, positive social interactions, at the same time seems to accomplish that goal of treating the whole person, not simply a series of symptoms.

**Limitation of this CAT:** This CAT has not been peer-reviewed and was completed as part of a course project by a second year MOT student. An exhaustive literature search was not conducted on this topic. And finally, this writer is not an expert on this topic.

**SEARCH STRATEGY:**

**Terms used to guide Search Strategy:**

- **Patient/Client Group:** autism, ASD, children
- **Intervention (or Assessment):** sensory motor therapy, sensory integration therapy
- **Comparison:** N/A
- **Outcome(s):** positive outcomes to treatment
### Databases and sites searched

<table>
<thead>
<tr>
<th>Databases and sites searched</th>
<th>Search Terms</th>
<th>Limits used</th>
</tr>
</thead>
<tbody>
<tr>
<td>10/10</td>
<td>“sensory motor therapy” AND “children” AND “group therapy”</td>
<td></td>
</tr>
<tr>
<td>10/10</td>
<td>“sensory motor therapy” AND “children” AND “group therapy”</td>
<td></td>
</tr>
<tr>
<td>MEDLINE OVID</td>
<td>“autism spectrum disorders”, “group therapy”, “children”</td>
<td></td>
</tr>
<tr>
<td>10/10</td>
<td>“autism spectrum disorders” AND “group therapy”</td>
<td></td>
</tr>
</tbody>
</table>

### INCLUSION and EXCLUSION CRITERIA

**Inclusion:**
- Child participants, < 11.
- Using some form of sensory integration/motor therapy
- Participants diagnosed with some form of sensory issues; Pervasive Developmental Disorder or Autism Spectrum Disorder.
- Studies written in English
- Full text retrieval
- Written within the last 15 years

**Exclusion:**
- Studies that looked at adults were excluded.
- Studies that looked at older children were excluded.
- Other forms of therapy were excluded.
RESULTS OF SEARCH

Table 1: Summary of Study Designs of Articles retrieved

<table>
<thead>
<tr>
<th>Study Design/ Methodology of Articles Retrieved</th>
<th>Level</th>
<th>Number Located</th>
<th>Author (Year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grounded Theory</td>
<td>4</td>
<td>N/A</td>
<td>Vertes, J. (2010)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Fertel-Daly, D., Bedell, G., &amp; Hinojosa, J. (2001)</td>
</tr>
</tbody>
</table>

BEST EVIDENCE

The following study/paper was identified as the ‘best’ evidence and selected for critical appraisal. Reasons for selecting this study were:


This article is identified as the best evidence by this writer because it had both an experimental and control group. This study also used both the DeGangi-Berk Test of Sensory Integration (TSI) and the Miller Assessment for Preschoolers (MAP) as outcome measures.

SUMMARY OF BEST EVIDENCE

Aim/Objective of the Study/Systematic Review:
The aim of this study was to see if implementing a Sensory Integration Treatment Protocol to children diagnosed with pre-primary impairments would improve their outcomes as measured by the DeGangi-Berk Test of Sensory Integration (TSI) and the Miller Assessment for Preschoolers (MAP) compared to a control group who engaged in regular classroom activities.

Study Design:
The study used a before and after, quasi-experimental design. Outcomes were measured using the TSI, which is intended to measure sensory integration in preschoolers and to detect sensory integrative dysfunction, and MAP, intended to identify children who exhibit moderate pre-academic problems, after implementing treatment for one hour a day, five days a week, for twelve weeks.

Setting:
The setting for the study was two classrooms in different schools in a similar geographic area of children diagnosed with pre-primary impairments.

Participants:
The control group had 16 children, six males and ten females, with a mean age of 51.62 months in the classroom. The experimental group consisted of 15 children, seven males and eight females, with a mean age of 50.87 months. All of the children in both groups were diagnosed with pre-primary impairments. Both of these classrooms were already in place.

Intervention Investigated
Control: The control group participated in standard classroom activities and play activities. These activities were not defined further.

Experimental: The experimental group received a “Sensory Integration Treatment Protocol” for one hour per day, five days a week, for twelve weeks. This treatment included vestibular activities, proprioceptive activities, postural control activities, tactile activities, fine motor activities and speech training activities. These activities followed the developmental sequence put forth by the sensory integration theory. I.e. gross motor activities were done before fine motor activities. A wide variety of professionals were involved with creating the treatment protocol including occupational therapists, special education teachers, physical therapists, and speech pathologists. This group also engaged in typical classroom activities.

Outcome Measures
The outcomes were measured using two assessments. The TSI, which looks at postural control, bilateral motor integration and reflex integration and the MAP, which measures sensory, motor and cognitive skills through verbal and nonverbal tasks.
Main Findings:

<table>
<thead>
<tr>
<th>Group</th>
<th>Pre-test</th>
<th>Post-test</th>
</tr>
</thead>
<tbody>
<tr>
<td>TSI: Postural Control</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EG</td>
<td>17.73</td>
<td>21.33</td>
</tr>
<tr>
<td>CG</td>
<td>21.31</td>
<td>19.31</td>
</tr>
<tr>
<td>TSI: Bilateral Motor Integ.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EG</td>
<td>22.33</td>
<td>26.53</td>
</tr>
<tr>
<td>CG</td>
<td>26.38</td>
<td>26.75</td>
</tr>
<tr>
<td>TSI: Reflex Integration</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EG</td>
<td>9.6</td>
<td>11.13</td>
</tr>
<tr>
<td>CG</td>
<td>11.19</td>
<td>10.75</td>
</tr>
<tr>
<td>TSI: Total Score</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EG</td>
<td>49.7</td>
<td>59.0</td>
</tr>
<tr>
<td>CG</td>
<td>58.9</td>
<td>56.81</td>
</tr>
<tr>
<td>MAP Total Score</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EG</td>
<td>14.7</td>
<td>30.1</td>
</tr>
<tr>
<td>CG</td>
<td>28.3</td>
<td>30.4</td>
</tr>
</tbody>
</table>

EG=Experimental Group   CG=Control Group

Original Authors’ Conclusions
The authors’ concluded from the data that implementing a Sensory Integration Treatment Protocol helped the children in the experimental group improve their scores on the DeGangi-Berk Test of Sensory Integration while the scores for the control group were not so affected. Postural control increased by over three points. Bilateral motor integration increased by over four points. Reflex integration increased by one and a half points with the total score increasing by almost ten points. The experimental group also showed improvement in the Miller Assessment of Preschoolers compared to the control group. “This suggests that the sensory integration-based intervention was effective in improving school performance of children with pre-primary impairments.” (pg 31)

Critical Appraisal:

Validity
The Miller Assessment for Preschoolers is a standardized screening tool intended to identify moderate delays in children compared to children of the same age. There are five sub-categories including:

- Foundations Index
  - Assesses abilities involving basic motor tasks and the awareness of sensations.
- Coordination Index
  - Assesses complex gross, fine, and oral motor abilities.
- Verbal Index
  - Focuses on memory, sequencing, comprehension, association, and expression in a verbal context.
- Nonverbal Index
  - Examines memory, sequencing, visualization, and the performance of mental manipulations not requiring spoken language.
Complex Tasks Index
Measures sensorimotor abilities in conjunction with cognitive abilities that require interpretation of visuospatial information.

“The inter-rater reliability was .978 for the total score, and ranges form .80-.99 for each index. The test-retest reliability was .81 when retested in a 1-4 week interval and the internal reliability was .79. In terms of validity, all indices equally contribute to the total score with a significance level of <.01 (Miller, 1982)” (pg 30)

The DeGangi-Berk Test of Sensory Integration has three components, postural control, bilateral motor integration, reflex integration and a combined total score. “For the total score of the test, the interrater reliability for two pairs of raters was .73 and .79. Over 1-week intervals, the test-retest reliability varied between .85 and .96 (Berk & DeGangi, 1983; Royeen, 1988)” (pg 30)

Interpretation of Results
The results of this study indicate that using a sensory integration approach in a classroom setting with children with pre-primary impairments, including autism, can positively affect their outcomes when tested for a variety of motor and cognitive skills.

Limitations:
This study was conducted with naturally occurring classrooms. It is possible that there are other factors that contributed to the experimental classroom children gaining skills in various areas more so than the control group. A larger sample size and true randomised trials would help to verify this study’s findings.

Summary/Conclusion:
Since many of these protocols do not require specialized equipment or skills to administer (examples of activities include playing duck, duck, goose and tug of war) it seems a reasonable conclusion that more classroom settings where children with pre-primary impairments are taught could use some or all of these activities to help their students achieve school goals. Since these activities address both the sensory needs of this group of students while also providing opportunities to interact socially, which can be challenging for some of these children, it seems an obvious route of therapeutic treatment for this population.

Table x: Characteristics of included studies

<table>
<thead>
<tr>
<th>Study</th>
<th>Summary of the Research Study</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>The effects of occupational therapy with sensory integration emphasis on preschool-age children with autism.</strong></td>
<td>This study looked at how OT intervention using a sensory integration approach with children having autism would affect frequency of mastery play, non-engaged behaviours and frequency of adult and peer interaction. Five boys who attended a half-day special needs preschool program were involved in the study. There was a three-week baseline period before a ten-week intervention phase in which 30 minutes of OT using a sensory</td>
</tr>
<tr>
<td>Title</td>
<td>Abstract</td>
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<tr>
<td>Sensory integration emphasis on preschool-age children with autism. <em>The American Journal of Occupational Therapy.</em> 53(5), 489-96.</td>
<td>Integration approach was given to each subject. At the end of the study all of the participants had increased their level of mastery play as recorded on video and assessed by the Engagement Check which measures specifically mastery and non-mastery play, engaged behaviours and interaction with peers and adults. This measure has evidence of reliability and validity. All but one participant had decreased non-engaged behaviours. None increased their peer interaction, suggesting the need for using a sensory integration approach in a group setting if this outcome is going to be influenced.</td>
</tr>
<tr>
<td>Effects of a weighted vest on attention to task and self-stimulatory behaviours in preschoolers with pervasive developmental disorders.</td>
<td>The purpose of this study was to examine the effectiveness of using a weighted vest for increasing attention to a fine motor task and decreasing self-stimulatory behaviours in preschool children with Pervasive Developmental Disorders(PDD). Five children diagnosed with PDD were observed five times before intervention, five times during intervention and five times after intervention to see if there was an increase to attention to a fine motor task and decrease in self-stimulating behaviours. All of the participants in this study increased their attention to a fine motor task during the intervention phase and all but one participant decreased the number of self-stimulatory behaviours while wearing a weighted vest. This is important because a weighted vest could easily be incorporated into a classroom setting allowing for the involved children to attend to fine motor activities with fewer distractions and less self-stimulatory behaviours.</td>
</tr>
<tr>
<td>A small group treatment model: Supporting performance in children with sensory processing problems.</td>
<td>In this study groups of 2 to 6 children were treated in an occupational therapy clinic using a sensory integration approach along with other frames of reference. The room set up with opportunities for vestibular, proprioceptive and tactile stimulation. The group interactions of the children along with the therapist expertise led to dynamic therapy sessions in which the children were encouraged to engage in otherwise difficult activities by watching other children do the activities. This writer appreciated the idea that children playing/working together could inspire more from one another than seen in a traditional therapy session. Often children with sensory processing disorders have difficulty socially and providing the opportunity to engage with peers in a safe and structured environment seems highly therapeutic.</td>
</tr>
</tbody>
</table>
Immediate effect of Ayre’s sensory integration-based occupational therapy intervention on children with autism spectrum disorders.


IMPLICATIONS FOR PRACTICE, EDUCATION and FUTURE RESEARCH

Practice:
One of the strengths of this study is that it could be implemented in a wide variety of settings with little extra cost to the schools. There is a specific protocol and this writer would recommend consultation by an OT for program development to administer this protocol with positive results. There is benefit to the students in that they will be receiving therapeutic treatment on a very regular basis allowing for more integration of the skills being fostered. Parents would benefit because there would be little to no added cost to the amount they already pay for school for their child, yet the child would potentially be improving more quickly in a variety of areas that may be delayed. The teachers would also benefit since they have the overarching goals of helping the children in their care succeed and this study has shown using two outcome measures that this protocol supports children in their learning process.

Education:
The amount of time spent in occupational therapy programs on sensory integration is limited. The current expectation is that a practitioner who is interested in this model would pursue further education upon graduation from an accredited program. While this is valid, sensory motor integration is one of the main frames of reference used by OT practitioners for children so having more than just a basic outline of the theory would be beneficial.

Future Research:
Future research in this area is needed. This could include more detailed descriptions of the children’s behaviour before and after intervention. Including not just academic and motor issues but social considerations as well. Questions like, based on the child’s involvement with their diagnosis what is their level of peer interaction before and after intervention? Do transitions for a child go more smoothly when that child engages with their peers in a sensory motor treatment protocol? Is a child able to handle standing in line with greater success after this treatment? There are also other assessments, such as the Sensory Profile, that can be given to parents to gain a bigger picture understanding of each child. Taking this research into the bigger picture of the occupation of the young child will be important for the future. This study focused on academics, which are vastly important for a child, but the true occupation of young childhood is learning how to play and interact with others. Since children...
with ASD struggle in this area and this intervention is done in a group setting it only makes sense to look at the area of play as an occupation for the child.

As well as all these questions it would be of interest to look at how incorporating weighted vests into a preschool classroom setting might change how a child responds to activities. As this form of treatment is commonly used by occupational therapists it would be appropriate to see how it affects children in the classroom setting. Also there are numerous swings used by Sensory Integration practitioners, what would it be like to have these available in a classroom to provide various sensory input for the children when needed?

REFERENCES:


