A Review of Research on the Use of Weighted Vests with Children on the Autism Spectrum

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INTRODUCTION

Autism spectrum disorder is a neurobiological disorder that is characterized by qualitative impairments in language, qualitative impairments in social skills, and stereotyped or restricted patterns of interest, behavior, or activities (DSM IV-TR, 2000). It has recently been estimated that .6% of the population has a diagnosis of autism spectrum disorder (Fombonne, E., 2005). Occupational therapists working in the school system have been and will continue to assess and treat students with autism spectrum disorder. However, empirical research studies on occupational therapy services with children with autism are rare (Watling, R., Deitz, J., Kanny, E.M., McLaughlin, J.E, 1999). Conversely, healthcare and education are increasingly pushing for evidenced based practice (Honaker, C., & Rossi, L.M., 2005). Accountability is, and should be, demanded by reimbursement sources, parents, teachers, and other healthcare professionals.

An example of an occupational therapy technique used with students with autism spectrum disorder is a weighted vest. The use of a weighted vest is based on the sensory integrative frame of reference. It is argued that the weight in the vest provides proprioception (deep pressure), which provides calming input to the central nervous system by promoting the production of neurotransmitters such as serotonin and dopamine (Vandenburg, N.L., 2001, Honaker, D., & Rossi, L.M., 2005). A survey of school-based occupational therapists reports that 82% report using weighted vests with students. These therapists report seeing benefits of calming, increased attention to task, and decrease in self-stimulatory behaviors (Olsen, L.J. &Moulton, H.J., 2004). Many occupational therapists report using the sensory integrative framework when treating children with autism. They also report using proprioceptive input as a part of the intervention (Watling et al, 1999). Despite this and other qualitative reports of the benefits of weighted vests, there is little organized assessment regarding the effectiveness of their use (Honaker, D. & Rossi, L.M., 2005).

The purpose of this paper is to gather and review the literature on the use of weighted vests with students who have an autism spectrum disorder, as well as specific protocols for use. Sound, research-based evidence for the use of weighted vests with this population will assist therapists in making informed decisions on appropriate use. It is also imperative that occupational therapists understand specific treatment techniques to be valuable members of the Individualized Education Plan (IEP) team.
LITERATURE SEARCH

The following journals were manually searched: American Journal of Occupational Therapy (1999-2005), AOTA’s Sensor, Integration Special Interest Section (1998-2005), OT Practice (1999-2005), Canadian Journal of Occupational Therapy (1997-2005), and Occupational Therapy in Health Care (1984-2006). The following databases were electronically searched: Medline (1980-present), Cumulative Index to Nursing and Allied Health Literature (1980-present), Psychinfo (1980-present), Academic Search Premier (1980-present), Educational Resource Information Center (1980-present), Professional Development Collection (1980-present), and Health Source: Nursing/Academic Edition (1980-present). The search terms used were weighted vest, autism AND deep pressure, autism AND proprioception. The reference section and in-text citations were examined for other works, and this process was repeated until no new studies were found.

INCLUSION-EXCLUSION CRITERIA FOR STUDIES

The studies used in this review had to be published in English. Studies had to be published between 1980 and 2006. Knowledge of autism has grown and changed rapidly in the last 25 years, and the use of a weighted vest in school system practice is a fairly new treatment technique. Articles chosen were those that studied the use of the weighted vest for children with autism spectrum disorder. Over thirty-seven articles were found in initial searches, and after reviewing the abstracts of these, five were included. As this is an area that has limited research, not all articles included were randomized controlled trials. Studies excluded from the review were:

* those done on students with a different diagnosis, such as Attention Deficit Hyperactivity Disorder (ADHD)

* those done for a purpose other than attention and on-task behavior, such as physical development, and

* those not specifically examining the use of a weighted vest such as those that examined other forms of deep pressure.

RESULTS

Five articles were selected after using the exclusion criteria listed in the review section. However, only three studies were found using experimental designs that examined the intervention of weighted vests with students on the autism spectrum. One of these studies, by Fertel-Daly, Bedell, & Hinojosa (2001), was a comparison of a group of five students at baseline, intervention, and post-intervention. This study found moderate improvements in the students during the intervention phase of wearing the vest for the outcomes of improved focus and decreased distractions. However, there was not a significant difference in the post-intervention phase. This seems to indicate that the benefits of wearing the vest
are limited only to the actual time wearing, and there not a lasting effect when the vest is removed.

A second study, Kane, Wiselli, Dearorn, & Young (2004-2005), measured four students on the autism spectrum for the outcomes of decreased stereotypy and increased attention to task, during three phases. These phases were baseline, student wearing a weighted vest, and student wearing a vest with no weight. These conditions were mixed in sequence to improve controls. The authors of this study found no improvements in reducing stereotypy or increasing attention to task while wearing the vest, and they state that for three students, the vest produced negative outcomes. A possible limitation to this study is the time of wear for the weighted vest (the vest was placed on the child one minute before observation began, then the child was observed for the next ten minutes). It is reported that deep pressure can create an initial surge in arousal before calming begins when used for a period of two hours (Takagi and Kobayasi, 1955, as cited in Fertel-Daly, et al, 2001). Although there is not a formal protocol for use of the weighted vest, many occupational therapists use the vests as long as thirty minutes, with the Fertel-Daly study using the vest for two hours (Olsen, L.J., & Moulton, H.J., 2004). It is possible that the novelty of the vest being put on may have resulted in increased stereotypical behaviors and increased distraction during this short observation period.

The third study, Myles et al (2004), examined three different single subject studies, all which used an ABAB study design. The intervention, data collection, and outcomes measured were slightly different in all three designs. The first of the three showed a slight negative effect on outcomes measured (on-task behavior), and the second and third studies showed a significant positive effect on outcomes measured (ability to stay seated and deep-pressure seeking behaviors, respectively).

The fourth article, Olsen, L.J. & Moulton, H.J. (2004), is a qualitative study done by survey of occupational therapists' use of the weighted vest. It collected information on the diagnoses the therapists used the vests with, the duration of time for vest wear, the amount of weight used, and the settings the vests were used in. The respondents were self-selected. An astounding 92.2% of the respondents that used the vests stated they used the vests with students with autism spectrum disorder. The vests were primarily used in the school setting. This survey generally reported at least somewhat decreased negative behaviors (flapping, hitting, rocking, tantrums, covering face, wandering) and at least somewhat increased positive behaviors (attention, eye contact, staying on task, purposeful requests, following instructions, and balance and stability). There were a variety of responses to questions regarding duration and amount of weight. Respondents reported using 2%-10% of the student's body weight for the weighted vest, with others using generally 2-4 lbs. The duration of time for wear also varied widely, from 10 minutes to 45 minutes or longer. This study is limited because there was no standardization for use of the weighted vests, and respondents were self-selected so they had an interest in the use of the vest. It also serves to illustrate the need for further research on the weighted vest and development of a standard protocol.

The fifth article, Honanker, D., & Rossi, L. (2005), is a two-part critical appraisal of the literature on how weighted vests are used in an effort toward "increasing the power of the
current evidence”. In part one of the study, the authors used a "CAT brief" (critically appraised topic) to organize their articles. Their articles looked at the effectiveness for many students, including those with PDD (including the Fertel-Daly study) and ADHD. They found that all articles had low external validity due to small sample size and homogeneous groups. They did find that most studies they looked at had either a questionable or a positive outcome. In part two of the study, the authors examined less rigorous studies and solicited expert opinions, including posting on the American Occupational Therapy Association’s Special Interest Section listserve and searching non-peer reviewed publications. This part of the study included the Lourette and Moulton article. Honaker and Rossi also found that the duration of time for wearing the vest varied, as well as the amount of weight used. They also found the literature to lack external validity and they found very few rigorous studies.

CONCLUSION

Although there seems to be a consensus among occupational therapists that regularly use weighted vests that the vests are beneficial, the evidence to support their effectiveness with students on the autism spectrum is limited. Due to the nature of autism and the many different treatment approaches (behavioral, sensory integrative, dietary, biomedical, developmental, etc), it is very difficult to control for outside factors that might change results. Also, since many children with autism react to change with stress, anxiety, or confusion (Kluth, 2003, as cited in Hume, 2006), the very presence of the data collector for the study may affect the behaviors and outcomes being measured. Most of the studies were compromised by a small sample size and homogeneous sample. Also, there is not a widely accepted, standardized protocol for the duration of wearing a weighted vest or the amount of weight to be included. Lacking a standardized protocol for the weighted vest, most occupational therapists relied solely on the use of clinical reasoning that includes observation and anecdotal evidence. Further research needs to be done using larger samples, with a standardized protocol, across a wider geographical region. Research is also needed to come up with a standardized protocol to use as a guideline for determining weight and duration of wear for the vest. As discussed in Myles et al 2004, the use of the weighed vest is following a typical cycle in which practitioners use an intervention with primarily theoretical support from researchers. Although sensory integrative theory and some studies seem to support the use of the weighted vests, the occupational therapy profession will continue to be asked for more compelling evidence for this treatment technique when working with students who have an autism spectrum disorder.

REFERENCES


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