Research in Autism Spectrum Disorders 6 (2012) 1004–1018

Contents lists available at SciVerse ScienceDirect

Research in Autism Spectrum Disorders

Journal homepage: http://ees.elsevier.com/RASD/default.asp

Review

Sensory integration therapy for autism spectrum disorders: A systematic review

Russell Lang [a,b,*], Mark O'Reilly [b], Olive Healy [c], Mandy Rispoli [d], Helena Lydon [c], William Streusand [e], Tonya Davis [f], Soyeon Kang [b], Jeff Sigafoos [g], Giulio Lancioni [h], Robert Didden [i], Sanne Giesbers [i]

[a] Texas State University-San Marcos, Clinic for Autism Research Evaluation and Support, San Marcos, TX, United States
[b] The Meadows Center for the Prevention of Educational Risk, University of Texas at Austin, Austin, TX, United States
[c] National University of Ireland, Galway, Ireland
[d] Texas A&M University, College Station, TX, United States
[e] University of Texas at Austin, Austin, TX, United States
[f] Baylor University, Waco, TX, United States
[g] Victoria University of Wellington, Wellington, New Zealand
[h] University of Bari, Bari, Italy
[i] Radboud University Nijmegen, Nijmegen, The Netherlands

ARTICLE INFO

Article history:
Received 27 January 2012
Accepted 30 January 2012

Keywords:
Sensory integration
Autism
Weighted vests
Proprioceptive
Vestibular
Sensory diet

ABSTRACT

Intervention studies involving the use of sensory integration therapy (SIT) were systematically identified and analyzed. Twenty-five studies were described in terms of: (a) participant characteristics, (b) assessments used to identify sensory deficits or behavioral functions, (c) dependent variables, (d) intervention procedures, (e) intervention outcomes, and (f) certainty of evidence. Overall, 3 of the reviewed studies suggested that SIT was effective, 8 studies found mixed results, and 14 studies reported no benefits related to SIT. Many of the reviewed studies, including the 3 studies reporting positive results, had serious methodological flaws. Therefore, the current evidence-base does not support the use of SIT in the education and treatment of children with autism spectrum disorders (ASD). Practitioners and agencies serving children with ASD that endeavor, or are mandated, to use research-based, or scientifically-based, interventions should not use SIT outside of carefully controlled research.

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* Corresponding author at: Texas State University-San Marcos, Department of Curriculum and Instruction, 601 University Dr, San Marcos, TX 78666, United States.
E-mail address: russlang@txstate.edu (R. Lang).

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doi:10.1016/j.rasd.2012.01.006

Autism spectrum disorders (ASD) are characterized by a combination of restrictive and repetitive behaviors and deficits in communication and social skills (American Psychological Association, 2000). Although not part of the diagnostic criteria, individuals with ASD may also appear to seek or avoid ordinary auditory, visual, tactile, and oral stimuli (Ben-Sasson et al., 2009). For example, individuals with ASD may perseverate on objects that have a specific texture or visual pattern, may cover their ears when they hear a specific noise (e.g., car horn), or may not respond to stimuli that should elicit their attention (e.g., someone calling their name). These unusual behaviors are sometimes described as "sensory behaviors" (Ben-Sasson et al., 2009; Kern et al., 2008; Rogers & Ozonoff, 2005; Lane, Young, Baker, & Angley, 2010).

A meta-analysis of 14 studies involving sensory processing symptoms in individuals with ASD suggested that sensory behaviors were common (Ben-Sasson et al., 2009). However, Rogers and Ozonoff (2005) reviewed 48 empirical papers and 27 theoretical or conceptual papers and found that the frequency, severity, and topography of these abnormal sensory behaviors varied greatly across samples of individuals with ASD. Further, Rogers and Ozonoff reported that there was insufficient evidence to suggest sensory behaviors could be used to differentiate ASD from other developmental disabilities.

Despite debate regarding the prevalence of these behaviors, researchers have sought to identify a biological cause for the abnormal behaviors observed in individuals with ASD. One hypothesis is that abnormal behaviors are caused by a defect in the nervous system in which sensory stimuli are processed and integrated abnormally (Ayres, 1972; Ayres & Tickle, 1980; Schaaf & Miller, 2005). Sensory integration therapy (SIT) is an extension of this hypothesis and further speculates that, given the nervous systems ability to change (neuroplasticity), providing specific forms of sensory stimulation in the appropriate dosage may improve the nervous system's ability to process sensory stimuli. Ultimately, the improved nervous system may then result in reductions in problem behaviors and more efficient learning (Baraneck, 2002; Lane et al., 2010; Schaaf & Miller, 2005). However, the exact nature of the nervous system's impairment and the influence of SIT on sensory processing is currently the subject of debate and ongoing research (Iarocci & McDonald, 2006; Lane & Schaaf, 2010; Smith, Mruzek, & Mozingo, 2005).

Implementation of SIT typically involves some combination of the child wearing a weighted vest, being brushed or rubbed with various instruments, riding a scooter board, swinging, sitting on a bouncy ball, being squeezed between exercise pads or pillows, and other similar activities. Ideally, the specific set of activities implemented is based upon an assessment of a child's sensory profile (e.g., Dunn, 1999) and adheres to the essential components of SIT described by Parham et al. (2011). Specifically, SIT should involve: (a) child safety, (b) opportunities to obtain tactile, vestibular, and/or proprioceptive sensory stimulation to support self-regulation, sensory awareness, or movement, (c) appropriate levels of participant alertness, (d) challenge to postural, ocular, oral, or bilateral motor control, (e) novel motor behaviors and efforts to organize movements in time and space, (f) preferences in the choice of activities and materials, (g) activities that are not too easy or too difficult, (h) activities in which the participant experiences success (i) support for intrinsic desire to play, and (j) a therapeutic reliance (Parham et al., 2011).

SIT is among the most common interventions delivered to children with ASD. Watling, Deitz, Kanny, and McLaughlin (1999) surveyed 72 occupational therapists (OT) working with children with autism and found that 99% regularly implemented SIT. Similarly, Case-Smith and Miller (1999) contacted 292 OTs and found SIT to be the most frequent intervention utilized by OTs with children with ASD. Finally, Green et al. (2006) surveyed 552 parents of children with autism and reported that 38.2% of parents said their child currently receives SIT and an additional 33.2% reported that their child has received SIT at some point in the past.

Previous reviews involving individuals with ASD and other diagnoses have arrived at varying conclusions regarding SIT's effectiveness (e.g., Hoehn & Baumeister, 1994; May-Benson & Koomar, 2010; Ottenbacher, 1982; Stephenson & Carter, 2005). Additionally, a recent review focusing only on individuals with ASD has not been conducted. Given discrepancies across previous reviews, the immense popularity and wide spread use of SIT within the ASD population (Green et al., 2006), and the increasing importance of implementing evidence-based practice (e.g., IDEIA, 2004) such a review is warranted.

The purpose of this current review was to systematically identify, analyze, and summarize research involving the use of SIT in the education and treatment of individuals with ASD. Herein we endeavor to determine if SIT can be classified as a research-based or scientifically-based intervention for individuals with ASD. A review of this type may provide useful information to practitioners and agencies interested in providing effective education/rehabilitation to individuals with ASD.

1. Methods

1.1. Search procedures

Systematic searches were conducted in four electronic databases: Medline, Education Resources Information Center (ERIC), Psychology and Behavioral Sciences Collection, and PsycINFO. Searches were limited to peer-reviewed studies