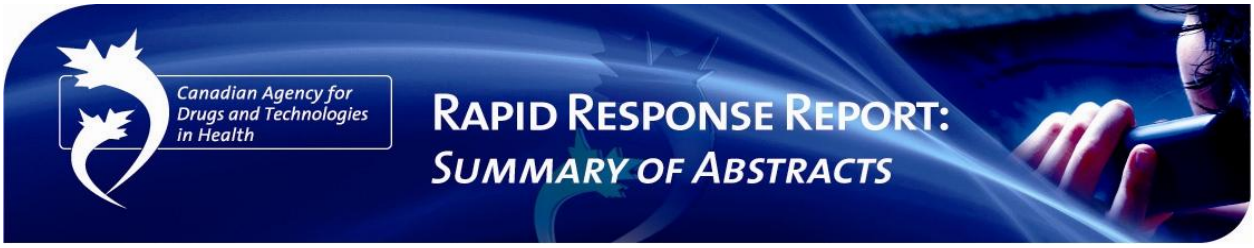

TITLE: Sensory Integration Theory Interventions for Children with Autism Spectrum Disorders: Clinical Evidence

DATE: 02 February 2011

RESEARCH QUESTION

What is the clinical evidence for the use of sensory integration theory interventions for children with or at risk of being diagnosed with autism spectrum disorder?

KEY MESSAGE

Available evidence regarding the clinical efficacy of sensory integration theory interventions for children with autism spectrum disorder is inconsistent. Further evidence is required before sensory integration therapies could be considered non-experimental.

METHODS

A limited literature search was conducted on key health technology assessment resources, including PubMed, EBSCO CINHAL, Ovid PsychINFO, the Cochrane Library (Issue 1, 2011) University of York Centre for Reviews and Dissemination (CRD) databases, ECRI (Health Devices Gold), EuroScan, international health technology agencies, and a focused Internet search. The search was limited to English language articles published between January 1, 2001 and January 20, 2011. No filters were applied to limit the retrieval by study type. Internet links were provided, where available.

The summary of findings was prepared from the abstracts of the relevant information. Please note that data contained in abstracts may not always be an accurate reflection of the data contained within the full article.

RESULTS

Rapid Response reports are organized so that the higher quality evidence is presented first. Therefore, health technology assessment reports, systematic reviews, and meta-analyses are

presented first. These are followed by randomized controlled trials, non-randomized studies, and evidence-based guidelines.

The literature search identified one health technology assessment report, five systematic reviews, seven non-randomized studies, and two evidence-based guidelines concerning the clinical efficacy of sensory integration theory interventions for children with autism spectrum disorder. No randomized controlled trials were identified. Additional information that may be of interest can be found in the appendix.

OVERALL SUMMARY OF FINDINGS

Available evidence regarding the clinical efficacy of sensory integration theory interventions (SIT) for children with autism spectrum disorder (ASD) is inconsistent. In two studies,[2,9] it was unclear whether the interventions described were consistent with SIT. One health technology assessment[1] found no studies supporting the effectiveness of SIT. Three systematic reviews[3,5,6] found limited and inconsistent evidence regarding SIT. Two other systematic reviews[2,4] provided limited support for the use of auditory integration training (AIT), while another two[5,6] concluded that AIT was unlikely to be more beneficial than unmodified music. Three non-randomized studies[9,10,11] found some benefit to children with ASD using various types of SIT, whereas two[8,12] found no differences, and two[7,13] found that SIT either had detrimental effects or produced results inferior to the control group. One national guideline[14] from New Zealand recommended that sensory programs should only be used for children with ASD who have sensory processing difficulties interfering with their education, and that such programs should be discontinued if progress is not apparent. A guideline[15] group from the United Kingdom chose not to make a recommendation concerning SIT for children with ASD and recommended against the use of AIT.

Further details regarding the included studies is contained in Table 1.

Table 1: Details of the Included Studies

Author, Year, Study type	Objectives, population	Results	Conclusions
Ludwig & Harstall, 2001 HTA[1]	To review the published research on the effectiveness of IBI programs for children with ASD.	This HTA included one review addressing physiologically based programs. Research on the efficacy of SIT showed no studies supporting effectiveness. AIT was not well accepted by the professional community; one research study did not provide support for the program.	No studies were found supporting the effectiveness of SIT or AIT.
Rossignol, 2009 SR[2]	To systematically review evidence on novel and emerging treatments for ASD. (population not specified)	Novel treatments were ranked based on the level of evidence supporting them. Treatments which may have incorporated SIT theories include Music Therapy (Grade A evidence), AIT, massage and neurofeedback (all Grade C evidence).	The reviewed treatments for ASD were commonly used, and some were supported by RCTs or SRs. Music Therapy was included in the author's listing of promising treatments.

Table 1: Details of the Included Studies			
Author, Year, Study type	**Objectives, population**	**Results**	**Conclusions**
Ospina et al., 2008 SR[3]	"To identify, appraise, and synthesize the evidence of the effects of[…]behavioural and developmental interventions for improving core symptoms associated with ASD." All studies reviewed in the sensory motor intervention section were conducted on children.	Six studies of SIT vs. no treatment reported statistically significant results for stereotypic behaviours, off-task behaviours, and touch aversion. Results for communication-related outcomes were contradictory, and no effect was reported for intellectual functioning. No studies were found comparing SIT to other active interventions. Two studies on creative dance and horse riding reported significant social gains. No studies evaluated effects over the long-term; therefore the sustainability of these changes is unknown.	The authors concluded that the evidence is either limited or inconsistent for sensory motor interventions to support their use in clinical practice.
Sinha et al., 2004 SR[4]	"To determine the effectiveness of AIT or other methods of sound therapy in individuals with ASD." Patients in included trials ranged from age 3 to 39.	Seventeen different outcome measures were used with only two outcomes common in three or more studies. Three studies did not demonstrate any benefit of AIT over unmodified music. Three trials reported improvements in total ABC score at three months for the AIT group. One study also reported improvements at three months in the AIT group for ABC subgroup scores. No significant adverse effects of AIT were reported.	The authors concluded that further research was required to determine the effectiveness of sound therapies. In the absence of evidence, the treatment must be considered experimental and care must be taken not to risk hearing loss.
Tochel, 2003 SR[5]	To determine the efficacy of SIT and AIT in children with ASD.	One RCT compared SIT to fine motor activities. No differences were found between groups for function, articulation, total language score or rate of vocalization, whereas differences in favour of the control group were found for variety, average length, and autistic speech. Three RCTs compared AIT to unmodified music. The largest and smallest found no difference between groups, whereas the third found a significantly greater improvement in the AIT group for ABC and FAPC scores.	The authors concluded that insufficient evidence about the clinical effects of SIT in children with ASD was found and that, while AIT may be associated with improvement in some scores, it is unlikely to be more effective than unprocessed music.

Table 1: Details of the Included Studies			
Author, Year, Study type	**Objectives, population**	**Results**	**Conclusions**
Baranek, 2002 SR[6]	To "evaluate the scientific basis of sensory and motor interventions used with children with autism."	Three studies regarding the efficacy of classical SIT, two regarding sensorimotor interventions, and nine studies regarding AIT were found. Results were inconsistent.	The author concluded that several studies in the area of SIT, sensory stimulation, and AIT yielded some positive but modest outcomes; however, method constraints limit conclusive statements and generalizability. For AIT, a few well-controlled studies have been recently conducted but showed little overwhelming support for the treatment.
Devlin et al., 2010 NRS[7]	"To compare the effects of SIT and a behavioural intervention on rates of challenging behaviour (including self-injurious behaviour) in four children diagnosed with ASD."	For each participant, results demonstrated that the behavioural intervention was more effective than the SIT in the treatment of challenging behaviour.	The behavioural intervention of this study was more effective than the SIT in the treatment of challenging behaviour.
Reichow et al., 2010, NRS[8]	To research the effect of weighted vests on engagement for children with autism and developmental delays.	There was no differentiation in engagement between the three different conditions: weighted vest, vest with no weight (placebo), and no vest (baseline).	There was no differentiation in engagement between conditions for any of the participants.
Wuang et al., 2010, NRS[9]	"To investigate the effectiveness of a 20-week SDHRP[…]on the motor proficiency and sensory integrative functions of 60 children with autism" (aged 6-8).	Children with autism in this study showed improved motor proficiency and sensory integrative functions after 20-week SDHRP ($p < .01$). The therapeutic effect appeared to be sustained for at least 24 weeks.	Children with autism showed sustained improvement in motor proficiency and sensory integrative functions after 20-week SDHRP.
Klyczek, 2009 NRS[10]	To examine the efficacy of a 10-week SIT intervention in nine children with AS or PDD-NOS.	Six children completed the study. Following intervention, significant improvements were identified in sensory processing, modulation of sensory input, praxis and balance compared to pre-intervention findings.	Authors concluded that the study provided preliminary quantitative evidence that SIT may be useful to improve the sensory and motor skills that are identified in children with AS and PDD-NOS

Table 1: Details of the Included Studies			
Author, Year, Study type	**Objectives, population**	**Results**	**Conclusions**
Fazioglu et al., 2008 NRS[11]	"To investigate the effect of an SIT program on sensory problems" of 30 children (aged 7-11) with autism.	Children in each group were assessed initially and after the study period on a checklist, Sensory Evaluation Form for Children with Autism. Statistically significant differences between groups indicated that the SIT program positively affected treated children.	The SIT program studied positively affected treated children.
Watling & Dietz, 2007, NRS[12]	To "examine the effects of Ayres' sensory integration intervention on the behaviour and task engagement of four young children with ASD."	No clear patterns of change in undesired behaviour or task management emerged through objective measurement. Subjective data suggested that each child exhibited positive changes during and after intervention.	The authors concluded that when effects were measured immediately after intervention, short-term Ayres's SIT did not differ from a play scenario. However, subjective data suggested that it may produce an effect during treatment sessions and in home environments
Kane et al., 2004, NRS[13]	"To evaluate the effects of wearing a weighted vest on stereotypy and attention to task in four children with ASD/PDD."	Behaviours were measured during 10-minute sessions under baseline (no vest), weighted vest, and vest without weight conditions. For all children, wearing the weighted vest did not reduce stereotypy or increase attention to task, and with three of them it appeared to have a negative influence.	Weighted vests did not reduce stereotypy or increase attention in any of the four children and may have had a negative effect in three of them.
NZGG, 2008 EBG[14]	To create a guideline intended to provide guidance on autism spectrum disorder (ASD) in both children and adults in New Zealand	Based on one SR, results for sensory and motor interventions, including SIT, for children with ASD were inconsistent and changes were modest. It was difficult to tell whether benefits were from an intervention or from learning skills associated with the intervention (such as play-coaching, structured teaching and attention skills	Sensory programs should only be used in consultation with experts such as OTs for children with ASD whose sensory processing difficulties interfere with their education. These strategies should be monitored carefully and discontinued if some progress is not apparent in 6 to 12 weeks.

Table 1: Details of the Included Studies			
Author, Year, Study type	**Objectives, population**	**Results**	**Conclusions**
SIGN, 2007 EBG[15]	To create a national guideline for the assessment, diagnosis and clinical interventions for children and young people with autism spectrum disorders	Two thirds of the studies identified through two systematic reviews found showed no benefit for AIT. No evidence was cited concerning SIT or OT, though the guideline states that OT may benefit children and young people with ASD for generic indications.	AIT is not recommended for children with ASD. Insufficient evidence was found to support an evidence-based recommendation in favour or against the use of occupational therapies, including SIT, for children with ASD.

ABC, Aberrant Behaviour Checklist; AIT, Auditory Integration Training; AS, Asperger's Syndrome; ASD, Autism Spectrum Disorder; EBG, Evidence-Based Guideline; FAPC, Fisher's Auditory Problems Checklist; HTA, Health Technology Assessment; IBI, Intensive Behavioural Intervention; NRS, Non-Randomized Study; NZGG, New Zealand Guidelines Group; PDD-NOS, Pervasive Developmental Disorder-Not Otherwise Specified; RCT, Randomized Controlled Trial; SDHRP, Simulated Developmental Horse-Riding Program; SIB, Self-Injurious Behaviour; SIGN, Scottish Intercollegiate Guideline Network; SIT, Sensory Integration Theory/Therapy; SR, Systematic Review

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PREPARED BY:
Canadian Agency for Drugs and Technologies in Health
Tel: 1-866-898-8439
www.cadth.ca

APPENDIX – FURTHER INFORMATION:

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