Sensory Integration Therapy and Auditory Integration Therapy

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Rehabilitative Therapy (PT; OT; Speech)  
Outpatient

I. Description
Sensory integration therapy (SIT) has been proposed as a treatment of developmental disorders in patients with established dysfunction of sensory processing, e.g., children with autism, attention-deficit/hyperactivity disorder, brain injuries, fetal alcohol syndrome, and neurotransmitter disease. SIT may be offered by occupational and physical therapists who are certified in SIT. Auditory integration therapy (AIT) uses gradual exposure to certain types of sounds to improve communication in a variety of developmental disorders, particularly autism.

For individuals who have developmental disorders who receive SIT, the evidence includes multiple randomized controlled trials (RCTs) and systematic reviews of these trials. Relevant outcomes are functional outcomes and quality of life. Due to the individualized approach to SIT and the large variation in individual therapists and patients, large multicenter randomized controlled trials (RCTs) are needed to evaluate the efficacy of this intervention. The most direct evidence related to outcomes from SIT comes from several small randomized trials. Although some of the studies demonstrated some improvements on subsets of the outcomes measured, the studies are limited by small sizes, heterogeneous patient populations, and variable outcome measures. As a result, the evidence is insufficient to determine the effects of the technology on health outcomes.

For who have developmental disorders who receive AIT, the evidence includes multiple RCTs and systematic reviews of these trials. Relevant outcomes are functional outcomes and quality of life. For AIT, the largest body of literature relates to its use in autism. Several systematic reviews of AIT in the treatment of autism found limited evidence to support its use. No comparative studies were identified that evaluate the use of AIT for other conditions. Therefore, the evidence is insufficient to determine the effects of the technology on health outcomes.

Background

The goal of sensory integration therapy (SIT) is to improve the way the brain processes and adapts to sensory information, as opposed to teaching specific skills. Therapy usually involves activities that provide vestibular, proprioceptive, and tactile stimuli, which are selected to match specific sensory
processing deficits of the child. For example, swings are commonly used to incorporate vestibular input, while trapeze bars and large foam pillows or mats may be used to stimulate somatosensory pathways of proprioception and deep touch. Tactile reception may be addressed through a variety of activities and surface textures involving light touch.

Treatment sessions are usually delivered in a one-on-one setting by occupational therapists with special training from university curricula, clinical practice, and mentorship in the theory, techniques, and assessment tools unique to SIT. Two organizations currently offer certification for SIT; Sensory Integration International, a nonprofit branch of the Ayres Clinic in Torrance, California, and Western Psychological Services, a private organization that has a collaborative arrangement with University of Southern California (USC), Los Angeles, to offer SIT through USC’s Department of Occupational Science and Therapy. The sessions are often provided as part of a comprehensive occupational therapy or cognitive rehabilitation therapy and may last for more than 1 year.

Auditory integration therapy (AIT; also known as auditory integration training, auditory enhancement training, audio-psycho-phonology) is another method, which involves having individuals listen to music that has been modified to remove frequencies to which they are hypersensitive, with the goal of gradually increasing exposure to sensitive frequencies. Although several methods of AIT have been developed, the most widely described is the Berard method, which involves 2 half-hour sessions per day separated by at least 3 hours, over 10 consecutive days, during which patients listen to recordings. AIT has been proposed for individuals with a range of developmental and behavioral disorders, including learning disabilities, autism spectrum disorder, pervasive developmental disorder, and attention-deficit/hyperactivity disorder. Other methods include the Tomatis method, which involves listening to electronically modified music and speech, and Samonas Sound Therapy, which involves listening to filtered music, voices, and nature sounds.

II. Criteria/Guidelines

Sensory Integration Therapy and auditory integration therapy are not covered because they are not known to be effective in improving health outcomes.

III. Administrative Guidelines

A. The provider cannot bill or collect charges for these services unless a written acknowledgement of financial responsibility, specific to the service, is obtained from the Member prior to the time services are rendered. Modifier code GA should be appended to the CPT when billing for these services.

B. Patients requesting services that are not covered should be informed that they will be responsible to pay for the services. To prevent misunderstandings about financial responsibility, the provider may ask the patient to sign an Agreement of Financial Responsibility prior to performing the services.

IV. Scientific Background
This policy was created in April 2000 and has been updated regularly with searches of the MEDLINE database. The most recent literature review covered the period through January 25, 2017. This policy is based on a 1999 TEC Assessment that evaluated sensory integration (SI) therapy (SIT).

SENSORY INTEGRATION THERAPY
The literature related to the use of SIT consists primarily of small case series, along with a smaller number of comparative studies and systematic reviews. Given the individualized nature of SIT and the potential for confounding due to effects of treatment other than the SIT itself, large comparative studies are needed to demonstrate effectiveness.

In 2014, Schaaf et al published an overview of current measurement issues in the area of SI. The authors propose several changes to the outcomes used in sensory integration research, as follows:

- additional measures to ensure a comprehensive assessment of the sensory and motor factors that may be influencing function and participation;
- assessment measures that address a wider age range;
- neurophysiologic studies;
- fidelity to the core principles of SIT;
- studies to evaluate the dosage of therapy to understand the best candidates for intervention and the appropriate intensity/frequency of intervention;
- and outcomes that are meaningful to clients and sensitive to the changes observed after intervention.

The Sensory Processing Disorders Scientific Workgroup (2007) has also discussed the methodologic challenges of conducting intervention effectiveness studies of dynamic interactional processes, the lack of scientific evidence to support current practice, and methods for improving the quality of research in this area.

Systematic Reviews
Several systematic reviews have addressed the use of SIT in various clinical conditions. Four of the 6 systematic reviews included in this evidence review pertain to studies evaluating SIT for autism, while the other 2 include a broader range of developmental disabilities.

The 1999 TEC Assessment compared the outcomes of sensory SIT with that of standard occupational/physical therapy among children with autism, mental retardation, or learning disabilities. One study was identified that evaluated the use of SIT in patients with autism, which was noted to be limited by its lack of a control group. Three studies were identified that evaluated the use of SIT in patients with mental retardation, which were noted to be inconsistent in their results regarding the superiority of SIT. Eleven studies were identified that evaluated SIT in patients with learning disabilities or motor delay, including, in total, more than 600 learning-disabled children. Studies that used random assignment and blinded assessors suggested that SIT was not superior to conventional therapy and, in many cases, was not even demonstrably superior to any treatment at all.
In 2015, Case-Smith et al published an updated systematic review of sensory processing interventions, including SIT (defined as clinic-based interventions that use sensory-rich, child-directed activities to improve a child’s adaptive responses to sensory experiences) and sensory-based interventions (defined as adult-directed sensory modalities that are applied to the child to improve behaviors associated with modulation disorders), for children with autism spectrum disorders with concurrent sensory processing problems. This review was designed to focus on interventions that activate the somatosensory and vestibular systems for patients with autism with co-occurring sensory processing problems. Nineteen studies published since 2000 were included, 5 of which evaluated SIT in patients with autism spectrum disorders and sensory processing disorders. Two studies reviewed were randomized controlled trials (RCTs), which were small (N=20 and N=17 in the SIT groups). Reviewers noted that the studies showed low or low-to-moderate effects and concluded that “It is premature to draw conclusions as to whether SIT [sensory integration therapy] for children with ASD [autism spectrum disorder], which is designed to support a child’s intrinsic motivation and sense of internal control, is ultimately effective.”

In 2015, Brondino et al published a systematic review of complementary and alternative therapies for autism, which included SIT and auditory integration therapy (AIT). Regarding SIT for autism treatment, the authors identified 4 trials, including the RCT reported by Pfeiffer et al (described below), and additional studies published in 1983, 2008, and 2011, with sample sizes of 18, 30, and 50, respectively. All 4 studies reported significant improvements in autistic core symptoms, including communication, social reciprocity, and motor activity. However, the reviewers noted that 2 studies did not use a standardized form of SIT, and 2 did not use standardized outcome measures.

Also in 2015, Watling and Hauer published a systematic review of Ayres Sensory Integration (ASI) and sensory-based interventions for individuals with ASD. The authors describe ASI as a play-based method that “uses active engagement in sensory-rich activities to elicit the child’s adaptive responses and improve the child’s ability to successfully perform and meet environmental challenges.” The therapy is individualized by the therapist in response to an initial assessment. Sensory-based interventions are described as “applying adult-directed sensory modalities to the child with the aim of producing a short-term effect on self-regulation, attention, or behavioral organization.” Twenty-three articles met the authors’ inclusion criteria, 3 of which were systematic reviews and 5 of which were RCTs. Overall, 4 studies evaluated ASI and the remaining 18 evaluated sensory-based interventions. Of the 4 studies evaluating ASI, 3 were RCTs, including the studies by Pfeiffer et al and Schaaf et al described below. Findings from 1 RCT included significant improvement in individualized goals, improved sleep, decreased autism mannerisms, and reduced caregiver burden.

In 2008, Case-Smith and Arbesman reviewed the evidence for SIT as part of a systematic review of interventions for autism used in occupational therapy. The authors identified one level-1 study, which was a systematic review from 2002 that had found only lower quality evidence (levels III and IV, with small sample size and lack of control groups), suggesting that SI intervention was associated with positive changes in social interaction, purposeful play, and decreased sensitivity. It
was concluded that “although each of these studies had positive findings, when combined, the evidence remains weak and requires further study.”

May-Benson and Koomar published a systematic review of SIT in 2010. The review identified 27 research studies (13 randomized trials) that met the inclusion criteria. Most of the studies had been performed in children with learning or reading disabilities; there were 2 case reports/small series on the effect of SIT in children with autism. The review concluded that although the SI approach may result in positive outcomes, findings may be limited because of small sample sizes, variable intervention dosage, lack of fidelity to intervention, and selection of outcomes that may not be meaningful or may not change with the treatment provided.

**Controlled Trials**

In 2014, Schaaf et al reported results from a randomized trial of a manual intervention for sensory difficulties in children with autism. The study enrolled 32 children from a convenience sample of eligible families with children aged 4 to 8 years who had a diagnosis of autism and demonstrated difficulty processing and integrating sensory information as measured by the Sensory Profile or the Sensory Integration and Praxis Test. Subjects were randomized to usual care or to an intervention described as following the principles of SI outlined by Ayres. The intervention was delivered by 3 licensed occupational therapists with experience working with children with ASD. The primary outcome was Goal Attainment Setting, a systematic process for identifying goals that are relevant to individuals and their families that has been used for evaluation of patients with autism. Sample goals include, “Improve auditory process as a basis for sleeping through the night without getting out of bed for 7–8 h per night,” and “Decrease oral sensitivity and will try 5 new foods” Each goal is associated with a scale for level of attainment. For the primary outcome, the experimental group had a significantly higher goal achievement score than the control group (mean 56.53 [N=17] vs 42.72 [N=14], p=0.003). Change in functional skills did not differ significantly between groups, but experimental group subjects had significantly greater improvements in self-care caregiver assistance (p=0.008) and social function caregiver assistance (p=0.039). The groups did not differ in terms of autistic or adaptive behaviors. Strengths of this trial were its use of a protocolized intervention and its attempt to use an outcome measure relevant to patients and families. However, further replication in a larger sample of patients is required.

A pilot study reported in 2011 randomized 37 children with a sensory processing disorder (21 with autism, 16 with pervasive developmental disorder not otherwise specified) to SI interventions or to fine motor interventions (18 treatments over 6 weeks). Fidelity to SI interventions was verified with a fidelity measure developed for research by Parham et al (2007). Blinded evaluation at the conclusion of the intervention found no significant difference between the 2 groups on the Quick Neurological Screening Test (QNST) or sensory processing scores except for Autistic Mannerisms (e.g., stereotyped or self-stimulatory behavior) subscale. The SI group demonstrated greater improvement than the fine motor group on individualized Goal Attainment Scaling. Post hoc analysis found that more children in the SI group were able to complete parts of the standardized QNST after the intervention. This finding is limited by the post hoc analysis and the difference in the 2 groups at baseline.
In 2007, members of the Sensory Processing Disorders Scientific Workgroup reported results from a single-institution randomized pilot study for a proposed multicenter trial. Thirty families (of 140 who met the inclusion/exclusion criteria) agreed to participate over a 3-year period. The children had a clinical diagnosis of sensory modulation disorder following a comprehensive evaluation with standardized and clinical testing (including responses to sensory stimuli, attempts by the child to self-regulate, behavioral disorganization, and somatic responses to the testing situations). The 24 children who began treatment were randomly assigned to 1 of 3 groups consisting of occupational therapy with SI (2 times per week for 10 weeks, n=7), equivalent activity control sessions (n=10), or a waiting-list control group (n=7). Functional improvements were assessed by 5 validated/standardized parental rating scales. Significant improvements relative to both control groups were obtained for Goal Attainment Scaling (37 vs 14 vs 7, consecutively). A number of the other outcome measures (Leitner International Performance Scale, Short Sensory Profile, Internalizing on the Child Behavior Checklist) showed trends for improvement in this small study.

In a 2003 study of 45 children with Down syndrome divided into 3 treatment groups (SIT alone, vestibular stimulation plus SIT, neurodevelopmental therapy), Uyanik et al reported greater improvements in outcomes in the vestibular stimulation with SIT group and in the neurodevelopmental therapy group when compared with the SIT alone group. Outcomes assessed were the Ayres Southern California Sensory Integration Test, Pivot Prone Test, Gravitational Insecurity Test, and Pegboard Test along with physical assessment. The authors concluded all methods of treatment should be considered when planning rehabilitation therapies for children with Down syndrome, even though SIT alone was not shown to be superior to the other therapy groups.

Section Summary: Sensory Integration Therapy
The most direct evidence related to outcomes from SIT comes from small randomized trials. Although some of the studies demonstrated some improvements on subsets of the outcomes measured, the studies are limited by small sizes, heterogeneous patient populations, and variable outcome measures. As a result, the evidence is insufficient to draw conclusions about the effects of and the most appropriate patient populations for SIT.

AUDITORY INTEGRATION THERAPY
Although auditory integration (AI) therapy has been proposed as a therapy for a number of neurobehavioral disorders, the largest body of evidence on AI therapy relates to its use in ASD. Several systematic reviews have evaluated the evidence related to AI therapy for ASD.

A 2011 Cochrane review evaluated AI training along with other sound therapies for ASD. Included were 6 RCTs of AI therapy and one of Tomatis therapy, involving a total of 182 subjects aged 3 to 39 years. For most of the studies, the control condition consisted of listening to unmodified music for the same time as the active treatment group. Allocation concealment was inadequate for all studies, and 5 of the trials had fewer than 20 participants. Meta-analysis could not be conducted. Three studies did not demonstrate any benefit of AI therapy over control conditions, and 3 studies had outcomes of questionable validity or outcomes that did not achieve statistical significance.
The review found no evidence that AI therapy is an effective treatment for ASD; however, evidence was not sufficient to prove that it is not effective.

In the 2015 systematic review by Brondino et al (described above) examined complementary and alternative therapies for autism, the authors identify the same 6 RCTs of AIT that were included in the 2011 Cochrane review. Similar to the Cochrane review, Brondino et al concluded that the largest studies did not report an improvement with AIT.

A 2010 systematic review of therapies for autism evaluated the evidence for AIT. The reviewer identified a 2002 systematic review (an early version of the 2011 Cochrane review by Sinha et al previously referenced), which identified no RCTs meeting the author’s inclusion criteria, and no subsequent RCTs or cohort studies comparing AI therapy with usual care.

In 2009, Rossignol conducted a systematic review of novel and emerging treatments for ASD, including AI therapy. The authors identified one 3-month double-blind controlled study of AI therapy in 17 individuals with autism, which demonstrated significant improvements in irritability, stereotypy, hyperactivity, and excessive speech in patients in the AI therapy group. The study also reviewed an earlier version of the 2011 Cochrane review by Sinha et al previously referenced. Overall, the authors concluded that there was Grade C evidence related to the use of AI therapy in autism (at least 1 level 2b [individual prospective, nonrandomized cohort study or low-quality RCT] or 3b [systematic review of retrospective case-control studies with homogeneity] studies or 2 level 4 studies [case series or reports]).

Section Summary: Auditory Integration Therapy
The largest body of evidence related to the use of AI therapy is in the treatment of autism. A 2011 Cochrane review and several earlier systematic reviews generally found that studies of AI therapy failed to demonstrate meaningful clinical improvements. No subsequent comparative studies of AI therapy were identified.

Ongoing and Unpublished Clinical Trials
A search of the online database ClinicalTrials.gov in February 2017 identified no ongoing or unpublished trials that would likely influence this policy.

REGULATORY STATUS
Sensory integration therapy is a procedure and, as such, is not subject to regulation by the U.S. Food and Drug Administration (FDA). No devices designed to provide auditory integration therapy have been cleared for marketing by FDA.

SUMMARY OF EVIDENCE
For individuals who have developmental disorders who receive sensory integration therapy (SIT), the evidence includes multiple randomized controlled trials (RCTs) and systematic reviews of these trials. Relevant outcomes are functional outcomes and quality of life. Due to the individualized approach to SIT and the large variation in individual therapists and patients, large multicenter randomized controlled trials are needed to evaluate the efficacy of this intervention. The most direct evidence related to outcomes from SIT comes from small randomized trials. Although some of the studies demonstrated some improvements on subsets of the outcomes measured, the
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For individuals who have developmental disorders who receive auditory integration therapy (AIT), the evidence includes multiple RCTs and systematic reviews of these trials. Relevant outcomes are functional outcomes and quality of life. For AIT, the largest body of literature relates to its use in autism spectrum disorder. Several systematic reviews of AIT in the treatment of autism found limited evidence to support its use. No comparative studies were identified that evaluated the use of AI therapy for other conditions. The evidence is insufficient to determine the effects of the technology on health outcomes.

SUPPLEMENTAL INFORMATION

Practice Guidelines and Position Statements

Sensory Integration Therapy

American Academy of Pediatrics
A 2012 policy statement by American Academy of Pediatrics (AAP) on SI therapies for children with developmental and behavioral disorders states that “[o]ccupational therapy with the use of sensory-based therapies may be acceptable as one of the components of a comprehensive treatment plan. However, parents should be informed that the amount of research regarding the effectiveness of sensory integration therapy is limited and inconclusive.” AAP indicates that these limitations should be discussed with parents, along with instruction on how to evaluate the effectiveness of a trial period of SIT.

American Occupational Therapy Association
In 2009, the American Occupational Therapy Association (AOTA) stated that AOTA recognizes SI as one of several theories and methods used by occupational therapists and occupational therapy assistants working with children in public and private schools to improve a child’s ability to access the general education curriculum and to participate in school-related activities.

In 2011, AOTA published evidence-based occupational therapy practice guidelines for children and adolescents with challenges in sensory processing and sensory integration. AOTA gave a level C recommendation for SIT for individual functional goals for children, for parent-centered goals, and for participation in active play in children with sensory processing disorder, and to address play skills and engagement in children with autism. A level C recommendation is based on “...weak evidence that the intervention can improve outcomes, and the balance of the benefits and harms may result either in a recommendation that occupational therapy practitioners routinely provide the intervention...or in no recommendation because the balance of the benefits and harms is too close to justify a general recommendation.” Specific performance skills evaluated were motor and praxis skills, sensory-perceptual skills, emotional regulation, and communication and social skills. There was insufficient evidence to provide a recommendation on SIT for academic and psychoeducational performance (e.g., math, reading, written performance).
Auditory Integration Therapy

American Speech-Language-Hearing Association
In 2004, the American Speech-Language-Hearing Association (ASHA) Working Group on Auditory Integration Training issued a report on Auditory Integration Training (AIT). ASHA concluded that “Despite approximately one decade of practice in this country, this method has not met scientific standards for efficacy and safety that would justify its inclusion as a mainstream treatment for these disorders.”

American Academy of Pediatrics
In 1998, the AAP Committee on Children with Disabilities issued a statement on AI training and facilitated communication for autism, which concluded, “Currently available information does not support the claims of proponents that these treatments are efficacious. Their use does not appear warranted at this time, except within research protocols.”

Medicare National Coverage
There is no national coverage determination (NCD) for sensory integration therapy. In the absence of an NCD, coverage decisions are left to the discretion of local Medicare carriers.

V. Important Reminder
The purpose of this Medical Policy is to provide a guide to coverage. This Medical Policy is not intended to dictate to providers how to practice medicine. Nothing in this Medical Policy is intended to discourage or prohibit providing other medical advice or treatment deemed appropriate by the treating physician.

Benefit determinations are subject to applicable member contract language. To the extent there are any conflicts between these guidelines and the contract language, the contract language will control.

This Medical Policy has been developed through consideration of the medical necessity criteria under Hawaii’s Patients’ Bill of Rights and Responsibilities Act (Hawaii Revised Statutes §432E-1.4), generally accepted standards of medical practice and review of medical literature and government approval status. HMSA has determined that services not covered under this Medical Policy will not be medically necessary under Hawaii law in most cases. If a treating physician disagrees with HMSA’s determination as to medical necessity in a given case, the physician may request that HMSA reconsider the application of the medical necessity criteria to the case at issue in light of any supporting documentation.

VI. References
2. Blue Cross and Blue Shield Association Technology Evaluation Center (TEC). Sensory integration therapy. TEC Assessment. 1999; Volume 14, Tab 22.


