



## Kaiser Foundation Health Plan of Washington

### Clinical Review Criteria Sensory Integration Therapy (SIT)

- For children with developmental and behavioral disorders

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### Criteria

#### For Medicare Members

Source	Policy
CMS Coverage Manuals	<a href="#">Medicare Benefit Policy Manual, Chapter 15, Coverage of Outpatient Rehabilitation Therapy Services</a>
National Coverage Determinations (NCD)	None
Local Coverage Determinations (LCD)	None
Local Coverage Article	None

#### For Non-Medicare Members

There is insufficient evidence in the published medical literature to show that this service/therapy is as safe as standard services/therapies and/or provides better long-term outcomes than current standard services/therapies.

**If requesting this service, please send the following documentation to support medical necessity:**

- Last 6 months of clinical notes from requesting provider &/or specialist

The following information was used in the development of this document and is provided as background only. It is provided for historical purposes and does not necessarily reflect the most current published literature. When significant new articles are published that impact treatment option, Kaiser Permanente will review as needed. This information is not to be used as coverage criteria. Please only refer to the criteria listed above for coverage determinations.

### Background

The sensory integration (SI) framework was first described by an occupational therapist Jean Ayres, PhD, in the early 1970s and refers to the body's way of handling and processing sensory inputs from the environment. This was based on a theory that the sensory system develops over time just like other higher order learning skills (such as cognition, language, and academic performance) and that deficits can occur in the process of developing a well-organized sensory system. A well-organized sensory system can integrate input from multiple sources primarily the three basic senses: vestibular, proprioceptive, and tactile. The vestibular system responds to gravity and movement, and the proprioceptive system receives inputs from joints and muscles. When these systems interact with the tactile sensation, sensory integration takes place. Normally, effective sensory integration occurs automatically, unconsciously, and without effort, but for some children it does not develop as efficiently as it should. Any dysfunction or disorder in the SI process may lead to problems in learning, response to sensory input, behavior, or motor development. According to Ayres' theory these could be manifested as coordination problems; unusually high or low activity level; delays in speech, language, or motor skills; delays in academic achievements; under-reactivity to sensory stimulation; sensitivity to touch, movements, sounds, or sights; poor organization of behavior; lack of self-control; poor self-concept; and other signs and symptoms (Ayres 1972, 1977).

Based on her theory, Ayres developed the sensory integration therapy (SIT) with the goal of improving the way the brain processes and adapts to sensory information, as opposed to teaching specific skills. The therapy involves activities that are believed to organize the sensory system by providing vestibular, proprioceptive, and tactile

sensory input. Techniques used include vestibular stimulation such as swinging in a hammock, using swing balls, bounce pads or scooter boards; tactile stimulation achieved by brushing parts of the child's body or the use of weighted vests and other clothing (Ayres 1977).

Since that sensory integration dysfunction was described, sensory-based therapies have been increasingly used by occupational therapists and other health professionals to treat children with a range of symptoms and disabilities including autism, attention deficit hyperactivity disorder, fragile-x syndrome, brain injuries and others (Zimmer 2014). SIT is usually provided by certified therapists with special training and mentorship in the theory, techniques, and assessment tools unique to sensory integration theory. It is delivered in one-on-one sessions individualized to the child, one to three times a week, for several months or years. In these therapy sessions, the therapists combine primitive forms of sensation with motor activities according to a manualized protocol (Schaaf 2014).

Some authors distinguish sensory integration therapy from sensory-based interventions (SBIs) which are adult-directed sensory strategies that are applied to the child, most often in the school environment, to improve behaviors associated with modulation disorders. SBIs require less engagement of the child and are integrated into his/her daily routine to improve behavioral regulation (Case-Smith 2014).

SIT is controversial and a topic for debate by many professionals in medicine, psychology, and education (May-Benson 2010). According to a Policy Statement from the American Academy of Pediatrics on SIT (Zimmer et al, 2012) proponents of SI theory believe that inappropriate or deficient sensory processing is a developmental disorder responsive to therapy and that treatment can improve developmental outcomes. A definition of sensory processing disorder has been proposed but is not universally accepted. Standardized measures such as the Sensory Profile have been developed to classify a child's sensory deficit. However, the possible diagnosis of a sensory processing disorder remains a challenging clinical issue, and it is unclear whether children who present with findings described as sensory processing difficulties have an actual disorder of the sensory pathway of the brain or that the deficits observed are associated with other developmental and behavioral disorders. The symptoms described in children with sensory processing disorders, overlap the behavioral differences seen in children with autism spectrum disorders, attention-deficit hyperactivity disorder, and developmental coordination disorders. Evaluating the effectiveness of sensory integration therapy presents another challenge due to the wide spectrum of symptom severity and presentation of the disorder, variations in response due to several factors, and lack of consistent outcome measures (Zimmer 2012).

SIT is a therapy and thus it is not regulated by the FDA. SIT has been reviewed by MTAC earlier in 2005 and did not meet the committee's evaluation criteria. It is being re-reviewed based on requests for its coverage.

## Medical Technology Assessment Committee (MTAC)

### *Sensory Integration Therapy*

#### **11/28/2005: MTAC REVIEW**

**Evidence Conclusion:** The results of Vargus' (1999) meta-analysis show that sensory integration therapy was not more effective than other alternative therapies in improving psychoeducational, behavior, language, motor, and sensory perceptual functions among the groups studied. The studies included in the meta-analysis did not provide sufficient data on the ages of participants, the types of disabilities, or details on therapies provided. There were also variations and differences in the characteristics of the participants, intervention methods, hours of therapy received, ratio of therapists to children, evaluation of the therapy, duration between therapy and re-testing, and outcomes measured. The authors of the meta-analysis were thus unable to determine the effect of sensory integration therapy among different ages or among individuals with different types of disabilities.

Humphries and colleagues (1992) compared sensory integrative therapy among children with learning disabilities and sensory integration dysfunction to another active treatment (perceptual-motor training), and to no treatment. There were some significant baseline differences between the study groups, and both the sensory integrative therapy and the perceptual-motor therapy were performed by the same occupational therapists, which may be a potential source of bias. Their results show significant pretest-posttest differences between the three groups in the motor functions but not in the psychoeducational variables. The difference in the motor performance between the two active therapies was statistically insignificant. In conclusion, the current literature does not provide a clear definition or description of the sensory integration therapy and does not provide evidence that the therapy is more effective than an alternative therapy or no treatment for children with learning disabilities, or neurodevelopmental delay.

**Articles:** The search yielded 126 publications, the majority of which were review articles. There were four systematic reviews; two meta-analyses: Ottenbacher 1982 and Vargus 1998; an article combining the results of only two studies (Kaplan 1993); and a number of controlled trials. Many of the studies revealed by the search were

conducted in the 1970s and 1980s, their sample sizes varied from 10 to 92 participants, and the majority were poorly controlled. The search on the use of sensory integration therapy for autistic children revealed one small case series with 10 children. The most recent meta-analysis and a randomized controlled trial (RCT) were critically appraised. The RCT selected was included in the meta-analysis but was reviewed, as it was the largest trial identified and had a relatively better-quality design. *Evidence tables were made for the following studies:* Vargas S, Camilli G. A meta-analysis of research on sensory integration treatment. *Am J Occup Ther.* 1999; 53:198-198. See [Evidence Table 1](#). Humphries T, Wright M, Snider L, McDougal B. A comparison of the effectiveness of sensory integrative therapy and perceptual-motor training in treating children with learning disabilities. *J Dev Behav Pediatr.* 1992; 13:31-40. See [Evidence Table 1](#).

The use of Sensory integration therapy in the treatment of neuro-developmentally delayed children does not meet the *Kaiser Permanente Medical Technology Assessment Criteria*.

## 12/06/2015: MTAC REVIEW

### Sensory Integration Therapy

**Evidence Conclusion:** The results of the meta-analysis (Vargus, et al, 1999) reviewed earlier for MTAC suggested that the benefits of sensory integration therapy on psychoeducational and motor functions was significantly better than no treatment among the individuals studied, but it was not superior to other alternative treatments. The authors cautioned about interpreting the results and concluded that there was insufficient evidence to determine the effectiveness of the SI approach. The search for more recent evidence after that last review identified a pilot trial that investigated the effectiveness of SI interventions in children with autism spectrum disorders, a RCT that compared SIT to usual care in children with autism, and a larger RCT that compared SIT to two other active treatments and a control among children with mild mental retardation. Schaaf and colleagues, 2014 (Evidence table 1), randomly assigned 32 children aged 4-8 years, with autism and sensory difficulties to either an occupational therapy/sensory intervention (OT/SI) group or a control group. The study was randomized, and controlled, with proper randomization procedure, and power analysis. However, it was very small and parents who rated their child's goals and other outcomes were not blinded to the treatment allocation, which is a source of bias. In addition, the OT/SI was not compared to an alternative occupational therapy with the same intensity and duration of intervention. The overall results showed significant positive improvement in Goal Attainment Scores (GAS) in the two study groups, but children in the OT/SI group scored significantly higher than the controls. The only other statistically significant differences between the two groups were for the less care-giver assistance during self-care, and social activities observed in the treatment group. There were no statistically significant differences between the study groups in adaptive behaviors. The authors concluded that the results of the study provide preliminary support for the efficacy of manualized SI intervention. They however, noted that the results should be interpreted with caution until they are replicated in future larger studies. Pfeiffer and colleagues, 2011 (Evidence table 2), conducted a pilot trial to identify appropriate outcome measures, and address the effectiveness of sensory integration (SI) interventions in children with autism spectrum disorders (ASD). They randomized 37 children with ASD, 6-12 year of age to undergo either a fine motor (FM) or sensory integration therapy. Pretests and posttests measured social responsiveness, sensory processing, functional motor skills, and social-emotional factors. The study was randomized, controlled, and blinded. However, it was a small pilot trial with no power analysis or follow-up after the therapy ended. Its overall results showed significant positive improvement in GAS in the two study groups. Children in the SIT group had more significant changes in GAS and improvement in mannerism vs. those in the FM group. The differences in the other outcomes were statistically insignificant. The authors discussed limitations to the study and suggestions for future studies. They explained that standardized measures for determining progress are often inappropriate for children on the autistic spectrum because of the wide variety in behavior and developmental levels among the children, and their ability to complete the test while maintaining its validity. The authors also indicated that another challenge for using a standardized measure is the fact that the SIT forms, activities, and goals are individualized to the specific needs of each child, resulting in a wide range of goals and outcomes among the participants within a study. Wuang and colleagues, 2009 (Evidence table 3) compared the effect of SIT, neurodevelopmental treatment (NDT), and perceptual-motor (PM) approach, and no treatment in 160 children 7-8 years of age with mild mental retardation. 120 were randomly assigned to one of the three active treatments and 40 children who fulfilled the inclusion criteria but could not attend the sessions because of its timing, were not randomized, did not receive any intervention during the study period, but were used as controls. Each of the active interventions was delivered in a 1-hr. session 3 days per week for 40 weeks, and the children were assessed with measures of sensorimotor function at baseline and after completion of the study. The results show that postintervention, the active treatment groups significantly outperformed the control group on almost all measures. The SIT group demonstrated a greater pretest-posttest change on fine motor, upper-limb coordination, and SI functioning. The PM group showed significant gains in gross motor skills, whereas the NDT group had the smallest change in most measures. The study had its advantages and limitations discussed in evidence table 3. Among the limitations is the inclusion of a selected group of patients, non-adjusting for confounding factors, and a lack of long-term follow-up. The authors recommended that the results be replicated in more studies with long-term

follow-up. A 2012 Policy Statement by the American Academy of Pediatrics on sensory integration therapies for children with developmental and behavioral disorders states that is unclear whether children who present with sensory-based problems have an actual "disorder" of the sensory pathways of the brain or whether these deficits are characteristics associated with other developmental and behavioral disorders. Because there is no universally accepted framework for diagnosis, sensory processing disorder generally should not be diagnosed. Other developmental and behavioral disorders must always be considered, and a thorough evaluation should be completed. Difficulty tolerating or processing sensory information is a characteristic that may be seen in many developmental behavioral disorders, including autism spectrum disorders, attention-deficit/hyperactivity disorder, developmental coordination disorders, and childhood anxiety disorders. Occupational 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. Important roles for pediatricians and other clinicians may include discussing these limitations with parents, talking with families about a trial period of sensory integration therapy, and teaching families how to evaluate the effectiveness of a therapy (Zimmer 2012).

**Conclusion:** The evidence remains insufficient to support the effectiveness of sensory integration therapy in improving the behaviors and functional skills in children with developmental and/or behavioral disorders. Due to the individual nature of SIT and the large variation in individual therapists and patients, large multicenter randomized controlled trials among a more diverse population, with blinded assessment, and long-term follow-up are needed to determine the effectiveness the efficacy of this therapy and durability of outcomes.

**Articles:** The search for studies published after the 2005 MTAC review, revealed over 150 publications, the majority of which were unrelated to the current review. There were three systematic reviews without meta-analyses, two small RCTs among children with autism spectrum disorders (ASD), one quasi-randomized trial among children with mild mental retardation, a number of small non-randomized comparative studies, observational studies with no controls, case series, and case reports on sensory integration therapy for children. The three randomized controlled trials were selected for critical appraisal. Pfeiffer BA, Koenig K, Kinnealey M, et al. Effectiveness of sensory integration interventions in children with autism spectrum disorders: a pilot study. *Am J Occup Ther.* 2011 Jan-Feb; 65(1):76-85. See [Evidence Table 1](#). Schaaf RC, Benevides T, Mailloux Z, et al. An intervention for sensory difficulties in children with autism: a randomized trial. *J Autism Dev Disord.* 2014 Jul; 44(7):1493-506. See [Evidence Table 2](#). Wuang YP, Wang CC, Huang MH, et al. Prospective study of the effect of sensory integration, neurodevelopmental treatment, and perceptual-motor therapy on the sensorimotor performance in children with mild mental retardation. *Am J Occup Ther.* 2009 Jul-Aug; 63(4):441-452. See [Evidence Table 3](#).

The use of Sensory Integration Therapy does not meet the *Kaiser Permanente Medical Technology Assessment Criteria*.

#### **04/11/2022: MTAC REVIEW**

##### **Sensory Integration Therapy**

**Evidence Conclusion:** The evidence remains insufficient to determine the safety and effectiveness of sensory integration therapy in improving the behavior and functional skills in children with ASD or other developmental and/or behavioral disorders. The published trials evaluating the effectiveness of ASI as described by Ayres, in improving the behavior and functional skills in children with developmental and/or behavioral disorders are limited by their small number, sample sizes, variable outcome measures, lack of blinding when parent-reported outcome measures used, and the short study durations. Due to these limitations, the published trials and the qualitative systematic reviews only provide low strength evidence suggesting that SIT may lead to some improvement in subsets of sensory and motor skills in selected children with ASD. None of the three published RCTs had a long-term follow-up to determine the safety of the intervention on the child and /or therapist, as well as durability of the observed effects. Large double-blinded, multicenter RCTs in children diagnosed with developmental disorders and sensory processing problems; that adhere to the core principles of ASI, using the Fidelity Measure of ASI; with an active comparator and blinded assessment of objective outcomes sensitive to the changes expected following ASI intervention; and with long-term follow-up, are needed to determine the safety, effectiveness, and durability of outcomes of the therapy.

**Articles:** PubMed and Cochrane database were searched from November 2014 through February 2022, using the search terms: sensory integration, sensory integrative dysfunction; sensory processing disorder, sensory integration therapy, SIT, learning disability, ASD, autism, neuro-developmental delay, and Ayres sensory integration, with variations. The search was limited to English-language publications in peer-reviewed journals, among human populations, and children 0-18 years. Experimental studies, abstracts, case reports, case series with less than 25 patients, reviews, comments, and editorials were excluded. Preference was given to meta-analyses and randomized controlled trials reporting clinical outcomes. Reference lists and PubMed related articles were also examined for

additional articles. To identify ongoing clinical trials, a search of the National Institute of Health Clinical Trials website <https://clinicaltrials.gov/> was conducted using the same methodology. See Evidence Tables.

The use of Sensory Integration Therapy does not meet the *Kaiser Permanente Medical Technology Assessment Criteria*.

## Applicable Codes

### Non-Medicare - Considered Not Medically Necessary:

CPT® Codes	Description
97533	Sensory integrative techniques to enhance sensory processing and promote adaptive responses to environmental demands, direct (one-on-one) patient contact, each 15 minutes

**\*Note:** Codes may not be all-inclusive. Deleted codes and codes not in effect at the time of service may not be covered.

\*\*To verify authorization requirements for a specific code by plan type, please use the [Pre-authorization Code Check](#).

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Date Created	Date Reviewed	Date Last Revised
10/30/2005	10/30/2005 <sup>MDCRPC</sup> , 01/06/2015 <sup>MPC</sup> , 11/03/2015 <sup>MPC</sup> , 09/06/2016 <sup>MPC</sup> , 07/11/2017 <sup>MPC</sup> , 06/05/2018 <sup>MPC</sup> , 06/04/2019 <sup>MPC</sup> , 06/02/2020 <sup>MPC</sup> , 06/01/2021 <sup>MPC</sup> , 06/07/2022 <sup>MPC</sup> , 06/06/2023 <sup>MPC</sup>	06/07/2022

<sup>MDCRPC</sup> Medical Director Clinical Review and Policy Committee  
<sup>MPC</sup> Medical Policy Committee

Revision History	Description
06/07/2022	Added April 2022 MTAC review; MPC approved to adopt MTAC's recommendation of non-coverage and continue existing the policy of insufficient evidence