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Sensory diet interventions for children with autism: A structured approach to enhancing self-regulation and participation

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Abstract
Within the context of sensory health, the term *sensory diet* - first coined by two American occupational therapists, P. Wilbarger and J. L. Wilbager, in 1991 - refers to an individualized program of sensory-based activities designed to support regulation, attention, and adaptive behavior in children with sensory processing differences. For children with autism spectrum disorder (ASD) and/or attention deficit/hyperactivity disorder (ADHD), sensory diets play an especially crucial role because atypical sensory responsivity, whether hyper- or hypo-responsive, is highly prevalent and significantly affects daily functioning, transitions, learning, and emotional well-being. Current research demonstrates that structured sensory diets, when grounded in thorough assessment and implemented consistently across routines, improve sensory modulation, reduce behavioral dysregulation, and enhance participation at home, in school, as well as in community environments. These benefits are strongest when sensory strategies are personalized, developmentally appropriate, and coordinated collaboratively among allied health professionals, parents, and educators. The aim of this paper is to synthesize contemporary findings and highlight the practical steps to be taken in identifying sensory needs, designing a sensory diet plan, selecting appropriate sensory activities that target varied sensory needs, and monitoring the child's sensory responsiveness.

Keywords: Autism spectrum disorder, occupational therapy, self-regulation, sensory diet, sensory processing

Introduction

When the term *sensory health* is raised in the discussion among professionals in the allied health and wellness field (including nursing care and palliative care service), it refers to the overall functioning, balance, and well-being of an individual's sensory processing-modulating-responding (PMR) systems. In other words, the concern of the PMR systems is how efficiently the sensory nervous system receives, organizes, interprets, and responds to sensory input from the environment and the body [1]. Therefore, it is not surprising to note that sensory health is crucial in nursing care because understanding and supporting a patient's sensory needs enhances safety, communication, comfort, and overall quality of care.

When sensory health is optimal, a person (be they a child, an adolescent or adult) can engage, regulate emotions, attend, and participate meaningfully in daily routines. Another concept, the *sensory diet*, contributes directly to sensory health. It provides or includes structured, intentional sensory activities customized to the person's sensory needs (also known as the sensory profile). These sensory activities support neural regulation, helping the person avoid sensory overload or under-responsiveness, and, in that way, promote stable arousal levels, improved attention, and better participation in learning and social situations [2, 3]. In this way, the sensory diet is a therapeutic tool designed to maintain and strengthen sensory health throughout the day.

What then is a *sensory diet*? In this paper, the authors refer to the term as an individually designed set of sensory-based activities, e.g., proprioceptive input (e.g., 'heavy work'), vestibular movement, tactile play, or oral-motor strategies, scheduled throughout the day to help a child maintain an optimal level of arousal, attention, and emotional-behavioral regulation. The term *sensory diet* was first created by two American occupational therapists, P. Wilbarger and J. L. Wilbarger [4], and it is defined as "an individualized plan of physical activities and accommodations to help a person meet their sensory needs." This plan provides the sensory input needed to stay focused and organized throughout the day. In fact, the concept of a sensory diet is grounded in sensory integration theory, which was postulated by Anna Jean Ayres in 1979 [5] in her book *Sensory Integration and the Child* [5], suggesting that purposeful sensory input can modulate attention and self-regulation [6, 7]. Recent empirical work shows that structured sensory diets can improve sensory responsiveness, self-regulation, and daily participation when implemented consistently and aligned with individualized needs [8].

Who needs a Sensory Diet?

Children who most need a sensory diet are those who exhibit serious sensory processing difficulties. These sensory-related challenges frequently occur in autism spectrum disorder (ASD), attention-deficit/hyperactivity disorder (ADHD), developmental delays, and pediatric feeding disorders. The main focus of this paper is on children with ASD. Sensory processing differences, e.g., hyper-responsivity (sensory sensitivity/avoidance) or hypo-responsivity (low registration/sensory seeking), can significantly disrupt an autistic child's participation at home, in school, and in community activities [6]. Studies [10, 11, 12] show that children with ASD, in particular, display atypical patterns across tactile, auditory, proprioceptive, and oral sensory domains, making them strong candidates for sensory-diet-based interventions.

What is the Rationale behind the Sensory Diet as an Intervention?

The rationale underlying the sensory diet is neuro-behavioral in nature [13]. The sensory input (vestibular, proprioceptive, tactile, visual, auditory, gustatory/olfactory and interoceptive) influences arousal level, attention and

motor output. When a child is hypo-responsive, they may seek input (e.g., crashing, deep pressure, mouthing); when hyper-responsive, they may avoid input (e.g., covering ears, refusing certain textures). A sensory diet aims to provide the 'right' type, intensity, and timing of input so the nervous system is better regulated and the child can engage in daily tasks more successfully. Evidence reviews [6, 7, 8] note promising clinical effects but also emphasize that the research base is still developing and that the sensory diet must be individualized and embedded in therapy and its functional goals.

How Beneficial can the Sensory Diet be?

A sensory diet is beneficial because sensory input directly influences the neural mechanisms responsible for arousal, behavior, and attention. Proprioceptive inputs such as pushing, pulling, squeezing, and weight-bearing have regulatory effects on the nervous system and are widely used to stabilize arousal levels across neurotypes [11]. Recent findings from studies (see Table 4) of randomized control trials (RCT) demonstrate that sensory diet programs can enhance sensory processing patterns, social behaviors, and occupational performance, including improvements in daily tasks assessed through tools such as the Canadian Occupational Performance Measure [8]. Similarly, sensory-based feeding interventions have been found to improve mealtime behaviors in children with food refusal, further showing the functional benefits of sensory modulation [12].

How to know if a Child requires a Sensory Diet?

A child may need a sensory diet when caregivers, teachers, or therapists observe ongoing challenges such as distress from ordinary sounds or textures, crashing or seeking intense movement, sensory-based picky eating, inattentiveness, difficulty transitioning between tasks, or frequent emotional dysregulation. The key red flags that suggest a sensory-based approach may help those who need it include the following: (i) frequent meltdowns or shutdowns in response to ordinary sensory input; (ii) chronic distractibility or low arousal despite structure; (iii) persistent crashing, spinning, excessive mouth play or seeking intense movement; (iv) extreme picky eating or aversions to clothing/textures; and (v) poor balance/coordination that affects activities of daily living.

Generally, the formal assessment tools, e.g., the Sensory Profile (SP) [16], Sensory Profile-2nd Edition (SP-20) [1] and Sensory Processing Measure-2nd Edition (SPM-2) [17], with caregiver and/or teacher versions of questionnaires, are administered by professionals (e.g., occupational therapists and educational therapists) to identify different sensory patterns (e.g., seeking, avoiding, sensitivity, or low registration). More importantly, results obtained from the SP [16], SP-2[1] or SPM-2[17] administration, for instance, are analyzed and interpreted to guide in designing an Individualized Sensory Diet Plan (ISDP), which is very similar to that of an Individualized Education Plan (IEP) prepared by special education teachers. However, simply conducting a standardized sensory-related assessment is incomplete or insufficient. There is still a need for the assessor to conduct direct clinical observation, too. Follow-up decisions are best made after a professional sensory-related assessment that interprets patterns across settings (home, school, clinic).

Preparation of a Sensory Diet

Preparing a sensory diet involves a structured process [18]. First, an occupational therapist conducts a comprehensive sensory assessment using caregiver interviews, observations, and standardized questionnaires. Next, functional goals are established, such as improving participation in classroom seated tasks or reduction of meltdowns during transitions. Appropriate activity selection is crucial to match a child's sensory profile. For instance, proprioceptive *heavy* work for modulation, vestibular movement to adjust alertness, or tactile desensitization to support sensory endurance or tolerance [10]. These activities are scheduled throughout the day at key times (morning routine, pre-transition, pre-meal, bedtime). Table 1 below provides a step-by-step guide to preparing a sensory diet [21].

Table 1: A Step-by-Step Guide in Preparation of a Sensory Diet

Step	Description
Step #1: Referral & baseline assessment	▪ Have an occupational therapist or a nurse (experienced in sensory integration/processing) take a history; ▪ Use caregiver/teacher questionnaires (e.g., Sensory Profile 2); and ▪ Observe the child in relevant settings to identify sensory patterns (seeking, avoiding, sensitivity, registration).
Step #2: Set functional goals	▪ Translate sensory findings into real life goals (e.g., "sit for 15 minutes during table tasks," "tolerate lunchtime foods," "reduce meltdown frequency during transitions"). ▪ Goals must be measurable & meaningful to family/school.
Step #3: Design activities matched to need	▪ Choose activities by sensory system and desired effect (calming vs alerting). *Examples:* The proprioceptive/deep pressure (e.g., push/pull, heavy work, weighted lap pad) can help to calm and increase body awareness; the vestibular activities (e.g., swinging, rocking) can be alerting or calming depending on type; the tactile activities can be graded to desensitize or provide calming input; the oral strategies (e.g., chewy/tug toys, crunchy foods) can address oral seeking/feeding issues. More importantly, the occupational or educational therapist must know what and how to decide in the ISP in terms of intensity, frequency and safe modifications.
Step #4: Schedule and embed in routines	▪ A sensory diet is scheduled around daily routines (before challenging tasks, at transitions, or periodically through the day). ▪ Incorporate short activities (1–10 minutes) that the child can realistically complete and that teachers/caregivers can deliver.
Step #5: Train caregivers and teachers	▪ Family and school staff are instructed on how to deliver activities consistently, monitor response, and adapt intensity. ▪ Collaboration is essential for generalization.
Step #6: Monitor, record and adjust	▪ Keep simple logs of behaviour/attention before and after activities. ▪ The therapist reviews outcomes and modifies activity type, timing or intensity to better meet goals. ▪ Research and clinical guidance emphasize the need for ongoing monitoring because effectiveness varies across children and contexts.

Practical Safety and Evidence

Two points to be taken into consideration when primary caregivers such as parents and teachers decide to introduce and implement a sensory diet to their children. The first consideration is safety. Some sensory activities (e.g., heavy work, swings, deep pressure) may require professional guidance from an occupational or physical therapist (or an educational therapist or a nurse trained in sensory diet management) to ensure they are safe, developmentally appropriate and do not produce adverse arousal.

The second consideration is the evidence to support what is done during the sensory diet implementation. Parents and teachers who are administering the sensory diet should read clinical reports, reviews and recent studies that inform them of the benefits for attention, behaviour and daily participation, especially when sensory diets are individualized and combined with broader therapeutic work. However, systematic reviews have noted that high-quality randomized trials are limited and call for better designed studies to define which children benefit most and how best to dose interventions. Therefore, clinicians as well as allied health professionals (e.g., nurses and therapists) should rely strictly on careful assessment, clinical reasoning and frequent monitoring.

An Example of an Individualized Sensory Diet Plan (ISDP)Implementation

Here is an example the authors of this paper introduce a hypothetical case (based on their past case experiences) of a 6-year-old with ASD who has morning meltdowns and refuses messy textures. In such a case, the authors recommend that the child should be assessed with the Sensory Profile-2nd Edition (SP-2) [16]. For instance, the SP-2 results show that the child displayed tactile defensiveness and hyper-responsivity. The therapist who is working with the child might prescribe brief morning proprioceptive activities (e.g., animal walks, and 5-minute wall push-ups), a scheduled heavy-work break before snack, and a graded tactile play program at home to slowly increase tolerance. All these activities planned for the child's ISDP are properly recorded and have to be adjusted weekly to meet the child's changing needs along the way.

An Individualized Sensory Diet Plan (ISDP): A Template

Table 2 below provide an example of an ISDP template that parents and teachers can use:

Table 2: A Sample of the ISDP Template

Child's name:		**Date of SP Assessment:**
Assessed by:		Assessor's designation:
SP Assessment Tool used:		Summary of SP Results:
Sensory Diet Strategies	Description	Note/Monitoring
▪ Sensory Diet Goals		
▪ Morning Strategies:		
▪ Midday Strategies:		
▪ Afternoon Strategies:		
▪ Evening/Bedtime Strategies:		
▪ On-Demand Regulation Tools:		

An Indiviualized Sensory Diet Plan (ISDP) Schedule

Table 3 below provides an example of a simplified template of an ISDP that parents and/or teachers can use (in consultation with an allied health professional) and populate based on a child's needs.

Table 3: An Example of ISDP

Time of Day	**Key Activity/Task**	**Challenge/Problem**	**Sensory Diet Strategy**	**Duration**	**Notes & Monitoring**
Morning (Wake-up)	E.g., getting out of bed, breakfast	E.g., irritability, low arousal	E.g., "pressure sandwich" hug/deep pressure + crunchy breakfast	~5 minutes for pressure; meal time	Did this help set a calmer tone?
Before School (First Transition)	E.g., leaving home, put on shoes	E.g., resistance to change, poor attention	E.g., wall push-ups or bear-walk, weighted backpack, or heavy work breaking	5 to 10 minutes	How was transition (meltdowns, cooperation)?
Mid-morning (Break Time)	E.g., class breaks or playground	E.g., restlessness, fidgeting	E.g., jumping on mini-trampoline, swinging, or therapy ball play	5 to 10 minutes	Note changes in focus or behavior after activity
Lunchtime (Mealtime)	E.g., eating	E.g., picky eating, texture aversion	E.g., crunchy or chewy food, chewy oral toys	Mealtime	Did child try/accept food? Level of distress?
Afternoon (Transition)	E.g., end of class, moving to next subject	E.g., shutdown or overload	E.g., proprioceptive heavy work (push/pull), deep pressure, calm corner	5 minutes	Behavior before or after transition
After School (Evening)	E.g., arriving home, dinner	E.g., over-excited, hyperactive	E.g., obstacle course, aerobic movement then calming (massage, yoga)	10 to 15 minutes	Was child calmer for dinner or homework?
Pre-bedtime Routine	E.g., wind-down, sleep	E.g., difficulty settling, insomnia	E.g., weighted blanket, slow rocking or gentle joint compression, quiet sensory play	10 minutes +	Sleep onset, restlessness, ability to fall asleep
Others (On-Demand Sensory Breaks)	E.g., moments of distress, meltdowns	E.g., sensory overload	E.g., squeeze ball, deep pressure, chew toy, noise-canceling headphones	Varaible	Use this to record which "micro-breaks" work best

Below is a set of instructions on how the ISDP template is applied:

1. Fill in *Key Activity/Task* and *Challenge/Problem* columns based on the child's typical daily routine and observed sensory/behavioral needs.

2. Work with a qualified therapist to choose appropriate *Sensory Diet Strategy* activities that match the child's SP [16] or SP-2[1] (e.g., proprioceptive, vestibular, tactile, oral).
3. Decide on realistic duration (Note: some activities may only need very brief sensory micro-breaks; others, longer).
4. In the *Notes & Monitoring* column, use simple check marks or brief reflections: e.g., "Did it help?", "How did the child respond?", and "What activity to be changed or replaced?"
5. Review and adjust weekly (or monthly) with the therapist-in-consultation, and the caregivers should play their role to ensure that the ISP remains effective and feasible.

This ISDP template can also be combined with a monitoring sheet (for example, the therapist's Sensory Diet Monitoring Sheet) to systematically record the child's responses.

Recent Empirical Studies (2020 to 2025)

The authors of this paper have also chosen selected published papers of recent studies (2020-2025) that investigate sensory-diet-type interventions (see Table 4) or sensory processing more broadly for inclusion here:

Table 4: Selected Studies on Sensory Diet-Type Interventions

Selected Study	Population Focus Intervention	Key Findings
Dehghani *et al* [8].	▪ 32 children with ASD, aged 4-10 years ▪ RCT comparing sensory diet program delivered via in-person Occupational Therapy vs tele-Occupational Therapy.	▪ Found significant improvements in sensory processing (Sensory Profile 2), social competence (Social Responsiveness Scale), and occupational performance (COPM) in both groups.
Baharian *et al* [10].	▪ 51 children with ASD, aged 3-6 years Randomized clinical trial: parents delivered sensory play activity program at home combined with clinic-based sensory integration therapy.	▪ After the intervention, significant improvements in sensory avoiding, sensitivity, and registration patterns; less clear in sensory seeking.
Kim, A. R., *et al* [15].	▪ Toddlers with food refusal/feeding difficulties	▪ Sensory-based feeding intervention (sensory play + oral-motor) improved mealtime behavior.
Shabdini, Azizi, & Peymani [19].	▪ Children with ADHD, aged 6-12 years ▪ Family-centered sensory diet program (including brushing, joint compression, proprioceptive, vestibular, auditory input) → measured effect on impulsivity.	▪ Found reductions in impulsivity in the intervention group.
Nimbley, E., *et al* [12].	▪ Children/adults with ASD (cross-sectional) ▪ Examined relationship between sensory processing difficulties and eating behaviors	▪ Findings indicated strong correlations between sensory sensitivities (tactile, taste/smell, etc.) and food selectivity.
Newton, E., *et al* [20].	▪ Review of pediatric feeding in children under 5 years of age ▪ Reviewed sensory processing considerations in feeding recommendations	▪ Study highlighted need for sensory-processing-sensitive feeding strategies in early years.
Lane, S. J., *et al* [14].	▪ Pre-print narrative review	▪ Proposed a Sensory Integration Decision Guide for primary care providers ▪ To improve identification/referral of children with likely sensory integration challenges ▪ Stresses high prevalence even in children without formal diagnosis.

Finally, both the caregivers and teachers should also be trained by either an occupational or educational therapist during the regular psychoeducation sessions to implement and monitor responses, with regular reviews to adjust intensity and strategies [6, 7, 19]. Research [22, 23, 24] emphasizes that sensory diets are most effective when individually tailored, embedded in daily routines, and monitored continuously for outcome changes.

Conclusion

A sensory diet is not a generic set of activities but a carefully calibrated framework that aligns a child's specific sensory processing profile with supportive routines throughout the day. For children with autism, ADHD or a combination of both (known as AuDHD in short), this structured approach is especially vital, as sensory processing differences often underlie challenges in behavior, communication, participation, feeding, and transitions. When thoughtfully designed through occupational therapy assessment and collaboratively implemented in home and school environments, sensory diets can optimize arousal states, improve emotional and behavioral regulation, and strengthen engagement in meaningful activities. Evidence from recent clinical trials underscores the effectiveness of sensory diet interventions in improving sensory modulation patterns, enhancing social responsiveness, and reducing functional difficulties in autistic children. Ultimately, sensory diets empower children by helping them understand and manage their sensory needs, build self-awareness, and develop greater independence. As families and educators become more attuned to the role of sensory processing in learning and behavior, sensory diets serve as a practical, supportive, and evidence-informed tool that enhances quality of life and daily participation for children on the autism spectrum.

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