

SENSORY SMART APPROACHES TO THE DENTAL TREATMENT OF NEURODIVERSE CHILDREN

A LITERATURE REVIEW FOR DENTAL PRACTITIONERS

Introduction

Dental treatments can present a multisensory environment with bright overhead lighting, sharp sounds with unfamiliar textures, and strong chemical odors. While most patients can tolerate these, children with neurodivergent disorders can find these stimuli particularly overwhelming in the confined dental space. According to Neurodiversity Statistics and Research, 15 to 20% of the world's population is neurodivergent; this estimate includes various cognitive variants. Within this estimate, 20% are diagnosed with dyslexia, while 1 in 100 children are diagnosed with autism spectrum disorder worldwide (2022), which has increased to 1 in 127 people according to the 2026 report of the WHO. ^(1,2)

The purpose of this review is to identify the most important aspects of oral sensitivity and to help practitioners develop strategies for the inclusion and management of neurodiverse children in their practice.

Understanding Neurodiversity in a Clinical Context

Compassionate care needs an understanding of the lived experiences of these children and their families.

The term “Neurodiverse/Neurodiversity” is used to describe the identity of individuals who differ from what is considered typical neurological development and functioning. “Neurodevelopmental conditions” is the clinical diagnostic term used.

This diagnosis comes under the umbrella of developmental disabilities. In ICD-11, “neurodevelopmental disorders” are defined as behavioral and cognitive disorders that arise during the developmental period, and result in significant difficulties in the acquisition and execution of specific intellectual, motor, sensory, language, or social functions. Its etiology is complex and often unknown. A common observation is an early interference in neurological development, resulting in heightened sensitivity, regression, dysfunction or loss of neurological functions. ⁽³⁾

Some of the included conditions are autism spectrum disorder (ASD), developmental learning disorder, attention deficit hyperactivity disorder (ADHD), intellectual speech and language disorders, and stereotyped movement disorder. ⁽³⁾

The Physiology of Oral Sensation

The oral cavity has a complex network of sensory experiences due to the interplay between various receptors and several cranial nerves. There are tiny receptors in the mucosa and underlying tissues that detect pressure, touch, vibration (mechanoreceptors), temperature changes (thermoreceptors), painful stimuli (nociceptors), chemical stimuli, taste, and irritation (chemoreceptors). Trigeminal nerve (CN V), facial nerve (CN VII), glossopharyngeal nerve (CN IX), and vagus nerve (CN X) are the main cranial nerves involved in the oral cavity. Together, they form an intricate network of sensory perceptions that help a person to eat, speak, detect injuries or infections, and proprioception (position of tongue and jaw) ⁽⁴⁾.

Any early developmental disturbances can lead to heightened sensations or regression, malfunction, or loss of one or more of them.

Oral Sensory Challenges in Neurodiverse

A typical characteristic of children with neurodivergence, especially profound in autism spectrum disorder (ASD), is atypical sensory responses with hypo or hyper reactivity to stimuli.

These children have been reported to have an aversion to textures. This has been suggested to arise from abnormalities of peripheral receptors or the central nervous system; some studies show reduced thalamus size in the brains of children with ASD. Even though the exact mechanism needs further studies, these children are seen to have very restricted dietary choices and are called “picky eaters”.

Tactile hypersensitivity and hyposensitive comes under the term “tactile defensiveness,” which is commonly seen in these children. This is manifested in daily life as an abnormal emotional response to a sensation with withdrawal or avoidance of a stimulation.

Abnormalities of the cortical and subcortical parts of the brain, altered GABA systems have been attributed to this, requiring further studies to understand the highly variable response to tactile stimuli in these children.

Auditory and visual sensory impairments are also widely seen in these children, resulting in atypical responses to auditory and visual stimuli. ⁽⁵⁾

In the dental office, dental materials and instruments can challenge the texture and tactile senses, while the light, sound, and human interactions put the auditory and visual senses under strain. Inability to process instructions, adapt, and cope makes dental treatments challenging.

Implications for Dental Health

Children with neurodevelopmental disorders have a higher risk of dental caries, gum disease, and poor oral hygiene compared to neurotypical children.

Toothbrushing is particularly difficult due to the inability to tolerate the texture of toothbrush bristles or the taste of toothpaste in the mouth. While some children struggled with the texture of the toothbrush, other children coped with electric brushes, while others found it too noisy or as having too much vibrations.

Many face significant challenges and barriers in daily life. Lack of school inclusion, societal judgment, and daily behavioral challenges put a deep strain on parents and caregivers, often leading to caregiver burnout. Adding to this, toothbrushing “battles” become a frustrating chore, often resulting in oral hygiene taking last priority, with parents finding it difficult to navigate oral sensitivity. ⁽⁶⁾

The Dental Office

A typical dental office is designed to function with a schedule of timed appointments. It can also be described as a triggering environment for the sensory system of neurodivergent children, eliciting deep responses of discomfort, due to which these children and families face barriers in getting appropriate and timely dental care.

Below are some strategies that can be applied to your practice to ease the patient experience and help deliver care.

Before the appointment

A few simple steps can make dental appointments go more smoothly:

1. **Train the front desk** staff to ask targeted questions during scheduling, including medical history, past dental experiences, known triggers and comforting elements. This reassures parents while equipping the dental team with the information to individualize each visit.
2. **Plan for behavior training before the first visit** to help build sitting tolerance and reduce oral defensiveness. This can be accomplished by sending audiovisual materials about the visit, along with appropriate parent education resources beforehand.
3. **Facilitate pre-visit collaboration between the dental team and the child’s medical or caregiver teams.** This will help collect information to guide appropriate sensory adaptations in the office and prepare the team members to receive the patient.
4. **Determine ideal appointment length and time of the day for the visit.** Thoughtful selection of a dental room away from high traffic areas of the dental office helps to maximize sensory adaptability. ⁽⁷⁾

During the appointment

Incorporating these modifications to standard dental office routine creates a more inclusive experience for neurodivergent children. These are:

1. **Modify the clinical settings to a sensory-adaptive mode by** dimming the lights, projecting calming visuals, such as bubbles on the ceiling, playing soft background music, and providing deep pressure input through a wrap or weighted blanket. These adjustments can help calm the child during the appointment.
2. **Implement picture exchange communication systems** to support children with limited or no verbal communication. This facilitates easier communication and helps shape responses. Pre-prepared picture boards and communicative cards are practical tools for this purpose.
3. **Consider animal-assisted therapies and mind-body therapies**, including biofeedback and hypnosis, where clinically appropriate.
4. **Use advanced behavior management strategies**, such as sedation and general anesthesia when indicated.⁽⁸⁾
5. **Develop individualized preventive strategies.** Educating parents about the importance of daily oral hygiene and offering tailored options, such as modified toothbrushes or electric brushes and fluoridated mouthwash used on the toothbrush instead of toothpaste, can help make oral care more manageable.⁽⁹⁾

Lastly, every child and family presents with unique circumstances and needs. Welcoming neurodivergent children into dental practice requires a deeper and more personalized understanding of each family. Compassionate inquiry and care, delivered within the scope of dental practice, paired with appropriately timed referrals, can be a meaningful source of support for parents and a source of fulfillment for the dental team.

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