

Approaches to Care for Children with Special Needs in Dental Settings: Desensitization and Teledentistry

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Abstract

Children with special health care needs (SHCN) are at a heightened risk of developing chronic physical, developmental, behavioral, or cognitive conditions that significantly affect their oral and general health. These children often encounter significant barriers to receiving adequate dental care, which contributes to neglected oral health needs. Common challenges include increased risk of dental diseases due to medication use, oral hygiene difficulties, and dietary restrictions. Newer strategies aimed at overcoming these barriers include the use of dental social stories, desensitization techniques, and teledentistry. Social stories offer a structured way for parents to help prepare children for their dental visits. Desensitization involves gradual exposure to dental settings and has shown promise in helping children with SHCN tolerate dental procedures. Additionally, the role of teledentistry is explored as a tool to improve access to care as well as to pre-triage SHCN patients. Through understanding and addressing the specific challenges faced by children with SHCN, dental providers can improve the overall well-being of these patients.

Children with special health care needs (SHCN) are defined by the Maternal and Child Health Bureau as being at an “increased risk for having chronic physical, developmental, behavioral, or emotional conditions.”¹ SHCN may include behavioral (e.g., autism spectrum disorder, attention deficit hyperactivity disorder, or anxiety), developmental (e.g., cerebral palsy, epilepsy), cognitive (e.g., intellectual disorder), congenital (e.g., genetic condition, metabolic disease), or systemic disorders (e.g., cancer, sickle cell disease).³

Children with SHCN represent a diverse group who experience varying degrees of physical, emotional, and functional limitations. According to the National Survey of Children's Health, in 2019-20, approximately 19.4% children in the United States had a special health care need and 28.6% of U.S. households with children had at least one child with SHCN.² Dentists must provide care for these children, which may require adaptation of the dental clinic and treatment procedures to overcome barriers.

According to the National Survey of Children's Health Data Briefs, in 2019-22, children with SHCN were nearly four times more likely to have unmet health care needs compared to children without SHCN.⁶ Of additional concern, as many as 20% of children with SHCN had unmet dental needs, with the most-common dental problems reported as cavities, malocclusion, bruxism, and calculus buildup.⁷ Children with SHCN are considered to be at a greater risk of developing dental diseases due to frequent use of oral medications high in sugar, dependence on a caregiver for regular oral hygiene, reduced clearance of foods from the oral cavity, impaired salivary function, a preference for carbohydrate-rich foods, a liquid or pureed diet, and oral aversions.¹⁰ Children severely affected have an even greater risk of unmet dental needs.⁸ In addition, the oral health needs have increased for this population due to children with disabilities being much

Dental social stories, desensitization techniques, and teledentistry can all play a part in helping special needs children overcome barriers to obtaining dental treatment. Here's an examination of these approaches for this patient population.

more likely to survive into adulthood compared to previous decades.⁹

Reducing the risk of developing oral disease is an integral part of the comprehensive oral health care for children with SHCN, as oral diseases can have a direct impact on general health and quality of life.⁹ To reduce the health disparities experienced by children with SHCN, dentists should be familiar with common barriers experienced by this patient population and their families. Barriers to care can be divided into two categories: environmental and non-environmental.¹⁰ Environmental barriers include finding a dental office willing and able to care for the child, transportation, family income, and insurance (reimbursement and acceptance by dental offices).¹⁰ Non-environmental barriers include the child's fear and anxiety, the child's ability to cooperate, and more-urgent health care needs.¹⁰ Additional barriers include functional limitation in oral self-care due to delays in motor and cognitive abilities, oral aversions that can interfere with oral hygiene and restrict diet, and hypersensitivities to

textures, smells, and tastes that accompany dental treatment.⁸

Health care for individuals with special needs requires specialized knowledge, as well as increased awareness and attention, adaptation, and accommodative measures beyond what are considered routine.⁴ Emerging strategies addressing non-environmental barriers for patients with SHCN include dental social stories, a sensory-adaptive dental environment (SADE), and desensitization.¹¹ Social stories are a behavioral intervention originally developed for children with ASD that consist of a short sequence of pictures and sentences describing a situation.¹² Dental social stories are a relatively simple, low cost, effective tool available in print or digital form.¹³ They assist children with SHCN to prepare for their dental appointment, structure the visit, reduce fear of the unknown, and allow the patient to review it repeatedly.¹³ SADE creates a multisensory environment with a combination of sound, lighting, vibration, tactile, and aroma sensations
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to regulate the sensory response.¹⁴ The aim is to reduce maladaptive behaviors and promote regulation in multiple settings.¹⁴

Desensitization is a structured program based on temporal and spatial organization, mainly through visual information, utilized to help patients with SHCN tolerate dental treatment.¹⁵ The technique involves a series of short visits to the dental practitioner that provides a gradual approach to learning to tolerate dental procedures.¹¹ Novoa et al. (2024) found that participants engaged in weekly desensitization sessions performed by an occupational therapist and dentist completed all oral examination procedures with 94% success rate at the fourth visit and 100% by

the seventh visit.¹⁶ Tufts University School of Dental Medicine initiated the Autism Smiles program in 2019, where predoctoral students work with children with autism spectrum disorder to simulate an interactive dental experience where children engage with the dental office, staff, instruments, and other stimuli to gain exposure to the dental sensory experience.¹⁷ Each child also receives a sensory tool kit, social story, and a dental communication board with images of what to expect throughout a dental appointment.¹⁷ Nelson et al. (2017) found that by utilizing dental desensitization 77% of children with ASD successfully completed a dental exam after one to two visits and 88% by the fifth visit.¹⁸

Common challenges in dental settings

For a dental provider, a regular checkup appointment might seem straightforward without the worries of negative behavior that could arise with local anesthesia administration. For children with hypersensitivity to sensory stimulation or children with special health care needs, something seemingly straightforward such as sitting on the dental chair and opening the mouth could stimulate severe anxiety and resistance. Starting from entering the office to placing fluoride varnish on the teeth, these patients can face multiple challenges. These include:

- Beginning of appointment: Difficulty entering the office/treatment area; difficulty sitting on the dental chair; anxiety while the provider leans the dental chair to a supine position.

- Clinical examination: Difficulty tolerating the provider coming close to the face; fearful reaction when the provider approaches from behind; difficulty tolerating instruments in the mouth.

- Prophylaxis: Allowing the provider to brush with a toothbrush or prophylaxis handpiece; difficulty tolerating an air water syringe, gauze, or suction; difficulty adjusting to toothpaste flavor/texture.

- Radiographic examination:
 - *Intraoral radiographs: Not able to bite on the film-holding device; difficulty tolerating the radiograph sensor touching the floor of the mouth, the palate, and tongue.

- *Panoramic radiographs: Hesitation when entering the room with the panoramic radiograph machine; not able to stand still while the machine rotates to obtain an image.

- Fluoride application: Difficulty tolerating the flavor and texture of fluoride varnish.

Specific approaches to overcoming these challenges

First, obtaining a thorough medi-



cal, dental, family, and social history with behavior-related information is critically important. This information helps prepare providers to facilitate a more-tailored approach and create smoother appointments for the patients. Specific information important prior to caring for children with SHCN includes the patient's previous dental experience and details of the child's behavior during past appointments, as well as home oral health care challenges faced by the family. When parents report they are struggling to maintain an oral hygiene routine due to a child's uncooperative behavior or sensory processing disorder, the provider should be alerted that the patient could also show challenging behavior in the dental setting.

Desensitization

Desensitization is a technique in which a patient is taught to replace fearful or maladaptive responses with non-fearful responses and may be useful for enabling treatment of children with SHCN. It has proven to be a successful yet time-consuming approach, but many providers may not be familiar with the associated techniques.

There are several general suggestions that dentists should utilize while interacting with children who have histories of severe dental anxiety or sensory hypersensitivity. First, the provider's eyes should be level with the child's eyes. Second, approach from the front of the child first before attempting the same action from the side or back where the child cannot see as clearly. Third, inform the child and prepare them for the subsequent steps of the appointment.

The following are examples of suggested approaches to overcome common challenges related to the dental examination and cleaning appointment:

- Let the child take time to look around the clinic. Walk the child around the clinical space so they can visualize the area.
- Demonstrate from a distance how the chair moves. Allow the child to try some of the buttons themselves. The dental chair may also be reclined prior to the child sitting, so the movement of the chair doesn't startle the child. If a child is initially hesitant to sit on the dental chair, ask them to sit in another chair first.
- Touch their hands with your hand before touching their head or face; hands are an area where people feel more comfortable being touched by strangers. Put gloves on and touch their hands again. Tell the child that you are going to touch their face, then touch their face, and follow the same steps for lips, teeth, and gums, working anterior to posterior.
- Approach the child from the front first, then tell the child that you will stand on his/her side before doing so,

then tell them you are going to stand behind them before doing so.

- Allow the child to hold the mirror and look at themselves. You can ask them to "help" hold the mirror/toothbrush as you guide it into their mouth.

The desensitization program used at the University of Michigan Children's Clinic is designed for children with hypersensitivity who require additional exposure to the dental setting to help familiarize them with the dental clinic and gradually gain access to routine dental care. Desensitization visits are presented to the parents to help children ease into routine recall visits. Parents are informed that the goal of the program is to acquaint the child with the dental clinic environment and help familiarize them with dental environment, instruments, and appointment procedures. Every child has a tailored goal based on the initial visit, with common goals of being seen in the dental clinic, completing dental prophylaxis with a prophylaxis handpiece, completing radiograph for routine caries diagnosis, and tolerating fluoride varnish application. Based on the baseline needs of each individual, it could take up to four to six visits, with two to three weeks between each visit. A desensitization home kit is also provided to the parent with instructions given to build a "dentist game" at home. The kit includes a disposable oral mirror, prophylaxis brush attachment, three-sided or all-surface toothbrush, foam mouth prop, and radiographic film protector wrapped in the plastic seal to mimic the phosphor plates used in a recall visit.

Two or three goals are identified for each desensitization visit (e.g. sit on the dental chair, lean the chair back, tolerate the provider touching the face). The provider introduces each step slowly through tell-show-do, with positive reinforcement used throughout. The provider stops if the child starts showing signs of resistance; the provider leaves the room and allows the parent and the child to practice what was taught during the appointment. The next desensitization appointment is scheduled in two to three weeks. Once the patient reaches the goals set for the desensitization program, he or she will return for a three-month recall with an optional desensitization visit one to two weeks prior to the recall.

Case reports

Case 1: A 4-year, 1-month old male patient presented to the pediatric dentistry clinic at the University of Michigan School of Dentistry to establish care. The patient's medical history included autism spectrum disorder, Chiari malformation, and a heart murmur that is being monitored. The patient was receiving speech therapy and occupational therapy. Before the appointment started, the parent mentioned that she was concerned about the

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child's severe oral aversion; that she struggled to brush his teeth at home, and the child was very sensitive about what he put in his mouth.

A knee-to-knee examination showed that the patient was in full primary dentition with general spacing, no caries, and moderate calculus accumulation. The child was obstructive for the knee-to-knee examination with tears and head movements throughout. At the end of the appointment, the child was able to sit on a folding chair and allowed the provider to touch his face and hold a toothbrush. While there were no urgent treatment needs, desensitization was proposed to help the child ease into routine dental care, with the goal of completing a comprehensive exam, dental prophylaxis with a prophy handpiece, radiographs, and removal of supragingival calculus at future visits.

The child came for the first desensi-

tization visit one month after the first encounter. The mom was informed that the main goal of the visit would be to "have fun" and feel more relaxed in the dental setting, and might not include brushing, taking radiographs, or other goals if the patient seemed uncomfortable. The appointment was set up in a small treatment room with a folding chair provided for the parent in front of the dental chair. The plan was to introduce the achievements the patient accomplished in the last visit (sat on folding chair) and initiate new actions. The child was led to the folding chair by the provider and comfortably sat on his own. The provider touched the child's hands to introduce the texture of gloves and touched the child's elbow and shoulder before approaching the face area. The child was mildly hesitant. A pair of gloves was provided to the patient. The child tried on the gloves and felt his own

hands and face with the gloves on and calmed. The provider was facing the child and prepared him with simple words such as "hand," "elbow," "shoulder," and "chin" before physically touching the patient.

The child adapted to this action well, so the provider turned to the side and performed the same set of actions before approaching from behind the patient. The child was still hesitant with the provider approaching with a mirror or toothbrush but was able to play with the dental mirror comfortably on his own and even used it to look at his teeth. In this appointment, the child did not get on the dental chair, but pressed buttons on the dental chair with the provider's guidance. The provider then left the room to allow the mom to review what was introduced in the appointment with the child. Once the provider exited the room, the child sat and played on the dental chair with mom. Mom was able to brush his teeth with the patient on the reclined dental chair. Instructions and a home desensitization kit were provided, and the parent was encouraged to brush the child's teeth with him lying down to mimic the position in the dental chair, and to massage/touch the child's face while in a reclined position.

The patient returned six weeks later for the second desensitization visit. The parent reported that progress was made at home using the tool kit after the last visit. They practiced brushing teeth while lying back and making noises simulating the buttons/reclining action of the dental chair while leaning back. In this visit, the child comfortably sat in the dental chair immediately upon entering the room. He was excited to lean back and move up in the dental chair. He allowed the provider to interact with him while both the child and the provider were wearing gloves without showing any level of anxiety. He became more comfortable playing with the air/water syringe with the provid-

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er spraying air on the child's chin and the child spraying water on the gauze. The child allowed the provider to brush the maxillary teeth after he brushed his own mandibular teeth. In this visit, the saliva ejector, the explorer and the panoramic radiograph room were introduced. The child wiped his own teeth with gauze and played with the oral mirror, however, the child did not allow the actions to be performed by the provider. The child tolerated the provider counting his fingers with the explorer but not his teeth. The mother was able to count the child's teeth in the second half of the appointment while she was in the room with the patient alone.

The third desensitization visit was carried out three weeks later. During the visit the patient retained what he achieved in the last appointment and made the following progress: allowed the provider to brush his anterior teeth with prophylaxis handpiece while reclined in the dental chair; tolerated the air/water syringe and used the saliva ejector to suction by himself; allowed the provider to examine all teeth with the explorer; and completed a set of extraoral bitewings with the panoramic radiograph machine. The child was very happy and proud of himself after completing each task. Considering the patient was making great progress during the past visits, the child was scheduled to return for a comprehensive exam after this appointment.

During the comprehensive exam, a full clinical examination utilizing oral mirror and explorer was performed. The child allowed the provider to clean his teeth with the prophylaxis handpiece if he could hold on to the handpiece with the provider. He allowed partial removal of calculus lower incisors with a hand scaler. The patient was then scheduled to return for a three-month follow up.

The child returned with mild to moderate anxiety for the three-month recall. The mother expressed that this may be due to the visits being more spaced out and the child was NPO for another physical examination on the same day. After discussing with the mother, this visit was turned into another desensitization visit with the understanding that the patient will return one month later. The patient showed hesitation and fear while introducing the explorer and hand scaler but verbalized that he wanted to "try again" whenever the provider expressed that they could stop the practice if he wasn't feeling well. The motion of counting with an explorer was reintroduced with the back of the oral mirror before attempting to use the explorer again. The child was able to review all the achievements he accomplished in the previous appointments, and allowed the provider to remove calculus with hand scalers. The patient appeared to be more comfortable while he was holding a hand mirror that allowed him to see all the actions.

When the patient came in for the three-month recall,

he was more relaxed compared to the previous visit but was still hesitant toward the explorer and the hand scaler. The appointment included a comprehensive clinical examination, dental prophylaxis, and all calculus was removed at this visit. The patient planned to return for three-month recalls with a desensitization visit two weeks prior to the recall if needed. Other goals, such as taking intraoral radiographs, will be gradually introduced at future appointments.

Case 2: A 5-year, 6-month old male patient presented for a routine recall visit. The patient had a history of routine dental visits from the age of 1 year. By 2 years of age, mom reported that the child seemed to be developmentally delayed, and a diagnosis of autism spectrum disorder was confirmed at the age of 3 years. The visits from age 2 to 5 years were completed in the knee-to-knee position, and the patient appeared to be more and more obstructive, with loud cries and strong head movements. The child was receiving applied behavior analysis therapy, with the goal to aid communication and improve fine gross motor skills. The child's aversive behaviors were triggered by new things, tags, and loud noises. No radiographs were able to be completed due to behavior.

In the most-recent encounter, the child was excited about the dental appointment, yet was reluctant to sit on the pre-reclined dental chair. The child showed obstructive behavior while the provider attempted to come close to his face. The visit was then transitioned into a desensitization session. The provider put on gloves and touched the child's hands, and gradually approached the elbow, shoulder, and chin. The child adapted well to this gradual approach. The oral mirror, explorer, and prophylaxis handpiece were introduced in the visit. The child tolerated the oral mirror in his mouth and the explorer on his fingernails and some of his teeth. The child was very sensitive to the taste of prophylaxis paste and tolerated the spinning prophylaxis handpiece touching his finger, but only allowed it to touch his teeth when inactive. At the end of the appointment a desensitization home kit and instructions were provided to the parent to help prepare the child for the next visit.

The child returned for the second desensitization visit one month later with his mother and younger sibling. He was able to enter the operatory and sat on the dental chair comfortably. The child allowed the provider to come close to the face and tolerated the oral mirror and the explorer. The provider was able to use a spinning prophylaxis handpiece to clean some of the patient's teeth. The child was still reluctant to lay on a reclined dental chair during the first half of the desensitization visit. The family was shown how to control the dental chair movement with the buttons. Then the provider left the room and al-

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lowed the family to explore the dental chair and practice what was introduced. The child and his sister took turns playing the “dentist game” and were able to sit on the dental chair and recline it after the second half of the appointment. At the end of the appointment the provider complimented the child’s progress while he demonstrated laying on the reclined dental chair.

During the third desensitization visit four weeks later the child sat in the dental chair unprompted and was excited to push the buttons to make the chair move up and down, but was hesitant to recline the dental chair. The provider completed a comprehensive examination with the explorer and the oral mirror. The patient tolerated a dental prophylaxis with the prophylaxis handpiece and his preferred toothpaste. Intraoral periapical ra-

diographs were introduced with counting to three and an index finger where the phosphor plate would be placed. The child was able to tolerate biting on the snap-a-ray with mild resistance and completed four periapical radiographs with positive reinforcement. The patient was scheduled to return for a six-month follow up with a prior desensitization visit at his mother’s request.

Teledentistry

Teledentistry is the use of telehealth modalities to deliver dental care. Teledentistry has many benefits in a cost-effective manner to improve access to oral health care for infants, children, adolescents, and individuals with special health care needs, especially those in underserved or hard-to-reach areas.¹⁹ The many types of teledentistry include the fol-

lowing.

- Synchronous (live video): real-time, interactive communication between the patient and dental professional.
- Asynchronous (store-and-forward): collection and transmission of dental records, images, and data to a dentist for later review;
- Remote patient monitoring: continuous monitoring of dental patients through digital devices and communication technologies.
- Mobile health (mHealth): using mobile devices to support dental care and education.^{19,20,21}

The American Academy of Pediatric Dentistry encourages the use of teledentistry as a complement to in-person clinical care, aimed at improving access for infants, children, adolescents, and individuals with special health care needs. While it complements traditional care, it does not replace the establishment of a dental home. Teledentistry is a valuable tool for timely patient assessments, triaging patient and traumatic injuries, and extending care when access to providers is limited, whether due to local unforeseen circumstances, remote locations, or special health care needs that prevent engagement with traditional services.

In this context, at the University of Michigan Children’s Clinic teledentistry has been used to pre-triage new patients with SHCN. One week before their new patient appointment the patient’s guardian is contacted to obtain information about the patient’s health history, medications, allergies, and previous dental experiences. Parental expectations for the upcoming appointment are reviewed, and the clinic can ensure that additional staff will be available if needed. The detailed information allows providers and staff to better prepare for the new patient’s visit and tailor the care accordingly. It also minimizes the amount of time taken during the in-person visit reviewing this information, which helps



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the provider focus on the child when presenting for care. As a result, the clinic's efficiency is improved. Parents are expressing satisfaction with the appointment outcomes.

Documentation of a teledentistry visit is similar to that of an in-person visit; security measures and privacy of protected patient information are necessary to ensure compliance with state and federal laws.^{21,22,23} Reviewing relevant laws and guidelines can assist practitioners in understanding their obligations concerning licensure, documentation, and electronic security in teledentistry. Furthermore, the care provided through teledentistry is an adjunct to in-person care and expected to conform to evidence based dentistry.^{21,22}

Conclusion

Addressing the oral health needs of children with special health care needs requires a flexible approach that acknowledges the unique challenges faced by these patients and their families. By identifying and mitigating environmental and non-environmental barriers, dental professionals can better accommodate the needs of these patients. Strategies such as desensitization, social stories, and sensory-adaptive dental environments have demonstrated success in helping children with SHCN tolerate dental procedures. Moreover, the integration of teledentistry provides an additional tool to enhance access to care, improve patient preparation, and tailor treatments to individual needs. Continued research and education on these interventions are essential for advancing pediatric dental care and reducing oral health disparities for children with special health care needs. ●

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