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SPECIAL CARE, SPECIAL SMILES: REDEFINING PEDIATRIC DENTAL CLINIC

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Abstract:
Dental anxiety often stems from fear of treatment, pain, uncertainty, and interactions with dental professionals. For children with developmental disorders, these challenges are compounded by motor, sensory, cognitive, and behavioral difficulties, making dental visits and oral hygiene routines more challenging. Traditional dental settings can be overwhelming due to heightened sensitivity to sensory stimuli. To mitigate this, there are many recent advancements done in dental clinics in combination with a Sensory Adapted Dental Environment (SADE), inspired by the Snoezelen approach, which was designed to create a more calming atmosphere. Thus, this article reviews the various modifications and advancements in dental clinic setup for special health care children.

Keywords: special health care needs, sensory adapted dental environment, dental clinic set-up, dental anxiety

1. Introduction

Globally, around 650 million people worldwide suffer from disability, and the number is growing as the population does. In 2006, the United Nations Development Program said that around 80% of disabled individuals live in developing nations. Children in India, one of the most populous nations in the world, are at a heightened risk of developing developmental impairments[1]. They are those who have physical, mental, sensory,

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behavioral, cognitive, emotional and chronic medical conditions which require health care beyond that considered routine and which involves specialized knowledge, increased awareness, attention and accommodation[2].

A study analyzing data from the National Family Health Survey (NFHS-5) conducted between 2019 and 2021 found an overall disability prevalence of 0.93% in the population, with locomotor disabilities being the most common, followed by mental disabilities[3]. Under this broad spectrum of developmental disturbances, children may have intellectual disabilities (ID), communication disorders, autism spectrum disorder (ASD), attention deficit hyperactivity disorder (ADHD), specific learning disorders, motor disorders and other neurodevelopmental disorders[3].

These children have a higher prevalence of poor oral hygiene, which was suggested to be the predominant cause of dental caries and periodontal disease among them. A meta-analysis reported that the prevalence of dental caries is around 49% in both 5-year-old and 12-year-old children[4]. This prevalence increases with age, reaching 60% at 15 years, 78% at 35-44 years, and peaking at 84% in the 65–74-year age group. The World Health Organization's 2022 country profile for India estimated that 21.8% of individuals aged 15 and above suffer from severe periodontal disease[5]. There are still a number of obstacles pertaining to these patients' dental requirements. The majority of research stated that patient behavior, the severity of dental illness, related disabilities, and insufficient training and expertise are the most frequent reasons why dentists fail to offer dental care for children with special health care needs[6].

Barriers to accessing dental care for children with developmental disabilities include their behavior, anxiety, transportation difficulties, parents' attitude towards the dental treatment, limited numbers of dentists with the necessary expertise, and overall workforce capacity shortages. Pediatric dentists have the needed training to be able to treat patients with developmental disabilities[7].

Anxiety-induced reactions may be difficult to manage and can result in reduced access to dental care, and these reactions may lead to the use of sedative medications, general anesthesia, or physical restraint for the completion of necessary dental work[8]. Management with these approaches may be costly, as they often require treatment to be completed in a more specialized setting, such as a hospital rather than an outpatient dental office. For patients referred for dental treatment under general anesthesia, behavior problems have been identified as being most strongly associated with dental treatment in the hospital[9].

Families of Special Health Care Needs (SHCN) children experience much higher expenditures than usual. Due to the financial barriers and priorities of other responsibilities, they are providing less priority for oral health care, which contributes to poor oral health among disabled children. In many instances, the families of SHCN children are emotionally or intellectually incapable of dealing with their health problems[10].

The other most important barrier faced by children with SCHN is difficulty in finding a dentist who is willing and able to care for young children and adolescents with

complex medical conditions. Pediatric dentists should be trained to treat patients with developmental disabilities[11].

In the regular dental setup, disabled children are sensitive and easily invoked to sensory stimuli such as high-speed handpiece, overhead light, loud ambient noises, texture, and taste of prophylaxis paste. Furthermore, Fallea et al. in 2016 reported that children presenting with Intellectual disability had unusual reactions to sensory stimuli. This altered neurophysiological predisposition that individuals with developmental disabilities encounter in regular dental setup could negatively impact their behavior and level of cooperation, making it more difficult for dentists to provide treatment[12].

Architectural designs of healthcare set up in India are not disability friendly, thus worsening the current scenario of delivering dental needs to the individual with special needs. To combat this situation, the Ministry of Urban & Development, Govt. of India, has formulated the guidelines in the year 2016, which provides specifications for building a barrier-free environment, thus making health care need accessible to them. Thus, this article reviews the various modifications and advancements in dental clinic setup for special health care children[13].

2. Discussion

2.1 Dental Clinic Considerations For Special Health Care Needs

2.1.1 Parking Space

It is essential to ensure that parking spaces are conveniently located near the clinic to enhance accessibility for patients and visitors. Ideally, parking facilities should be provided within a distance of 98 feet from the clinic, allowing for ease of access and minimizing inconvenience. This proximity will not only improve patient experience but also cater to individuals with mobility challenges, ensuring a more inclusive and efficient environment[14].

2.1.2 Walkway

Walkways should have a smooth, hard, and levelled surface to ensure they are suitable for walking and wheeling. To enhance accessibility, the length of the walkways should not exceed 60 meters. If a longer distance is unavoidable, it is recommended to provide rest areas with benches or resting seats at suitable intervals of 98 feet. These features will promote comfort and convenience for all users, including those with mobility challenges[15].

2.1.3 Tactile Pavers: Guiding & Warning Blocks

To assist visually impaired patients, tactile pavers should be incorporated into pathways. These pavers serve as essential guides, enhancing safety and navigation. There are two types of tactile pavers: dot-type and guiding block-type. Together, they create an intuitive pathway, enabling visually impaired individuals to move independently and confidently within the environment[15].

2.1.4 Ramps

Ramps with a vertical rise greater than 6 inches should be equipped with handrails to ensure safety and support for users. Additionally, the minimum clear width of a ramp should be 47 inches to provide adequate space for easy and comfortable access, accommodating individuals with mobility aids or other accessibility needs[14].

2.1.5 Staircase

Staircases must be equipped with grab bars to offer reliable support and ensure safety while walking. These grab bars provide stability, particularly for individuals with mobility challenges, reducing the risk of accidents and promoting confidence in navigating stairs[15].

2.1.6 Lifts

The lift should have a minimum interior dimension of 48 inches in width and 48 inches in depth to accommodate diverse accessibility needs. Where feasible, a 13-passenger lift is recommended to provide ample space for the seamless movement of wheelchairs and enhance overall convenience[15].

2.1.7 Door

Use sliding or folding doors. It should not be too heavy to operate and should not require a force of more than 20N to operate. Automatic doors should have a push button system to open them. All external doors should have warning blocks installed 30 inches before entrances. The minimum opening of doorways should be 35 inches. If the door is operated by hand, the handle must be mounted at a height of 33 to 43 inches from the floor. For wheelchair users, the door should have a horizontal handle provided on the closing face of the door, approximately 30 inches from the floor[16].

2.1.8 Waiting Room

In a dental clinic for special children, there should be a special area for an aquarium; the use of this can induce a positive distraction in children. The use of flat plasma TV displaying nature's slideshow, ambient art, and aquarium can be used to engage the children. Designing the ceiling as well as designing walls can also play a crucial role in reducing stress and anxiety and creating calmness, especially during treatment when a patient is lying down and facing upwards in a dental unit[33]. Studies have shown that Images of water, plants, animals, and other elements of nature, such as flower and leaf patterns and tree designs, and small lights on the ceiling that gently turn on and off during long night hours simulates stars and creates a positive distraction & alleviates the anxiety in special child[34].

The room should be well equipped with sensory toys such as fidgets, stress balls, Fat brain dimple toy, Hooper ball, kinetic sand moulding tool box, teeter hooper for calming and alerting, to promote focusing and concentration, decreasing the stress and increasing the tactile awareness of fingers/hands in children[35]. The installation of a special shelf for a variety of magazines and comic books can provide entertainment to both

parent and child. Floors should be levelled with dimensions 35*48 inches. Carpets should be securely fixed and have firm cushion, pad or backing. Have exposed edges of carpets fastened to floor surface and trim along the entire length of the exposed edge. Lighting must be white (example: high-pressure sodium) with an average lux of 35 to 40. This helps to increase the contrast of the images present[15].

2.2 Operatory Room Facilities

2.2.1 Sensory Adapted Modifications To Procedure and Environment

A variety of techniques and strategies may be used to help patients with developmental disability better deal with dental visits. First, procedures and environments can be modified to reduce sensory stimuli; second, the application of specific intervention strategies may help the patient to better handle uncomfortable sensations[17]. Based on the Snoezelen environment, a sensory adapted dental environment (SADE) has been created that may help children in dental clinics feel less anxious about getting dental work done and have a more relaxing experience. SADE has been thoroughly studied in people with developmental disability[18].

2.2.2 Visual Aspect

Williams has stated that people who are oversensitive to visual stimuli have a problem filtering different wavelengths of light. As a result, one experiences visual overload and struggles to interpret visual stimuli. It has been reported that direct fluorescent lighting flickers and is extremely upsetting. To overcome these problems, remove all direct overhead fluorescent lighting, including the regular dental overhead lamp. Dimmed upward reflecting fluorescent lights make up the modified illumination. A "solar projector" should be used to create slow-moving, repeating visual color effects inside the child's range of vision. A head-mounted LED narrow spectrum light emitting diode source lamp is recommended for the dental hygienist. Camouflage the instruments by covering the handles of the instruments covered with toys[19].

2.2.3 Auditory Aspect

According to Love, dental clinics noises, such as drills, are in the range of 100dB, presenting a significant risk of noise-induced hearing loss. To camouflage the second sensory stimuli, that is noise, play soft music in the background to distract the children from the regular loud sounds of the dental equipment. Use headphones to mask the noises from adjacent areas[20].

2.2.4 Tactile Stimulus

The tactile stimulus consists of a regular dental X-ray vest. A friendly immobilization wrap can be developed which is in the shape of a butterfly with a smiling face and wings that envelope and “hug” the child when wrapped around. The wrapping material should be soft and pliable, with the aim of rendering optimal comfort. The butterfly hugs the child tightly to ensure safety and as a means of deep pressure[21].

2.2.5 Taste

In a sensory-adapted dental environment, considerations related to taste focus on minimizing discomfort for individuals with heightened sensitivities. This includes using neutral or mild-tasting materials, offering flavour customization or flavour-free options, and avoiding strong, bitter, or chemical-like flavours in dental products. Pre-treatment explanations about potential taste sensations and frequent water rinses during procedures further enhance comfort, ensuring a less stressful and more accommodating experience for patients with taste sensitivities[22].

2.2.6 Smell

In a sensory-adapted dental environment, adjustments related to smell focus on reducing strong, overwhelming, or unpleasant odors that could cause discomfort, especially for individuals with sensory sensitivities. This includes using neutral-smelling or pleasant-scented products, minimizing the use of strong chemicals or cleaning agents, and ensuring proper ventilation in the treatment area[23]. Additionally, the use of air purifiers or essential oils may be considered to create a calming atmosphere. These adaptations aim to provide a more comfortable and soothing experience for patients who are sensitive to strong smells[24].

2.2.7 Dental Chair

Since pediatric dentistry is a specialty that is age-defined and should be tailored to the particular needs of newborns, kids, teens, and people with special medical problems, the pediatric dental chair needs to be comfortable for both the child and the operator. Pediatric dental chairs are quite small to accommodate children of all ages and sizes; on the other hand, traditional dental chairs are quite big for small children. As a result, either the pediatric chair's size should be raised to a specific level or the "Stay N Place Booster Seat," which lifts the patient to a comfortable height and does away with the need for time-consuming "scooting up".[27]

Some pediatric dental chairs can also be designed with specific characteristics, such as cushioned boards and papoose boards, which are frequently used to immobilize kids while they receive dental treatment. After setting the child on a level board, broad cloth straps are stretched around the child's legs, middle torso, and upper body. In order to prevent a youngster from struggling and rejecting therapy, the restraints can be applied rapidly, preventing harm to the child. The patient might have easier or better access due to the small, thin, and adjustable headrests. A movable or adjustable spittoon should be available so that patients don't have to stand or lean forward to reach. Not only can proper child patient positioning boost output, but it also improves the operator's posture, comfort, and longevity in the field[28].

Apart from these, transferring a special need individual from their wheelchair to dental chair is strenuous. UK government created a dental chair called DIACO exclusively for wheelchair patients, but the high cost and space occupied by the chair has led to further research (Diaco, 2004). The chair designed by DIACO company accommodates only disabled patients[29].

2.2.8 Restroom

Unisex accessible toilet allows Persons with Disabilities to be assisted by caretakers of the same or opposite gender with a minimum internal dimension of 86 inches * 86 inches should be present. Each restroom should have a western closet with grabrails attached to them. The toilet paper dispenser is to be present 2 inches to 8 inches above the top of the closet[30].

2.2.9 Conscious Sedation

Nitrous oxide conscious sedation is a valuable and often effective technique for managing anxiety and discomfort in children with special health care needs during dental or medical procedures[25]. This method involves the inhalation of a safe, colorless gas, commonly known as laughing gas, which helps to relax the child while keeping them awake and responsive. Nitrous oxide provides a sense of calm without inducing deep sedation, allowing the child to remain in control of their breathing and awareness[25]. It is particularly beneficial for children who may have difficulty tolerating procedures due to sensory sensitivities, developmental disabilities, or communication challenges. When administered by a trained healthcare provider, nitrous oxide has a rapid onset and wears off quickly, ensuring minimal aftereffects. This approach offers an effective way to enhance comfort, reduce fear, and improve cooperation in children with special health care needs, making medical and dental visits more manageable and less stressful[26].

2.2.10 In-House General Anaesthesia

When minimal to moderate oral sedation fails in pediatric dentistry, deep sedation or general anesthesia is often required, typically provided in hospitals at significantly higher costs and inefficiencies compared to office-based anesthesia. Studies have shown that hospital-based anesthesia can be over ten times more expensive than office-based alternatives, with longer procedure and recovery times[31]. Despite hospital operating rooms being safe, they are often inefficient, requiring pediatric dentists to bring their own supplies, dealing with scheduling delays, and facing lower priority in medical settings. While hospital treatment remains essential for some cases, office-based anesthesia with the help of a "Dental Anesthesiologist" provides a more cost-effective and time-efficient alternative, particularly benefiting underserved patients[32].

3. Conclusion

Establishing a dental clinic tailored to individuals with special health needs is a critical step toward ensuring equitable access to oral healthcare. By integrating specialized equipment, creating an inclusive and accessible environment, and fostering a team of compassionate, well-trained professionals, the clinic can address the unique challenges faced by this population.

Such a facility not only promotes improved oral health outcomes but also contributes to the overall well-being and quality of life of special patients. It emphasizes the importance of personalized care, bridges gaps in the healthcare system, and serves as

a model for inclusive dental practices. With a strong commitment to compassion and innovation, this initiative sets the foundation for transforming how dental care is delivered to those with special health needs, making a meaningful impact on the community.

Conflict of Interest Statement

The authors declare no conflicts of interest.

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