



NARRATIVE REVIEW

Comprehensive Dental Care for Children with Visual Impairment

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Abstract

Introduction: Children with visual impairment are more susceptible to acquiring pathologies in the oral cavity than the general population, the most prevalent of which are dental caries, inflammation of the gums, and loss of the structures that support the teeth. The oral health care needs of visually impaired children are needed. **Purpose:** To provide a better understanding that can guide ophthalmologists about the importance of comprehensive dental care for children with visual impairments. **Review:** Factors that respond to the need for oral health care in visually impaired children are lack of ability to carry out oral hygiene habits, lack of knowledge on the part of health personnel to provide services adapted to the needs of this population, absence of promotion and education programs, and lack of public policies on oral health. This article discusses the dental aspects of visual impairment, its implications for obtaining dental care, associated oral conditions, and medical complications. **Conclusion:** It is imperative to prioritize the implementation of preventive methods and oral health education among visually impaired children. The function of the dentist is significant in the management of children with such conditions. Ophthalmologists should collaborate with dentists who possess a strong drive to provide care for children with special needs such as visual impairment and will discover that this endeavor offers significant opportunities to be an enriching experience.

Keywords: dental care; special needs children; visual impairment; child health

Introduction

Oral health is an essential aspect of overall health and should not be neglected. Various studies stated^[1] increased gingival and periodontal diseases in the visually impaired population as compared to the normal population. For probable reasons, these children lack motor skills, proper brushing technique, and good education, rely totally on their guardians, and lack public awareness, and motivation for these children which shows a higher prevalence of dental diseases.^[2] Maintaining proper dental hygiene might be particularly crucial for children who have visual impairments, as their disability may provide challenges that hinder their capacity to effectively care for their oral health. While the functional side of the oral cavity is comprehensible to individuals, they may perceive the cosmetic component as less significant. The primary motivation for seeking dental care is likely the experience of pain. Therefore, the unmet need for oral health care remains a significant concern for this population.

Vision being one of the primary senses, is essential for understanding and interpreting the environment around us. Thus, when this sense is affected in early childhood, it has an adverse impact on the overall growth and maturation of the child.^[3] Low vision is defined as visual acuity of less than 6/18 but equal to or better than 3/60, or a corresponding visual field loss to less than 20°, in the better eye with the best possible correction. Blindness is defined as visual acuity of less than 3/60, or a corresponding visual field loss to less than 10°, in the better eye with the best possible correction. Visual impairment includes both low vision and blindness.^[4] An estimated 253 million people live with significant visual impairment; 36 million are blind and 217 million have moderate to

severe vision impairment. Most of these people reside in South Asia, East Asia, and Southeast Asia.^[5] Many of the causes of childhood blindness are avoidable, being either preventable or treatable.^[5] Blindness in children is often due to prenatal causes, developmental abnormalities, trauma, measles, neonatal conjunctivitis, retinopathy of prematurity, traditional eye medicine application, corneal scarring related to malnutrition, and Vitamin A deficiency.^[5]

India has the highest percentage of caries among blind individuals globally—60%.^[6] On the other hand, dental caries is more common than 80.6% in Indonesia.^[6] Fifty percent of the visually impaired individuals in Indonesia have an Oral Hygiene Index Score (OHI-S) that falls within the medium range, specifically with an average score of 2.3.^[6] The factors contributing to oral health issues in blind individuals include the use of cariogenic foods, the structure of their teeth, and a lack of dental health education.^[6]

The provision of preventative dental care is a crucial aspect to prioritize when addressing the healthcare needs of children with special needs, particularly those who have visual impairments.^[7] Certain adjustments to behavior management strategies may enhance the effective delivery of dental care. Furthermore, the procedures utilized in the therapy process must be tailored to meet the specific demands of individual patients.^[7]

Review and discussion

Perceptions of children suffering from visual impairments

Parents sometimes prioritize the medical needs of their children, inadvertently neglecting their oral health. Dentists have a diverse range of perspectives when it comes to the management of pediatric patients with visual impairments. While most of them consider it as a part of the service that they are expected to provide, a few believe it to be an intrusion into their otherwise normal routine. According to the study conducted by Nagarajappa et al.^[8], it was found that dentists generally exhibited a positive attitude towards delivering oral healthcare services to individuals with learning difficulties. This favorable attitude was shown to be more pronounced among dentists with advanced qualifications and previous experience in treating such patients.^[8]

The oral health status of children with visual impairments

Numerous studies have documented the unfavorable oral health conditions observed in children with visual impairments. These children had a greater prevalence of dental caries and periodontal disease, and both gingival infections and traumatic damage to the gingiva are significant oral health concerns.^[9] According to the findings of Singh et al.^[9], a significant proportion of blind children, specifically 92% in the permanent dentition

and 66% in the deciduous dentition, had dental cavities. Additionally, it was indicated that females had a higher prevalence of caries in the primary dentition, whereas the opposite was observed in the permanent dentition.^[10] In a study conducted by Al-Haddad et al.^[11], it was shown that blind individuals exhibited a decreased prevalence of dental caries, an increased susceptibility to severe accidents, and suboptimal oral hygiene practices. The main contributing factor to the suboptimal state of oral health is the individuals' limited capacity to detect initial indications of dental problems. Caries are frequently detected just upon the manifestation of a dental cavity. Dental extraction is typically performed when individuals experience dental issues, such as damage or decay in their teeth, or when they encounter accompanying dental pain. Nevertheless, this typically suggests the necessity for comprehensive intervention and therapy.^[12] Furthermore, a subset of children who have vision impairment demonstrate restricted hand-eye coordination. This hinders the development of fundamental skills related to oral hygiene maintenance, such as teeth brushing and flossing.

The dental management of children with visual impairments

Oral health care provision for children with visual impairments is confounded by the obstacles they encounter in terms of information access, physical clinic accessibility, financial limitations, and the intricate challenges presented by their medical condition. Dentists who possess a strong interest in providing dental care to children who have specific healthcare needs, particularly those with visual impairments, should strategically construct their clinic to encompass the requirements of these visually impaired children. Alterations that were made include: 1) revising the user's text to be more academic in tone and style; 2) ensuring that the rewritten text maintains the original meaning and intent; 3) avoiding the potential enhancements that can be incorporated into the standard configuration encompass; and 4) maintaining the clarity of the sections by eliminating any extraneous elements.

The dental clinic should provide a print version of the text using contrasting colors, and if feasible, include a Braille version^[8] as well.

1. Dental appointment

Since it can set the tone for subsequent sessions, the initial appointment is the most important one. It assists in getting rid of the worry and dread associated with receiving dental care for both the parent and the child. This meeting may be employed to evaluate the child's emotional state at the moment, past experiences, and developmental stage, which in turn allows the dentist to create a strategy for behavior guidance to make it easier

to provide essential dental care. Additionally, it aids in the evaluation of the children's oral health state and the degree of it, which will further assist in identifying possible dangers associated with the giving of dental care.^[13]

2. Behavior management for children with visual impairment

Children who are visually impaired might have had negative encounters with doctors including dentists due to their repeated interactions with medical specialists. We have a fear of things that are hard to see or understand. Well, it is evident that kids with visual impairments comprehend even less, and it gets harder for them to conquer these anxieties.^[14]

If a patient's concerns and phobias are not properly addressed and treated during therapy, they may demonstrate inadequate adherence to instructions, including failing to return for crucial follow-up care.^{[15],[16],[17]} Data suggests that the patient's anxiety levels may escalate or perhaps lead to the development of fear following dental injury or treatment.^{[18],[19],[20]}

These visually impaired children's behavior at the clinic typically reflects their worries and attitudes about dentistry. Adequately managing such negative behaviors early will aid in creating a favorable dental attitude towards dentistry as a whole, with major long-term benefits. Thus, behavior management is not merely the implementation of a single strategy, however, rather a collection of strategies tailored to the child's specific needs.

The first step in properly managing a visually impaired child is to develop communication and hence a rapport with the child. Communication can be either verbal or nonverbal communication. It is not just what the dental staff says, but also what the patients say. The manner they express things is also crucial. It is frequently the tone of their voice that affects these visually impaired children. However, nonverbal communication may be missed by visually impaired patients. Body posture, gestures, and facial expressions are all examples of clues as a result, they may be at a disadvantage. The dentist must communicate directly with the patient, rather than solely with the accompanying individual. The dentist ought to use euphemisms to communicate in a soothing, amicable, and non-threatening manner.

To provide emotional support to these children, they must be allowed to freely express their emotions without fear of rejection or criticism. Thus, successful effective communication is crucial in establishing trust with the patient, the healthcare provider, and the parents, thus creating an environment conducive to efficient dental care. A wide range of behavior management approaches has been documented in academic literature to effectively manage these visually impaired children's behavior. Nevertheless, children who experience visual problems may not recognize the advantages of employing these

strategies and hence there is a need to customize and combine various techniques according to the needs and acceptance of the individual patient.^[21]

Some of the techniques that can be used in clinical practice have been listed below:

A. Tell-Feel-Do technique

This is a modification behavior management technique from Tell-Show-Do. The tell-show-do technique is frequently used to introduce children to dental treatment and its importance in managing visually impaired individuals child is unquestionable. Since the 'show' component of this technique is limited or impossible these kids need to use their other enhanced senses to accustom them to dental setup. In visually impaired children, this approach becomes Tell-Feel-Do.

In this method, the dentist describes the office first. The dentist does the approach by accurately characterizing objects, instruments, and materials these children will discover.^[21] In the 'tell' component of this method, the procedure is described to the children in a manner that is simple for them to comprehend. Following that, he or she is permitted to handle the instruments as well as the substances utilized in their surgery and treatment.^[21]

After becoming acquainted with and acclimated to the dental environment, the dentist conducts the procedure identical sequence as the children were instructed absent any alteration.^[21] The Tell-Feel-Do technique is highly prevalent and largely recognized for behavior management in visually impaired children.

B. Ask-Tell-Ask procedure

Ask- Tell- Ask is a procedure in which the dentist first inquires about the child's feelings toward dentistry in general, and specifically about the proposed treatment. [Ask] This will allow the dentist to determine the source of the fear-promoting factor, common attitude, or misunderstandings of the child in the direction of dental care.

Following this, the dentist can concentrate on alleviating the apprehension or distress by providing detailed explanations of the expected procedures and engaging in non-threatening demonstrations, which are suitable for the child's cognitive development.

[Tell] The dentist may then inquire further as to whether the has sufficiently comprehended and whether or not the patient is still anxious about the forthcoming treatment and attempt to alleviate it in accordance with [Ask].

This technique has the potential to be employed with visually impaired children, in combination with the tell-feel-do technique, as well as being integrated into communicative management strategies. It not only aids in examining the impact of fear on children's emotional well-being, while simultaneously emphasizing the

importance of eradicating the subjectivity of terror and the child's delusions concerning dental treatment.^[21]

C. Contingency management

This method uses presenting and taking away "reinforcers," or things that are desired or undesirable, to help with the establishment or elimination of a behavior.^[21] Reinforcers can be social (like praise or changing your voice), material (like toys or stickers), or activity-based (like letting the child play or doing any activity of your choice).^[21]

Positive reinforcement is a method of reinforcing desired behaviors, which in turn increases the likelihood of those behaviors recurring. On the contrary, negative reinforcement is associated with the cessation of the aversive stimulus. Positive and negative reinforcement can be used in visually impaired children.^[21]

D. Distraction

The utilization of distraction as a technique for behavior management involves redirecting the attention of children away from the auditory stimuli associated with dental procedures, resulting in a reduction of anxiety. The state of being distracted can be attained by the utilization of auditory and/or audio-visual stimuli. However, auditory distraction is employed in children with visual impairments. The patient either listens to music or stories through headphones while going through a stressful process. Stark et al and Ingersoll et al have shown a reduction in uncooperative behavior with the use of audiotaped stories in their respective studies.^{[22],[23]} According to Klein and Winkelstein^[24], the act of playing familiar melodies can assist a child in overcoming a negative situation. Experience a greater sense of ease in the dental environment. Nevertheless, in children with visual impairments, hearing is one of the fundamental senses that maintains their orientation to a circumstance, it has been observed that certain children are less receptive to such methods of distraction.^[24]

E. Voice control

Voice control refers to the deliberate manipulation of vocal characteristics, such as tone, loudness, and tempo, intending to influence and direct the behavior of a patient. The procedure is conducted on children who are uncooperative and stubborn. The children may experience an increase in feelings of being overwhelmed and heightened anxiety when they find themselves unable to cope with various stressors. The individual is encouraged to mentally construct a visual representation of the surrounding environment.^[13]

F. Aversive Conditioning

Aversive conditioning is an approach that is both safe and successful in the management of highly undesirable behavior. In clinical practice, two often employed

strategies are HOME. The utilization of the "Hand-Over-Mouth Exercise" and the incorporation of physical actions. However, these techniques have no place in the management of visually impaired children as they may deteriorate their morale and exacerbate their fear.^[13]

G. Pharmacological issue

Most children can be properly managed using the aforesaid strategies. However, in some rare instances, it may be useless either because the patient lacks collaboration ability or the systemic background of the patient requires that pharmaceutical measures be used. In such instances, the use of sedation (oral/inhalational) or general anesthesia may be appropriate, depending on the cooperation of the patient and the procedures required.

Therefore, behavior management strategies are implemented to secure the essential cooperation from these children while also cultivating a favorable attitude towards the field of dentistry. This further guarantees oral health plays a key role in enhancing individuals' overall quality of life. So, behavior management makes sure that these kids will cooperate and also gives them a good attitude about going to the doctor. This also makes sure to have good oral health, which makes their general quality of life improve.

Unlike other kids, these kinds of teaching methods may need more work and time from the dentist experts because of the limits that their disability. However, once their trust is gained, they are one of the best patients to treat.^[13]

3. Definitive treatment for the visually impaired

Determining the severity of visual impairment is of utmost importance to appropriately customize information and treatment approaches. The preliminary dental assessment in children with visual impairment is crucial. A thorough medical and dental history and consultations with their physician are required to gain an understanding of the case.

The healthcare provider must acquire a comprehensive understanding of the medical situation. The role of management is to facilitate the process of planning and prevent undesirable complications arise.^[13]

In conjunction with the required radiographs, the intraoral examination frequently provides the dentist with an assessment of the child's oral health, which facilitates treatment planning. Since preventing oral disease is the most effective way to guarantee good dental health, children with visual impairments require an effective preventive strategy. This is especially vital given that these children were unable to perceive the predisposing factors as well as the early signs of dental disease. A potent preventive measure should include oral health and dietary counseling, dental health education, proper application of fluoride, and placement of preventive resin restorations and sealants followed by regular recall and

follow-up appointments. With the aid of diet diaries and diet charts, their diet should be evaluated critically, and a suitable diet plan must be developed to ensure adequate nutrition and eliminate the potential for caries development. The guardians, instructors, the parents should receive an education regarding the necessity of maintaining proper oral hygiene.

Dentists should have the ability to illustrate proper teeth brushing, flossing, and tongue cleaning methods to both children and all individuals involved in their oral healthcare.^[25] In contrast to those with normal vision, blind children rely on all of their other senses for perception and navigation. In addition to visual perception, other sensory modalities contribute to the process of learning. Therefore, it is necessary to integrate various sensory modalities and cultivate their sustained retention, it is imperative to utilize them in the training to maintain their oral hygiene. Numerous educational aids in the form of models, rhymes, braille, etc. have been utilized for the education and training of visually impaired children.^[12]

Methods can be custom-designed according to individual patient needs and at the same time stay rooted to the basic principles.^[12] Upon evaluation of the patient's need, fluorides may be applied systemically or topically. Regardless of their systemic consumption via an oral or dietary supplement, a topical treatment (dentifrices, lubricants, varnishes, or rinses) is invariably advantageous for the prevention of caries.^[19] In planning treatment for children with visual impairment, there are no shortcuts because of how hard it is for them to keep their dental visits. It's always better to do pulpotomy or pulpectomy instead of pulp-capping methods that aren't as solid.

All the details restorations like caps made of stainless steel should be chosen over multiple surface repairs. Putting out fluoride things like glass ionomer types of cement can be used in both ways to avoid and treat problems in visually impaired children. It has been observed that children with visual impairments are more susceptible to anterior teeth trauma, with increased over-jet or deficient lip coverage being the primary risk factors. Consequently, the identification of these risk factors is imperative and early orthodontic intervention is implemented promptly after treatment is administered. Thus, an all-encompassing treatment approach including effective behavior management and therapeutic efficacy, protocols should be developed for the effective dental management of children with visual impairments.^[26]

Conclusions

The sense of vision plays a crucial role in enabling a kid to perceive and recognize their environment. Assessing the capacities of children with blindness might provide challenges, potentially leading to the

perception of developmental delays in some cases. To mitigate the impact of oral health diseases on individuals with visual impairment, it is imperative to prioritize the implementation of preventive methods and oral health education. The function of the dentist is significant in the management of children with such conditions. Ophthalmologists should collaborate with dentists who possess a strong drive to provide care for children with special needs such as visual impairment and will discover that this endeavor offers significant opportunities to be an enriching experience.

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