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Comprehensive dental management of visually impaired children: A brief review

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Abstract

Vision is one of the primary senses that help a child construe his/her environment during the early years of life, the absence of which may have damaging effects on their overall development. Oral health care needs of visually impaired children are often overridden by the focus on their medical rehabilitation. However, with the current understanding of the fundamental role played by dental health in the maintenance of general health of an individual, it becomes all the more important to provide access to dental services whenever mandated. The dental management of visually impaired children is not very different from that of an otherwise healthy child. With certain modifications in the behavior management and therapeutic techniques the necessary treatment can be provided to them with ease. The pediatric dentist plays an unmatched role in implementing their knowledge and skills to provide comprehensive and quality dental care to this proportion of the population.

Keywords: Behavioral Management, Dental Care, Special needs children, Visual Impairment.

Introduction

Individuals with disabilities constitute a considerable fraction of the population as a result of factors such as population increase, ageing, and medical advances that preserve and prolong life.[1] The contemporary concepts view disability as an umbrella term for impairments, activity limitations and participation restrictions.[2, 3]

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. [4] '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.[3, 5] 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.[6] Many of the causes of childhood blindness are avoidable, being either preventable or treatable. Blindness

in children is often due to prenatal causes, developmental abnormalities, trauma, measles, ophthalmia neonatroum, retinopathy of prematurity, traditional eye medicine application, corneal scarring related to malnutrition and Vitamin A deficiency.[7-9].

Oral health is now recognized to be an integral part of the overall health of an individual which in turn has a direct impact on their well-being and quality of life. It is all the more important for children with visual impairments as they are sometimes unable to maintain adequate oral hygiene owing to their disability. Though they understand the functional aspect of oral cavity, the aesthetic part is less relevant to them and pain is probably the main factor for seeking dental care. Thus, oral health care continues to be one of their greatest unattended needs.[10, 11]

One of the most important factors to be emphasized upon while treating children with special health care needs including those with visual impairments is their access to preventive dental care. Certain modifications to behavior management approaches may further facilitate the successful provision of dental treatment. Also, the techniques employed in treatment should be customized according to patients' needs.[10, 12]

Attitudes towards Children with Visual Impairments

Children with visual impairments often face rejection from their peers and society. Their parents especially mothers encounter numerous stresses while bringing them up. These range from the emotional bearing created by the child to the physical liability of taking care of such children.[1] The parents focus on the medical needs of the child and the oral health is often ignored. Dentists exhibit a varied attitude towards managing children 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. Nagarajappa et al reports that the overall attitude of dentists towards provision of care for people with learning disabilities was favorable, which increased with higher qualification and past experience.[13]

Barriers towards Access to Dental Care.

The visually impaired children face numerous barriers to access adequate dental care. [10, 14-16] While a few are related to their medical condition, others are related to the attitudes toward provision and reception of treatment by the dentists, parents and the children themselves. It has been seen on numerous instances that the dentists are not willing to incorporate such children into their daily practice. This is primarily due to the lack of adequate education or training both at the undergraduate and post graduate level. Also, the architectural and physical barriers of the dental clinic pose as secondary factors in facilitating dental treatment to these children. Financial constraints, lack of motivation and general neglect of oral health care needs by the parents and the institution are the other obstacles in obtaining necessary dental care for these children. Moreover, the inherent fear towards dentistry and difficulties in expressing dental problems prevent the children from demanding dental care.

Oral Health Status of the Visually Impaired Children

Many studies have reported poor oral health status amongst children with visual impairments. These children demonstrated a higher incidence of caries, periodontal and gingival diseases as well as traumatic injuries to the teeth.[15, 17-23] Singh et al, reported that 92% of the blind children manifested dental caries in the permanent dentition while it was 66% in the deciduous dentition. They also stated that females had more caries prevalence in the primary dentition while it was vice versa in the permanent dentition.[23] Al- Alousi et al, reported that the blind subjects in his study had a low prevalence of dental caries, increased predisposition to traumatic injuries, poor oral hygiene and extensive unmet needs for dental treatment.[24] Tagelsir et al found a poorer oral hygiene status among the visually impaired children who were

institutionalized when compared to the non-institutionalized children. He also stated that children with a higher caries experience were more likely to report an oral health related impact on quality of life.[16] However, visually impaired children had better oral hygiene status when compared to children with other disabilities.[25, 26]

The primary reason for such a poor oral health status is their inability to visualize early signs of dental disease.[18] They often detect caries only when there is a 'hole' in their teeth or when there is an associated pain. However, this usually indicates the need for extensive treatment and any early intervention may not be possible at this stage. In addition, some children with visual impairment exhibit limited hand to eye coordination. This limits the acquisition of basic oral hygiene maintenance skills like tooth brushing and flossing.

Dental Management of Visually Impaired Children

Provision of oral health care in visually impaired children is complicated by the barriers they face in terms of access to information, physical access to the dental clinic, financial constraints and the complex problems posed by their medical condition. [10, 27]

Dentists who are keen on treating children with special health care needs including those with visual impairments should design their clinic in such a way that it incorporates the needs of such children. Some of the modifications/ additions that can be made to the normal set-up include keeping the passages clear of clutter without any loose rugs, incorporating handrails along the passage ways, avoiding flashy lights and putting up pamphlets in large print, contrasting colours and in Braille, if possible.

1. First dental appointment

The first appointment is the most crucial one as it can set the stage for future appointments. It helps in eliminating the fear and anxiety towards dental treatment both for the child as well as the parent. This appointment can be utilized to assess the child's developmental status, past experiences, and current emotional state which in turn enables the dentist to formulate a behavior guidance plan to facilitate the provision of necessary oral health care.[28] Moreover, it helps in the assessment of the medical condition of the child as well as its severity which will further help identify potential risks involved during the provision of dental treatment.

2. Behavior Management techniques for the visually impaired

The visually impaired children may have had numerous experiences with health care professionals which may adversely affect their attitude towards dentistry. We have a fear of things that is difficult to understand or see. It is obvious that the visually impaired children understand even less and it becomes more difficult for them to overcome these fears.[14] Their fears and attitude towards dentistry is often reflected in their behavior in the operatory. Adequate management of such negative behaviors at an early stage will help in instilling a positive dental attitude towards dentistry as a whole and will have significant long term benefits. Thus, behavior management is not simply the application of a single technique but, a combination of techniques, customized according to the individual needs of the child.

The first step in adequately managing a child with visual impairment is establishing communication and thus, a rapport with the child. Communication can be verbal or non- verbal. It is not just what the dental staff says, but the way they say is also important. It is often the tone of their voice that makes an impact on the child. However, visually impaired patients may not pick up non-verbal cues such as body posture, gestures or facial expression and hence may be at a disadvantage.[8] It is of paramount importance that the dentist speaks directly to the patient and not only to the person accompanying him/ her. The dentist should speak in a calm, pleasant and non-threatening way, making use of euphemisms whenever

possible. Emotional support should be offered to these children by permitting them to express their feelings without any rejection or criticism. Thus, an effective communication will help gain the trust of both the patient and parent thereby paving the way for effective dental management.

Numerous behavior management techniques have been reported in literature for the management of children. However, children with visual impairments may not benefit from all these techniques and hence there is a need to customize and combine various techniques according to the needs and acceptance by the individual patient. Some of the techniques that can be used in clinical practice have been listed below;

a) Tell- Feel- Do

Tell-show-do technique is a popular and an effective approach in orienting any child to new elements of dental treatment and its value in managing a visually impaired child remains undisputed. Since the 'show' component of this technique is greatly limited/ even impossible with these children, it is necessary to incorporate the use of their other heightened senses to familiarize them to the dental set-up. Hence, in visually impaired children this technique is modified as 'Tell-Feel-Do'. In this technique, the dentist first paints a picture of the office setting and the treatment by adequately describing the objects, instruments and materials that the child will be exposed to. The 'tell' component of this technique involves explaining the procedure to the child in a way he can easily understand. He/she is then allowed to feel the instruments and materials used in their examination and treatment. Once they are familiarized and adapted to the dental environment, the dentist performs the procedure in the exact same sequence like it was explained to the child without any deviation.[14] The Tell- Feel- Do technique is still one of the most widely used and accepted techniques for the behavior management of visually impaired children.

b) Ask- Tell- Ask

Ask- Tell- Ask is a technique in which the dentist first enquires about the child's feelings towards dentistry in general and about the planned treatment in particular (Ask). This will enable the dentist to identify the fear promoting factor, the general attitude or misconceptions of the child towards dental treatment. The dentist can then focus on eliminating the associated fear or anxiety by explaining the anticipated procedures through demonstrations in a non-threatening way which is appropriate to the cognitive development of the child (Tell). Following this, the dentist can further enquire if the child has adequately understood and if he or she is still apprehensive about the impending treatment and resolve it accordingly (Ask).[29] This technique can be used in visually impaired children in conjunction with the tell-feel-do technique as well as a part of communicative management. It not only helps in the management of fearful children but also focuses on eliminating the subjective fear and the delusions that the child has regarding dental treatment.

c) Contingency Management

This technique focuses on the presentation / withdrawal of desirable or undesirable stimuli, also known as 'reinforcers' to facilitate the establishment or elimination of certain behaviors. The reinforcers can be social (praise, voice modulation), material (toys, stickers) or activity (allowing the child to play or performing any activity of his/her choice). Contingency management encompasses the following techniques such as positive reinforcement, negative reinforcement, omission or time-out and punishment. Positive reinforcement rewards desired behaviors and hence strengthens the recurrence of such behaviors. Negative reinforcement on the other hand is involved with the withdrawal of the unpleasant stimulus

which further reinforces the desired behavior. Positive and negative reinforcement can be used in visually impaired children.

However, in time-out or omission and punishment the pleasant stimulus is withdrawn to establish good behavior of the child. Visually impaired children cannot visualize the scenario nor have the sufficient reasoning power to understand the fact that the dentist is trying to help him overcome his fear. Hence, such methods should be avoided as they may cause more harm than benefit in such children and may worsen his/her fear.

d) Distraction

Distraction is a method of behavior management where the children are distracted from the sounds of dental treatment thereby reducing anxiety.[30] Distraction can be achieved using audio and/or audio-visual aids. However, in visually impaired children, audio distraction is applied. During audio distraction, the patient either listens to music or stories through headphones during a stressful procedure. Stark et al and Ingersoll et al have shown reduction in uncooperative behavior with the use of audiotaped stories in their respective studies.[30, 31] Klein and Winkelstein suggested that playing familiar songs, enables the child to overcome an unpleasant situation and feel more comfortable with the dental environment.[32] However, in visually impaired children since hearing is one of the primary senses that keep them oriented to a situation, it has been seen that some children are less receptive to such distraction techniques.

e) Voice Control

Voice control is a purposeful variation of the tone, volume and the pace of voice to guide and direct the patient's behavior.[29] Even though this technique is commonly performed in uncooperative and stubborn children to assert authority, the visually impaired children may tend to get overwhelmed and more anxious as they cannot visualise the scene around them.

f) Aversive conditioning

Aversive conditioning is a safe and effective method of managing extremely negative behavior. The two common methods that are used in clinical practice are; HOME (Hand- Over- Mouth- Exercise) and use of physical restraints. However, these techniques have no place in the management of visually impaired children as it may deteriorate their morale and exacerbate their fear.

g) Pharmacological techniques

Most children can be effectively managed using the aforesaid techniques. However, in some rare scenarios it may be ineffective either due to the fact that the patient lacks cooperation ability or the systemic background of the patient demands that pharmacological means be used. In such situations, the use of sedation (oral/inhalational) or general anesthesia may be justified, depending on the compliance of the patient and the procedures required.

Thus, behavior management ensures the necessary cooperation from these children and at the same instils a positive outlook towards dentistry. This further ensures good oral health thereby improving their overall quality of life. Unlike other children such guidance techniques may require greater effort and time from the dental professionals owing to the limitations posed by their disability. However, once their trust is gained, they are one of the best patients to treat.

3. Definitive treatment for the visually impaired

It is critical to establish the degree of visual impairment so that information and treatment can be tailored accordingly. The initial dental examination of a visually impaired child is like any other healthy child. A thorough medical and dental history along with consultations with their physician is mandatory to obtain an insight into the case management, aid in planning and to avoid unwanted complications.[8] The intraoral examination coupled with the necessary radiographs often gives the dentist an idea

about the oral health status of the child thereby facilitating treatment planning.

As preventing oral disease is the most desirable approach towards ensuring good dental health, an effective preventive strategy is essential for children with visual impairments. This is all the more crucial as these children cannot visualize the predisposing factors as well as the early signs of dental disease. An effective preventive protocol should encompass diet counselling, oral health education, adequate fluoride application, placement of preventive resin restorations and sealants followed by a regular recall and follow up appointments.

Their diet should be critically assessed with the help of diet charts and diet diaries and an appropriate diet plan must be formulated to ensure adequate nutrition as well as eliminate the risk of developing caries. The parents/ caregivers, teachers and wardens of special schools as well as the children themselves should be educated regarding the need for adequate oral hygiene maintenance. Dentists can demonstrate tooth brushing, flossing and tongue cleaning techniques to the children as well as to all the individuals who are involved in their care .[17, 21] Unlike their sighted counterparts, a blind child depends on all the other senses except vision to learn. Hence, it is necessary to incorporate these senses while training them 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.[4, 12, 18, 33-35] Methods can be custom designed according to individual patient needs and at the same time stay rooted to the basic principles. [12] Fluorides can be administered both topically and systemically after assessing the need for the same. Irrespective of their systemic intake through water or other foods, a topical regimen (dentifrices, gels, rinses or varnishes) is always beneficial in the prevention of caries.[36, 37] Pit and fissure sealants have been shown to reduce occlusal caries effectively. Patients with visual impairment may benefit from such sealants as they reduce the risk of caries in susceptible pits and fissures of both primary and permanent teeth.

In planning treatment for a child with visual impairment, there is no room for shortcuts as the difficulty in reporting for repeated dental appointments needs to be considered before addressing a specific dental problem. It is always beneficial to perform pulpotomies or pulpectomies rather than less reliable pulp-capping procedures. Full coverage restorations like stainless steel crowns should be opted over multi-surface restorations. Fluoride releasing materials like glass ionomer cements are useful as both preventive and therapeutic approaches in children with visual impairment.

It has been seen that visually impaired children are prone to anterior teeth trauma and the risk factors primarily include an increased over-jet or inadequate lip coverage. This necessitates the identification of these risk factors and a timely intervention in the form of early orthodontic treatment. Thus, a comprehensive treatment strategy encompassing adequate behavior management and therapeutic protocols should be devised for the effective dental management of children with visual impairments.

Conclusion

Vision is one of the senses that help the child identify his/ her surroundings. As the capabilities of a child with blindness are difficult to assess, these children may sometimes be considered to be developmentally delayed. Preventive strategies and oral health education should be given priority to reduce the burden of oral health disease over their already existing medical condition.

The pediatric dentist has an enormous role to play in the management of such children. Dentists who are motivated to treat children with special health care needs will find it to be a very enriching and rewarding experience.

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