Review Article

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Management of Hearing Impaired Children in Dental Clinic

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Abstract

Special children pose challenge to pediatric dentist. Each child is different and the treatment plan should be suitably modified. Hearing impaired children present a unique communication hurdle, thus making both the dentist and child in an arduous situation. Health care provider's especially pediatric dentist should be aware of the strategies to efficiently manage such children in dental clinic. Thus, this review in an attempt to provide an insight into the causes and types of hearing impaired children and blueprint to impart quality treatment to such children.

Keywords: Hearing impaired; sign language; communication barriers dentistry.

Introduction

"Hard of hearing" is used to describe people with hearing loss ranging from mild to severe. At times, sounds (such as speech) are heard but not clearly understood. Such people usually communicate through spoken language and may benefit from hearing amplification with hearing aids and cochlear implants.

Deaf children are those with severe or profound hearing loss, which implies very little or no hearing. Hearing devices, such as cochlear implants, may help them to hear and learn speech. In learning to communicate, such children may benefit from visual reinforcement, such as signs, cued speech and lip reading. [1,2]

Age of onset: Children develop language in the early years of life. The impact of hearing loss on the development of spoken language is greatest in those who are born with hearing loss or develop it soon after birth.[3]

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Degree of hearing loss: Hearing loss may range from mild to profound. The greater the severity, the greater the impact.[4]

Epidemiology

Total hearing loss affects 1.8 million people, and there are 14 million hearing impaired individuals in the United States.

About 1 in 600 neonates have congenital hearing loss. During the neonatal period, many more acquire hearing loss from other associated conditions.

Etiology

The following are known causes of hearing loss:

1. Prenatal factors
   - Viral infections, such as rubella and influenza
   - Ototoxic drugs, such as aspirin, streptomycin, neomycin, kanamycin
   - Congenital syphilis
   - Heredity disorders (e.g., Alport, Arnold-Chiari, Crouzon, Hunter, Klippel-Feil, Stickler,

   Treacher Collins, and Waardenburg syndromes)
2. Perinatal factors

- Toxemia in pregnancy
- Prematurity
- Birth injury
- Anoxia
- Erythroblastosis fetalis

3. Postnatal factors

- Viral infections, such as mumps, measles, chickenpox, influenza, poliomyelitis, meningitis
- Injuries.[5]

Types of Hearing Loss

A. Conductive Hearing Loss
   Outer or middle ear involvement of the conduction pathways to the inner ear.
B. Sensorineural Hearing Loss
   Damage to the sensory hair cells of the inner ear or the nerves that supply the inner ear.
C. Mixed Hearing Loss
   Combination of conductive and sensory hearing loss
D. Central Hearing Loss
   Damage of the nerves or the nuclei of the central nervous system in the brain or the pathways to the brain.

- Kumar S et al. concluded that children with hearing impairment have poor oral hygiene and high levels of periodontal disease. This may be due to a lack of communication; hence, appropriate oral health education should be tailored to the needs of these students with the support of their teachers and their parents.[4]
- Sandeep V et al. concluded that visual instruction was found to be an effective oral health education tool in Children with Hearing Impairment (CHI).[6]
- Pareek S et al. concluded that the program of teacher and parent supervised tooth brushing with fluoride toothpaste can be safely targeted to socially deprived communities and can enable a significant reduction in plaque and gingival scores. Thus, an important principle of oral health education is the active involvement of parents and caregivers.[7]

Implications of Auditory Disability Relative to International Standards Organization (ISO).[8]

ISO	DISABILITY	SPEECH COMPREHENSION	PSYCOLOGICAL PROBLEMS IN CHILDREN
0 decible	Insignificant	Little or no difficulty	None
25 decible	Slight	Difficulty with faint speech; language and speech development within normal limits.	Child may show a slight verbal deficit.
40 decible	Mild-moderate	Frequent difficulty with normal speech at 3 feet (91.4cm); language skills are mildly affected.	Psychological problems can be recognized.
55 decible	Marked	Frequent difficulty with loud speech at 3 feet (91.4 cm) difficult understanding with hearing aid in school situation.	Child is likely to be educationally retarded, with more pronounced emotional and social problems then in children with normal hearing.
70 decible	Severe	May understand only shouts or amplified speech at 1 foot (30.5 cm) from ear.	The prelingually deaf show pronounced educational retardation and evident emotional and social problems.
90 decible	Extreme	Usually no understanding of speech even when amplified; child does not rely on hearing for communication.	The prelingually deaf usually show severe intellectual disability and emotional underdevelopment.

How speech and psychological problems relate to various degrees of hearing loss.

Communication Methods

Auditory-verbal therapy is a method of teaching deaf children to listen and speak using their aided, residual hearing.

Cued speech is a form of visual communication that combine mouth movements with cues in order to help distinguish different phonemes.

Auditory-oral therapy, like auditory-verbal therapy, focuses on teaching deaf children to speak using their aided residual hearing; however, there is more of a focus on speech reading and contextual cues.

Sign language uses manual communication and body language to convey meaning, as opposed to sound patterns.[9]

Dental Management of Hearing Impaired Child

The following should be considered in the treatment of a hearing-impaired patient:

1. Prepare the patient and parent before the first visit with a welcome letter describing what is to be done and including a medical history form.
2. Let the patient and parent determine, during the initial appointment, how the patient desires to communicate (i.e., interpreter, lip reading, sign language, note writing [for child who can read], or a combination of these). Look for ways to improve communication. It is useful to learn some basic sign language. Face the patient and speak slowly at a natural pace and directly to the patient without shouting. Exaggeration of facial expressions and the use of slang make lip reading difficult. Even the best lip-readers comprehend only 30% to 40% of what is said.
3. Assess speech, language ability, and degree of hearing impairment when taking the patient's complete medical history. Identify the age of onset, type, degree, and cause of hearing loss, and determine whether any other family members are affected.
4. Improve visibility for communication. Watch the patient's expression. Make sure the patient understands what the dental equipment is, what is going to happen, and how we will feel. Have the patient use hand gestures if any problem arises. If appropriate, write out and display information.
5. Reassure the patient with physical contact; hold the patient's hand initially, or place a hand on the patient's shoulder while maintaining eye contact. Explain to the patient in case you want to leave the room.
6. Use the tell-show-feel-do approach. Use visual aids and allow the patient to see the instruments, and demonstrate how they work. Hearing-impaired children may be very sensitive to vibration.
7. Display confidence; use smiles and reassuring gestures to build up confidence and reduce anxiety. Allow extra-time for all appointments.
8. Avoid blocking the patient's visual field, especially with a rubber dam.

Fig. 1: Hearing device

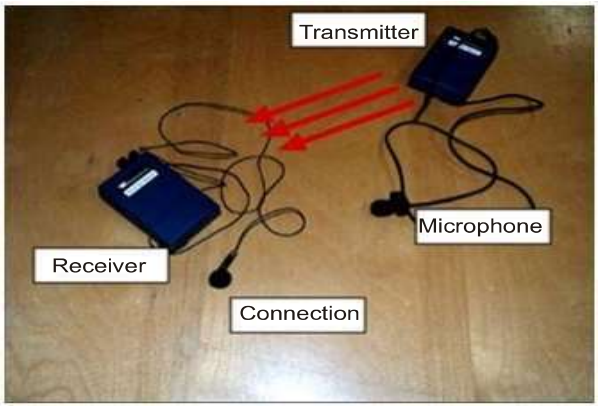

Fig. 2: FM radio system

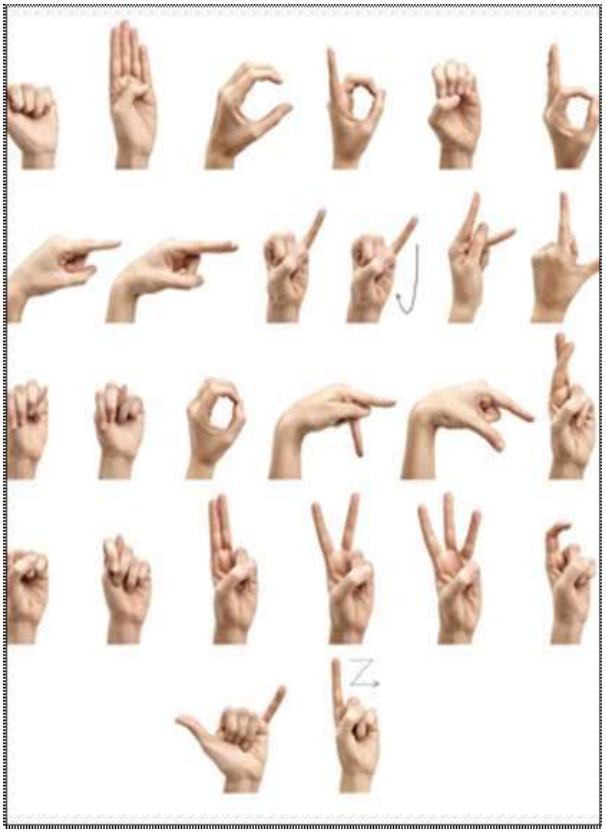

Fig. 3: Sign language

9. Adjust the hearing aid (if the patient has one) before the hand piece is in operation because a hearing aid amplifies all sounds. Prefer to remove it or turn off the same before working with hand piece
10. Otitis media can often be treated and reversed by medical or surgical means.[10,11]

Conclusion

Performing dental treatment for a hearing impaired child is mainly dependant on communication between the operator and child. Thus, the dentist should be well versed with the methods to employ good rapport with such children. As it is very well said "My is my Ear and My hand is My Mouth"; learning sign language is essential to deliver the quality treatment of hearing impaired children

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