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Involve ment of parents of children with hearing impairment in care and maintenance of hearing aids

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Abstract

Parents' involvement is very crucial for their children's all-round development. The parents of children with hearing impairment play an effective role in the development of language, speech, curricular and co-curricular activities, care and maintenance of hearing aids of their children at home. This paper focuses on parents' need to take care and maintenance of hearing aids for their children with hearing impairment. This further emphasizes that the parents should know the various types of hearing aids and their parts, tips to take care and maintenance regarding hearing aids for the betterment of their children's hearing health.

Keywords: Children with hearing impairment, hearing aids, care and maintenance

Introduction

Childhood hearing loss affects approximately 34 million children worldwide (World Health Organization 2020). Diagnosis is often not anticipated by parents, and for many, hearing loss is identified in childhood through neonatal hearing tests and hearing aids provided shortly thereafter. Timely and consistent access to sound through suitable hearing aids is critical to speech development (McCreery, Bentler, and Roush 2013; Ching and Dillon 2013) ^[10, 3]. However, parents often find it difficult to learn how to use hearing aids and to implement important daily routines for constant maintenance and use of the devices. Education that helps parents learn new information and gain confidence in their role is an essential component of the intervention.

Parents of children with hearing impairment experience different levels of difficulty, depending on their barriers, managing hearing aid use and monitoring device operation. Parents reported a number of problems, such as frustration with wearing hearing aids and lack of confidence in knowing how to handle hearing aids, and indicated they wanted more learning support (Muñoz, Preston & Hicken 2014; Muñoz *et al.* Al. 2016, 2019) ^[14, 15, 12]. Hours of use of hearing aids vary widely among young deaf children, generally falling follow the recommendations (Muñoz *et al.* 2015; Walker *et al.* 2013; Jones and Launer 2010) ^[13, 22, 8] and parental reports often overestimate them registration (Walker *et al.* 2015) ^[21]. This is worrying because research has found that children speak better when they wear hearing aids 10 or more hours a day (Tomblin *et al.* 2015) ^[20].

Several factors are likely to contribute to parents' difficulty handling hearing aids in their daily routine. Hearing education is often provided when parents experience difficult emotions (Kurtzer-White and Luterman 2003) ^[9], raising considerations for parents to remember information later (Watermeyer, Kanji and Cohen 2012) ^[23] and this can negatively affect your ability to transmit information to other caregivers. It is also important to recognize that behavior change can be difficult. Even when change is desired, people can experience barriers that derail their ability to act upon intervention recommendations or persist in the face of difficult situations (Rollnick, Miller & Butler 2008) ^[18].

Hearing Aid

In this section, we try to understand the meaning, types and parts of hearing aids.

Meaning of Hearing Aid

In spite of the great variety of types, designs and technical features, hearing aids can all be described as small, wearable electronic devices which enable a person to hear sounds better

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and understand speech more clearly, providing an overall improvement in communication ability.

Types of Hearing Aid

Actually, there are mainly two types of amplification

devices that children with hearing impairment are used. One is individual amplification devices and another is group amplification devices. Here, we will understand the types of individual amplification devices as shown in Figure-2.1.



Fig 1: Types of Hearing Aids

Let us see the meaning of hearing aids in terms of Body level, BTE, CIC, ITC and ITE.

- i) **Body Level Hearing Aid:** A type of hearing aid that comprises a rectangular case carried on the body connected by cords to ear moulds. A body level hearing aid is generally reserved for the most severe hearing losses. It is not often used and is the least common style of hearing aid today.
- ii) **Behind-The-Ear Hearing Aid (BTE):** Behind-The-Ear (BTE) hearing aid consists of a hard plastic case that fits behind the ear and connects to a plastic mould that fits inside the outer ear. The electronic parts are stored in the case behind the ear. Sound travels from the hearing aid through the ear mould to the ear. These hearing aids are used by people of all ages for mild to profound hearing loss.
- iii) **Completely-in-canal (CIC) Hearing Aid:** CIC is the smallest of all the hearing aid choices and different than other possibilities because they are custom-fitted to the inside of the ear canal to amplify sounds in persons with mild to moderately severe hearing losses.
- iv) **In-the-canal (ITC) Hearing Aid:** This hearing aid is custom-designed to fit in the ear canal. ITC protrudes slightly into the outer ear and so is visible. In-the-canal (ITC) hearing aids are appropriate for mild to moderate hearing losses but not for infants or young children.
- v) **In-the-ear (ITE) Hearing Aid:** All the parts of this type of hearing aid are contained in a shell that fills in the outer part of the ear. ITE hearing aids are larger than the in-the-canal and completely-in-the-canal aids and for some people may be easier to handle than smaller aids.

Parts of Hearing Aid

Every hearing aid has four main parts

- i) The **battery** provides the power to the hearing aid.
- ii) The **microphone** picks up sound waves and changes them into electrical signals. It is usually on the top of the BTE hearing aid where the hook meets the hearing aid case.
- iii) The **amplifier**, inside the hearing aid case, makes the electrical signal larger and sends it to the receiver.
- iv) The **receiver**, inside the hearing aid case, changes the electrical signal back into larger (or amplified) sound waves which are sent down the ear canal into the ear. The receiver is like a tiny loud speaker.

Other parts of a hearing aid

The on or off switch (M-T-O) turns the hearing aid's microphone on and off. M is for the microphone and means that the hearing aid is on. O is for off and means the hearing aid is off. Many aids have a setting marked T which stands for telecoil. The T switch is used with telephones or other special equipment. The hearing aids of children should be set on M so they can hear the sounds around them. The volume switch controls loudness. In some hearing aids, the volume is controlled by a wheel with numbers. The volume increases as the number increases. The audiologist or dispenser will tell you which volume or number to use. Sometimes, the audiologist or dispenser will set the volume on the hearing aid and put a cover over the volume control to make sure the hearing aid stays at that level. The ear mould on a BTE is the part that fits in the ear. It directs sound into the ear and helps hold the hearing aid in place. The ear mould is custom-made to fit the shape of your child's ear. This helps to stop feedback (squealing or sounds). A good fit is very important, so new ear moulds must be made as your child grows. The hearing aid hook connects the ear mould to the hearing aid case on a BTE hearing aid. Ear mould tubing is part of the ear mould and connects the ear mould to the hearing aid hook. The battery compartment of the BTE hearing aid is usually near the bottom of the hearing aid.

Tips for Parents to take Care and Maintenance of Hearing Aid

As a parent of a hearing-impaired child, caring for your child's hearing aids automatically becomes part of your daily ritual. In addition to the hygienic aspect, the protection of these valuable devices also prevents damage and allows them to have a longer life cycle.

Clean your child's hearing aid daily

Clean the case with a lint-free cloth or use the toothbrush included in the hard case of the hearing aid. Detergents, alcohol and soaps should never be used for cleaning. It is recommended to clean the ear moulds with water only when they are disconnected from the hearing aid.

Protect the hearing aids against extremely low and high temperatures

Extreme temperatures can damage the internal components

of a hearing aid. Therefore, avoid prolonged exposure to colder climates and heat sources such as hair dryers, stoves, stoves, open flames, hot cars, and even direct sunlight.

Don't let your child swim or shower with the hearing aid

Your child's hearing aids are water and dust resistant. However, hearing aids usually have some level of water resistance. For example, with the IP68 rating of Phonak Sky V hearing aids, it means they can be submerged in water to a depth of 1 meter for 60 minutes. However, prolonged periods of continuous immersion in water result in high humidity and water condensation, which over time damages electronic components.

Keep your child's hearing aid away from dirt

Ensure you and your child has clean fingers when touching the hearing aid, so that the tiny microphone input does not get blocked with dirt.

When applying hair spray, the hearing aids should be removed

This is especially useful advice for teenagers. Sprays and other cosmetic items can damage the devices, so they should always be removed before use.

Store and ventilate the hearing aids in a safe place when not in use

Before going to bed, store the aids in their storage box, remove the batteries, and open the battery door for some overnight ventilation. If your child is old enough, get into the habit of doing this task every day.

Keep batteries and devices out of reach from babies, toddler and dogs

Younger children and dogs are very curious, and small batteries and aids often end up in their mouths and hands. In fact, one of the most common hearing aid accidents is when a pet thinks it's lunch. Therefore, in addition to getting hearing aids with tamper-proof battery holders and mini ear hooks for younger children, it is important that the hearing aids and their batteries are always kept in a safe place.

Avoid dropping the hearing aids

Yes, this is definitely a strict rule when it comes to children. Even as shell materials become more and more robust, hearing aids can still be damaged if they hit hard surfaces. While cleaning or changing the batteries, hold the hearing aids over a soft surface. Explain to your child the importance of taking good care of their devices and attach them to a pediatric clip to hold them in the ears.

Consider to get a hearing aid dehumidifier

Children tend to lead much more active lives than adults: they play at school, take sports lessons or jump in muddy puddles. Therefore sweat, humidity from their surroundings and ear wax build-up moist, which can easily be removed by a dehumidifier.

Visit the hearing care professional regularly

Visiting a hearing care professional on a regular basis offers some advantages: As a parent, you can be confident that your hearing aids are properly checked and cleaned, prolonging their life, and that a professional can answer

your questions.

Parents of children with hearing impairment should know the above tips and follow it with their children's hearing aids to keep it for long time usability.

Troubleshooting Guide for BTE Hearing Aid

Problem	Possible causes
Hearing aid whistles or squeals when child is wearing it	Ear mould not placed in ear properly Volume turned up too high Crack in ear mould tubing Ear mould too small Problem with connection between hook and hearing aid Wax build-up in ear or ear mould
Hearing aid seems weak	Weak battery Ear mould plugged with wax Ear hook blocked Tubing twisted or partly blocked Hearing aid needs repair
Hearing aid seems dead	Dead battery/no battery Battery incorrectly inserted Ear mould plugged On/off switch turned to O or T Ear hook blocked Hearing aid needs repair
Hearing aid sound is not clear	Corrosion on battery or in battery compartment On/off switch turned to T Dirt or dust in volume wheel Dirt or dust on microphone Hearing aid case cracked
Hearing aid sound goes on and off	On/off switch not working properly Battery is weak Hearing aid needs repair

Conclusion

Parents of hearing-impaired children are continually faced with the problem of obtaining and maintaining the most optimal performance from their child's hearing aids. The importance of adequately functioning hearing aids in a child's aural habilitation program has been well documented. Though there has been only limited research investigating the monitoring skills of parents and the effectiveness of parent training, the present paper indicates that parents can be effective in monitoring the function of the hearing aids worn by their hearing-impaired children.

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