PREFACE

Government of India, Ministry of Social Justice and Empowerment has been instrumental in dispensing various aids and appliances including hearing aids under the ADIP (Assistance to Disabled persons for purchase/fitting of aids/appliances) since 1995. NIEPMD is the first National Institute to distribute Behind the Ear (BTE) Hearing Aid. Since January 2014 for the beneficiaries having a monthly income of less than Rs. 15,000/- are eligible to get free of cost aids and appliances under this scheme.

This book deals with the troubleshooting of Hearing Aids. This book provides pictorial representation of explaining various problems occurring in the body level and behind the ear analog hearing aids.

This book aims to give orientation for electronic technicians and audiologist the basic concept of hearing aid troubleshooting and maintenance.

We wish to express our profound thanks to Shri. Suresh J Pilla & Shri. M.V. Gowrishankar who helped in expressing ours concept.

Any further suggestions for the improvement of the book is welcomed.

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Troubleshooting Hearing AID

Message from the Director

Hands that serve are greater than lips that pray.

Dr Neeradha Chandramohan

As per the 2011 Census 5071,007 persons are having hearing impairment (HI) of which 2677544 are males and 2393463 are females. Out of this the auditory needs of about 45% of the clients can be addressed through hearing aids. Now, this is a major issue which needs to be tackled and intervened at an early stage such that persons with hearing impairment lead a good “quality of life” and are inclusive in society as early as possible.

How do we go about it?

To make persons with HI at par with other people in society an early identification and diagnosis is the key area. Audiologists are of the opinion that hearing assessment could be done at birth through BERA and OAE while for children and for adults through PTA , Immitance etc . After a complete evaluation it’s necessary to provide the management plan. The first step is providing appropriate BIS marked hearing aids. The GOI under the ADIP scheme provides free hearing aids, but getting hearing aids repaired is a major hurdle affecting the usage of hearing aids. Basic trouble shooting for wide varieties of hearing aids ranging from body level to high tech digital hearing aids have pictographically provided in this manual. As its mandatory to provide earmoulds for the body level and behind the ear hearing aids care and maintenance of earmoulds have also been included. Parents are to be educated regarding the use of hearing, many a times children do not corporate in the use of hearing aids some of these can be solved with behavior management while other need minor electronic repair. Usually the repair of the hearing aids is handled at the manufacturers service stations in cities. However empowering electronic technicians like mobile repairers, watch repairers, TV mechanics as well as Hearing care professionals like Audiologists would help addressing minor repairs and trouble shootings locally. This would also save the time and trouble for clients in travelling to neighboring cities in search of technicians.

This training would help the target groups to know the various components of hearing aids, common problems in the circuits involved and finally restoring its functionality optimally.

I congratulate the participants for attending the workshop and becoming partners with NIEPMD in extending quality services for hearing impairment to every nook and corner of India.

The effort of the authors in bringing out this illustrative informative and pictographic manual is laudable.

Director
Troubleshooting Hearing AID

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Troubleshooting Hearing AID

INTRODUCTION:

A Hearing aid is a battery powered, electronic device that makes listening easier for people with a hearing loss.

Hearing aids need to be prescribed by an audiologist based upon the audiogram of the client. The same hearing aid cannot be used for everyone by just increasing and decreasing the volume. As everyone's hearing loss may be different and the hearing aids amplification has to match the hearing needs of the client.

Hearing aid increases the loudness of sounds in the user’s ear by amplifying the signal. It has a very sensitive microphone, amplifier and receiver. Hearing aids are becoming increasingly smaller and less conspicuous. They have widely differing characteristics, amplifying different components of speech sounds for maximum comprehension by each wearer.

Fig 1: Basic block diagramme of a Hearing Aid.
EVOLUTION OF HEARING AIDS

Devices for the hearing impaired have a long history. Until the late 19th century, hearing aids were acoustic and offered only modest amplification. They were cartoonish ear trumpets. Tubular or funnel-shaped devices supported in one hand that collected sound waves and funneled them to the ear. The development of electrical technologies, however, opened new possibilities for amplification.

The telephone, patented by Alexander Graham Bell whose wife and mother were hearing impaired in 1876, was the first electrical device that could transmit speech. Since the receiver was held up to the ear, some hearing impaired people found it easier to listen to a conversation on Bell's telephone than listening to someone in person.

However, Thomas Edison, who was hard of hearing, did not find the telephone helpful. He later recalled that his inability to hear sounds from the receiver spurred his interest in improving it. This led to his 1878 invention of the carbon transmitter for the phone; amplified the electrical signal. Some people tried to adapt telephones as hearing aids in the early 20th century. But the results were obtrusive, heavy, and only amplified speech by 15 decibels at most. The volume of a normal conversation averages about 60-70 dB, and a person normally raises their voice by about 30 dB if a conversation partner has trouble hearing, so the early aids were of limited usefulness. A pictographic description showing intensities/loudness of commonly heard sounds is depicted as a audiogram to help understanding the effect of hearing loss.
Then along came the vacuum tube. Applying the three-element tube invented by Lee De Forest in 1907, Western Electric Co., in New York City, started producing technically superior hearing aids in 1920. These offered 70 dB of amplification and a more even frequency response. It was anything but portable, weighing in at 100 kilograms and was as big as a filing cabinet. In 1924, Western Electric had a new model: its electrical components fit in a small wooden box weighing just 4 kg. The box was attached to a receiver that, as in olden times, users had to hold up to their ears. Though portable, it was hardly inconspicuous. Many refused to use them not only because of the inconvenience but also because of the stigma attached to being visibly hearing impaired.

In 1938, Aurex Corp., an electronics manufacturer in Chicago, developed the first wearable hearing aid. A thin wire was connected to a small earpiece and then to an amplifier-receiver that clipped to the wearer’s clothes. The receiver was wired to a battery pack, which strapped to the leg. Sub miniature vacuum tubes developed in 1937 by Norman Krim, an engineer at Raytheon, allowed for amplifiers that were not only smaller but also required less power. Marketed to hearing-aid manufacturers, these amplifiers quickly gained a fair share of the market, but they still relied on a separate, strap-on battery pack.

Buttons and Boards:

In the late 1940s, manufacturers combined these tubes with two innovations from World War II printed circuit boards and button batteries to produce more compact and reliable models. Batteries, amplifier, and microphone were combined in a single unit that could fit in a person’s shirt pocket or even hidden in a woman’s hairdo. The unit was connected to an earpiece via a wire. But the devices were not invisible, despite users’ attempts to camouflage them by hiding the microphones...
Troubleshooting Hearing Aid

in their hair or using them as tie clasps, brooches, and the like. The hearing-impaired wanted a true one-piece unit that could be worn at the ear, but, of course, this was impossible even with the smallest sub miniature vacuum tubes.

The development of transistors in 1948 by Bell Laboratories led to major improvements to the hearing aid. The transistor was invented by John Bardeen, Walter Brattain, and William Shockley. Transistors were created to replace vacuum tubes; they were small, required less battery power and had less distortion and heat than their predecessor. These vacuum tubes were typically hot and fragile, so the transistor was the ideal replacement.

In addition, in the 1970s, the microprocessor was created. This microprocessor helped to open up the door to miniaturization of the hearing aid. The microphone, placed inside the ear, was connected by a wire to the amplifier and battery unit, which was clipped to the ear. Amplitude compression enabled audio signal to be separated into frequency band. These bands were able to adjust sounds so that sounds that were more intensive were weakened and sounds that were weakened would become more intensified. The system of multi-channel amplitude compression would be later used as the fundamental structural design for the first hearing aids that used digital technology.

In the late 1980s, several companies were applying digital signal-processing chips to hearing aids, initially in hybrid analog-digital models in which digital circuits controlled an analog compression amplifier. Fully digital models debuted in 1996, and programmable models, which allow for greater flexibility and fine-tuning of the hearing aids according to the patient's needs, became available in 2000.
Troubleshooting Hearing Aid

Presently, the digital hearing aid is now become programmable. By making the hearing aid programmable, it has allowed hearing aids to be capable of regulating sound on their own, without using a separate control. The hearing aid can now adjust itself depending on what environment it is in and often does not even need a physical volume control button. Today’s problem is background noise. Excelling at amplification and controlling acoustic feedback, digital hearing aids also bring in extraneous sounds that can obscure a conversation. Researchers are working on devices that filter this noise out.

ANALOG & DIGITAL

Analog Instruments:

Analog hearing instruments consist of a microphone, a pre-amplifier, a processor, an amplifier and a receiver. During analog processing, the microphone transduces the acoustic input signals into electrical input signals. The pre-amplifier amplifies the electrical input signals and the means processor spectrally shapes the frequency response. After spectral shaping, the amplifier amplifies the electrical signals, which are then transduced by the receiver into acoustic output signals.
Trimmer digital is primarily an analog hearing aid. In analog hearing instruments, both the acoustic and electrical signals are continuous in time and in amplitude. Analog hearing instruments may be digitally programmable; however signal amplification is still accomplished via analog means. Digitally programmable analog hearing instruments allow settings such as frequency response and gain to be manipulated digitally using a computer or hand-held programmer, however, digitally programmable analog hearing instruments do not provide true digital signal processing. These are also referred to as trimmer digital hearing aids.

**DIGITAL INSTRUMENT**

Digital hearing instruments consist of a microphone, a pre-amplifier, an analog-to-digital converter, a digital signal processor, a digital-to-analog converter, an amplifier and a receiver. During digital signal processing, the microphone transduces the acoustic input signal into an electrical input signal. The electrical input signals are amplified by the pre-amplifier and are digitized by the analog-to-digital converter. The digital signals are spectrally shaped by the digital signal processor and are converted into analog electrical signals by the analog-to-digital converter. The electrical signals are then amplified by the amplifier and transduced into an acoustic output signal by the receiver. In digital hearing instruments, neither the acoustic nor the electrical signals are continuous in time and amplitude.
Troubleshooting Hearing AID

### Digital Signal Processing

![Digital Signal Processing Diagram]

**A/D** → **DSP** → **D/A**

- **A/D**: Analog to Digital
- **DSP**: Digital Signal Processing
- **D/A**: Digital to Analog

**Binary (digital)**: 1001101110100

**Acoustic to Electrical to Acoustic**

**Microphone** → **Speaker**

---

**Basic difference between analog and digital hearing aids:**

![Analog Signal Processing Diagram]

**ANALOG SIGNAL PROCESSING**

1. **Pre Amplifier**
2. **Amplified Electronic Signal**
3. **Final Amplifier**
4. **Processed Electronic Signal**
5. **Acoustic Output Signal**

---

**Features:**

- Amplifies Speech and Noise
- Basic features Limited Program Memory
- Low Cost
- Programmable Conventional Designs
Troubleshooting Hearing AID

Features:

- Amplifies Speech and Noise
- Basic features Limited Program Memory
- Low Cost
- Programmable Conventional Designs
- Gain Control (Trimmer Control)

Features:

- Advanced features (Automatic, Wireless, Adjustable)
- Analyses Speech and Noise
- Modern Designs
- Improved sound quality
- Multiple Program Memory
- Precise Programming Ability
- Regulates hearing aid output
- Utilizes DSP (Digital Signal Processing)
Personal sound amplifier & Hearing aid:

A common request made by a common man who is asked to get a audiogram done for a hearing aid says “kindly give me any aid I will increase or decrease the volume to suit my needs”. A hearing aid does not just amplify sound. It is a sophisticated equipment which has a microphone, amplifier and receiver with many presets so as to suit the person hearing needs. A hearing aid though works on the principle of a public address system is much sophisticated as it gives frequency and intensity specific amplification as required for the hearing loss of a person.

Personal sound amplifiers are developed for individuals with normal hearing, especially to hear sound of different types. A personal sound amplifier increases the volume of sounds by amplifying them based upon some fixed criteria.

Hearing aids are for people with hearing loss ranging from mild to profound degree which further differs in form of the speech frequencies between 125Hz to 8Khz that are affected. Hearing aids are adjusted for each individual person to specifically target their unique hearing loss as determined by the audiologist.

Features In Hearing Aids which makes it unique:

Noise Reduction

Hearing aids can reduce amplification in certain channels. Typically, amplification is reduced in the channels that provide little benefit to overall speech understanding. This can be helpful in reducing the noise that is arriving from the front and the overall noise in the room.

Feedback Reduction

Acoustic feedback in hearing aids is the high-pitched whistling sound. It is a result of the amplified sound leaking out the ear canal and being picked up by the microphone of the hearing aid. Fortunately, feedback is now much less common because most digital hearing aids have a feedback manager that reduces feedback.
Troubleshooting Hearing AID

**Linear peak clipping**

Linear amplification with peak clipping provides constant gain as a function of input level. The decibel increase in the amplified signal is equal to the decibel increase in the input signal until the input signal reaches the saturation point of the amplifier.

**Gain(volume) control**

Hearing aids have been able to automatically increase or decrease volume depending on the input sounds. This feature minimizes the need to physically adjust a volume control.

**Directional Microphones**

The most effective way of minimizing the negative effects of surrounding noise is to have two microphones on each hearing aid – one for the area in front and one for the area behind. Each microphone provides information to the hearing aid processor, which analyzes the sound in the environment. When the analysis shows a high level of noise, the sensitivity of the back microphone is reduced, to decrease the noise from the back.

**Multiple programs or Memories**

Multiple programs or memories can be stored in hearing aids and accessed using a push button or through a remote control. These programs optimize the hearing aids for different listening environments. Multiple programs can also be available for special uses, such as for listening on the telephone or to television. More advanced hearing aids analyze the sound environment and adjust automatically for specific environments.

**Self-learning**

Hearing aids with this feature can remember your volume and program preferences in specific listening environments. You can train the hearing aids with a push button or remote control.
Troubleshooting Hearing AID

Data Logging

Many hearing aids internally record the number of hours the hearing aids are worn, which programs are being used, how often and how much the volume is increased or decreased, and, in some cases, the nature of the sound environments.

Telephone adaption

Understanding speech on the telephone can be difficult for some individuals with hearing impairment and hearing aids can help in various ways. Signals from both cell phones and landline telephones can be heard through the hearing aid, either by simply placing the receiver near the microphones of the hearing aid or by utilizing the electromagnetic induction coil (telecoil) contained in many hearing aids.

Wireless and Bluetooth connectivity

Bluetooth or wireless streaming device (either worn around the neck or kept in the pocket) to receive sound from Bluetooth transmitters and send the sound to the hearing aids.

Remote controls

Hearing aids can be operated using a remote control. For some individuals and certain hearing aids, a remote control can be very helpful, allowing the changing of programs and/or volume without touching the hearing aids. The increased automatic functioning of modern hearing aids has somewhat reduced the need for remote controls.

Frequency shifting

Some hearing aids have a feature described as frequency shifting or frequency lowering. When hearing loss in the high pitch region is severe to profound, it can be difficult to provide adequate amplification to those pitches. With frequency shifting or frequency lowering, high pitch sounds are shifted down to lower frequencies where hearing is typically better.
Troubleshooting Hearing AID

Sound Generators or Tinnitus Maskers

Several hearing aids have the capability of internally generating sounds that are not present in the environment. The sound generators are used to produce various sounds that can help reduce the perceived loudness of tinnitus (ear or head noise).

ADIP SCHEME

The main objective of the Scheme is to assist the needy disabled persons in procuring durable, sophisticated and scientifically manufactured, modern, standard aids and appliances that can promote their physical, social and psychological rehabilitation, by reducing the effects of disabilities and enhance their economic potential. This came into force in 1996.

ADIP has been the constant endeavour of the Government to provide the disabled persons with aids/appliance, at minimum costs, which are essential for their social economic and vocational rehabilitation.

The main objective of the scheme is to assist the needy disabled persons in procuring durable, sophisticated and scientifically manufactured, modern, standard aids
Troubleshooting Hearing AID

and appliances to promote physical, social, psychological rehabilitation of Persons with Disabilities by reducing the effects of disabilities and at the same time enhance their economic potential.

The scheme shall also include essential medical/surgical correction and intervention, prior to fitment of aids and appliances as per the norms.

<table>
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<tr>
<th>TOTAL INCOME</th>
<th>AMOUNT OF ASSISTANCE</th>
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<tr>
<td>Upto Rs. 15,000/- per month</td>
<td>Full cost of aid/appliance</td>
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<tr>
<td>Rs. 15,001/- to Rs. 20,000/- per month</td>
<td>50% of the cost of aid/appliance</td>
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Types of Hearing AIDs

- BODY LEVEL
- BEHIND THE EAR (BTE)
- RECEIVER IN THE CANAL (RIC)
- IN THE EAR (ITE)
- IN THE CANAL (ITC)
- COMPLETELY IN THE CANAL (CIC)
- INVISIBLE IN THE CANAL (IIC)
- SPECTACLE AID
Troubleshooting Hearing AID

Parts of Hearing AIDs

Body Levels
Troubleshooting Hearing AID

Parts of Hearing AIDS

Behind the Ear (BTE)

- PROGRAM CHANGE
- TRIMMER
- VOLUME CONTROL (+)
- VOLUME CONTROL (-)
- BATTERY COMPARTMENT
- HOOK
- CASING
- EAR TUBING
- HUGGIES FOR CHILD
- EAR PLUG
- EAR MOLD
TROUBLESHOOTING

LISTENING CHECK

Turn the hearing aid ON and speak while turning the volume control wheel slowly up and down.
Troubleshooting Hearing AID

LISTENING CHECK

Hearing checkup using an audiometer in a two room setup.

Ling Sound

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Troubleshooting Hearing AID

No Sound

Battery:

- Replace battery

step:1

step:2

step:3

step:4

step:5
Troubleshooting Hearing AID

No Sound

Battery:

- Replace battery

step: 1

step: 2

step: 3

step: 4

step: 5
Troubleshooting Hearing Aid

No Sound

Check the Battery with Multimeter (or) Battery Tester. It should show minimum of 1 volt.
Troubleshooting Hearing AID

No Sound

Make sure that positive and negative terminal of battery are in proper position in the battery compartment.
Troubleshooting Hearing AID

No Sound

Make sure you have the correct size of battery for the aid.

- Check for corrosion on battery compartment. This can be removed with buds.
Troubleshooting Hearing Aid

No Sound

External Switches:

Check to see that external switch is not set to “telecoil” or “off” position.

Tubine/Cord

- Make sure that tubing/cord is not collapsed.
Troubleshooting Hearing Aid

No Sound

Moisture:

Check for moisture

If the hearing aid is wet, place aid in dry aid kit.

EAR Mould:

• Check to see that earmold(or) ear plug is not impacted with wax.
Troubleshooting Hearing Aid

No Sound

The earmold may be washed with warm soapy water.

Be sure that earmold is completely dry before putting it back in the ear.
Troubleshooting Hearing AID

No Sound

RECEIVER

• Keep the MULTIMETER in the resistancemode.

• Connect the receiver in O.K. cord, touch the other end of the cord to the multimeter probe pint. If the meter shows some value (or) deflects, it means that the receiver is O.K.
Troubleshooting Hearing AID

No Sound

Cord

• Keep the MULTIMETER in the continuity mode.

• Check the continuity between thick pin to thick pin and thin pin to thin pin. If you can hear a beep sound. The Cord is OK. If there is no sound replace the Cord.
Troubleshooting Hearing Aid

No Sound

Interior Problem:

• check if any of the wire is open. If so resolder it.

• Keep the multimeter in resistance mode.

• Check the resistance of microphone. It should show 50 Ohm after isolation it from the circuit. If it shows more than that, it means microphone is not alright. In that case change the microphone.
Troubleshooting Hearing Aid

No Sound

INTERIOR PROBLEM

• Keep the multimeter in continuity mode.

• Check the continuity of cord pin socket spring with printed circuit board using multimeter
Troubleshooting Hearing AID

No Sound

INTERIOR PROBLEM

• Problems with the switch are one of the major problems. To rectify this problems, shorting of correct switch pointing should be done using circuit diagram. If the hearing aid works after shorting the switch points, it implies that the problems is in the switch. Clean the switch with Iso-Prophyl (or) replaces the switch if necessary.
Troubleshooting Hearing AID

No Sound

INTERIOR PROBLEM

- Hearing aids is ESD devices, so interior troubleshooting need to be done under the ESD protective station.

- Soldering is done under the microscope, with sharp tip soldering rod.

- Check the compression pot. Isolate it from printed circuit board and check it with multimeter keeping it in the resistance mode. The meter should read the value given on the check pot. If it does not, it means the pot is open. In such a case replace the pot.

- Hearing aid test analyser kit also available in the market.
Troubleshooting Hearing Aid

LOW OUTPUT

Weak/Muffled Sound

• Nearly exhausted battery

• Battery that registers 1.0 volts or less should be discarded

• If battery leakage occurs, discard battery properly

• Check for dirty or clogged microphone screen.
Troubleshooting Hearing AID

DISTORTION

• Check the corrosion on battery contact and terminals.

• Clean the contact with battery contact cleaner

• Excessive Wax in ear

Defective volume control
Troubleshooting Hearing AID

Check for moisture.

Change the battery.

Earmold needs venting.

Interior Problems:

Change the Microphone and see if the quality of output changes. If there is any change in the quality of the output then replace the Microphone.

Clean all switches using Iso-Prophyl, without applying in the Microphone and Receiver.

Change the Receiver and see if the quality of output changes. If there is any change in the quality of the output then replace the Receiver.

Replace the Microphone and Receiver with the correct polarity.
Troubleshooting Hearing Aid

FEED BACK

- Volume control setting is too high

- Improper fitting of earmould
Troubleshooting Hearing Aid

Feed Back

• Crack in tubing

• With the volume control set at normal setting, put finger over earmold opening and listen for feedback. If no feedback occurs, then feedback is due to volume control or improper fitting of the earmold.
Troubleshooting Hearing Aid

Feed Back

- Remove earmold, and place finger over earhook. If feedback does not occur, then the problem is in the earmold or tubing.

- Remove earhook, and place finger over opening of the aid. If feedback does not occur, then the problem was in the earhook.

- If feedback still occurs, it is “internal feedback”.

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Troubleshooting Hearing AID

INTERMITTENT SOUND

• May be characterized by scratchy sound or hearing aid sounding like it is going on and off.

• Corrosion on battery contacts and battery terminal

• If tubing collapses, sound may cut off

• Check the cord by using the same above mentioned method. If it shows intermittent detection it means that the cord is defective

• Check cord pin socket spring by opening cord pin socket. If it shows low tension or is broken replace it.

• Check the connection of cord with the receiver.
**Troubleshooting Hearing Aid**

**Intermittent Sound**

- Make sure that the battery is correctly seated and snug in battery compartment.
- Corrosion on battery contacts and battery terminal

- Possible defective volume control

- Clean all the switches

- Possible internal problems
ROUTINE CARE AND MAINTENANCE

Avoid High Temperature

Don’t leave hearing aid on the radiator or in the direct sunlight, or any other equipment that generates heat. Heat can damage the hearing aid amplifier and can cause batteries to deteriorate.
Avoid Moisture

Keep hearing aid dry. Even perspiration can cause damage. If the child has trouble with excessive perspiration, you can purchase a dry aid kit. Place the aid in the kit overnight and it should be dry in the morning.
Troubleshooting Hearing Aid

Battery Care

Keep several spare batteries handy in case battery goes dead.

Store batteries in a cool dry place.

Remove batteries from the aid at night to prolong battery life

Discard dead batteries properly
Troubleshooting Hearing Aid

Earmould Care

Keep the earmold clean. If the opening becomes clogged with wax, clean it gently. Do not use alcohol to clean the earmold. Earmold should be cleaned occasionally with soap and water. Be sure earmold is dry before you put it back on the child.
Troubleshooting Hearing AID

Protect the aid for hard knocks:

The hearing aid is a delicate mechanism. Avoid dropping it or bumping it against hard object.
Troubleshooting Hearing Aid

Removing the Aids:

Get into the habit of turning the switch to the “OFF” position before you remove the aid. When the switch is in the “ON” position, that battery is discharging whether the child is wearing the hearing aid or not. If the aid doesn’t have an “OFF” switch, open the battery compartment so that the battery is not touching the battery contacts.
Troubleshooting Hearing Aid

Telephone Usage of Hearing Aid:

Body Level

Behind the Ear (BTE)
Troubleshooting Hearing AID

SOLDERING

Procedure:

Open the device carefully. observe under microscope.

Identify the area to be solder.

Apply FLUX in the soldering area.

Clean the surface with help of WIG to remove the old solder lead.

Using Iso Prophyl clean the soldering surfaces area (without applying in mic and receiver).

Take required amount of Lead in soldering rod.

Apply soldering in required area.

Keep some time in mild hot place to make the soldering surface dry.

After soldering refix the device and check the quality.

NOTE:

Soldering iron temperature 320-350 degree.

Always connect wrist strap to electrostatic mat while working with hearing aids.
Troubleshooting Hearing AID

MATERIALS REQUIRED

- MICROSCOPE
- SOLDERING MACHINE
- SOLDERING MATERIALS
- WRIST STRAP
- PUTTY CLAY
- SCREW DRIVER SET
- STETHOSCOPE
- BATTERY TESTER
Troubleshooting Hearing Aid

Materials Required

- Brush
- Wire Trimmer
- Nose Player
- Pen Knife
- Scissor Twiser
- Multimeter
Has a fifteen years experience of working across India in clinical and academic positions, with 35 publications, more than 100 papers presented in National & International conferences and has six books to his credit. Presently working as Associate Professor and Head of Department of Speech Hearing and Communication at NIEPMD, Chennai.

After completion of his Engineering in Electrical and Electronics, Er. Sridhar got trained in the leading hearing aid manufacturing company. Presently has been active as master trainer for electronic technicians to troubleshoot hearing aid at the grassroot level.

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