ACOUSTIC FEEDBACK AND ITS CONTROL IN THE SELECTION AND USE OF HEARING AIDS

P. RAMA MOHAN BABU* AND ARUNA CHITRE†

'Acoustic Feedback is the whistling sound which results when a very quiet sound which comes from the receiver of a hearing aid is picked up by the microphone, amplified and putout, at the receiver again'. Dale (1962). Acoustic Feedback is a very common problem that is encountered wherever hearing aids are used. To prevent A.F.B. (Acoustic Feedback) the hearing aids are attached to earmoulds of various types like the Stock Ear pieces or the Moulded Ear Pieces. The former type of ear pieces are available in various sizes commercially. The ear piece is chosen so it approximately fits the ear of the user and as such it reduce the A.F.B. only to a little extent. Stock Ear Pieces are recommended only when the moulded ear pieces cannot be made available. Steps must be considered to reduce this Acoustic Feedback because not only is the resulting squeal unpleasant, it may also drown out the sounds that the wearer wishes to hear.

A.F.B. assumes greater significance in hearing aids functioning at saturation sound pressure levels and providing high gains.

A.F.B. is caused by (1) Leakage of Amplified Sound from the receiver round the mould, *(2)* Leakage between the mould and the receiver i.e., when the ring and spring fitting is not giving a complete seal off of the sound, and (3) Leakage from the plug socket of the hearing aid socket. An attempt is made in this paper to suggest ways of overcoming these problems.

Also, while hearing aid trials are given A.F.C. becomes a serious problem with high gain aids for severe hearing loss cases. The usual practice among Audiologists is to use stock ear pieces and give the trial. However, this prevents the use of the hearing aid at high gain levels which inturn results in inadequate information regarding the suitability of the hearing aid as well as the benefit the case can derive from its use. A study of the problems presented during Hearing Aid Trials as a result of A.F.B. was made and ways of reducing this problem have been worked out and presented in this paper.

Physical separation of the receiver and the microphone does much to reduce the occurrence of A.F.B.

Leakage of sound round the mould may be suspected if the squeal as a result of A.F.B., stops when the canal of the mould is closed (while testing, the distance

P. Rama Mohan Babu is an Audiologist and Speech Pathologist at the B. M. Institute, Ashram Road, Ahmedabad-380009.

Aruna Chitre is an Audiologist and Speech Pathologist at the B.Y.L. Nair Hospital, Byculla, Bombay-400008.

between the microphone and the receiver is kept about one foot). This problem is overcome by preparing another mould out of a new impression of the ear.

When A.F.B. round the mould is ruled out the contact between the receiver and the mould should be tested. Feed Back at this point may either be due to blockage of the ear canal of the mould by Wax or by an illfitting ring of the mould on to the receiver. After the wax blocking out the passage is removed, if the feedback stops on pressing firmly the receiver with the thumb into the ring of the mould—this suggests an illfitting earmould ring. This could be remedied by putting plastic or paper washers or by replacing the ring itself.

Sometimes the leadplug in the receiver may be worn out leaving a gap between the plug and the receiver. This may be remedied by using any good adhesive paste to fix the plug. However, care should be taken to see that the metal parts of the plug do not get covered by the adhesive material.

Before hearing aid trials are given as a rule for all cases needing high gain amplification custom ear moulds should be prepared in advance. These moulds could be used after the hearing aid trial as well. Persons who wear aids when they are feeding back, cannot hear at all well with them. It is advisable to discontinue the use of such hearing aids atleast till the A.F.B. is controlled reasonably. Where facilities for making earmoulds are not available the following methods will be of help in reducing the A.F.B. (Body level type of high gain amplification hearing aids of different commercial makes are used in the study).

1. Insert ear piece was attached to the receiver instead of the stock ear mould. It was noticed that it did reduce the Feed Back. Insert ear piece has to be a soft tipped one that does not cause pain and irritation of the ear canal.

2. Aural domes were fitted in addition to the stock ear piece attached to the receiver. The reduction in A.F.B. was found to be comparatively less.

3. To seal the leakage of sound round the receiver the following materials were tried, (i) Plaster of Paris (ii) Soft variety of Bees' wax and *(iii)* Zalgen.

(i) Plaster of Paris in the liquid form (of medium thickness) was poured round the receiver in the ear. The pinna was oiled well before pouring the Plaster of Paris, to facilitate the removal of this material afterwards. However, this material was found to be requiring lot of time in setting and was messy to handle. Where receivers are suggested for both ears the time required in the preparation of Plaster of Paris sealing is relatively very high. And this has to be applied with the patient in the lying position. Two points in favour of this material are *(i)* It does provide adequate protection from A.F.B. (2) It is easily available and is not expensive. *(ii)* Soft Bees' wax was tried to seal the gaps round the receiver. When proper wax is selected it does provide satisfactory reduction of A.F.B. even at high gains. This is inexpensive, easily available and can be applied quickly to both ears while

the patient is in the sitting position. However, the receiver is likely to get clogged up with this material. A light application of oil on the ear and the receiver is helpful in the easy removal of the wax.

{iii) Zalgen in the paste form was found to be very convenient and satisfactory in the reduction of A.F.B. This can be applied easily on to two ears in a short time. The patient can stay in sitting position itself. It is not messy to handle and is easily removed. However, this is relatively expensive and is not so easily obtainable.

All the three materials mentioned above were tried with (a) only the receiver *(b)* receiver attached to the stock ear piece and (c) receiver attached to the insert ear piece. There were no significant differences in the reduction of A.F.B. in all the three conditions when Plaster of Paris and Zalgen were used. However, it was found that greater reduction in FB could be obtained when Bees' wax was used in combination with custom or stock ear pieces as compared to the other two conditions viz., only Receiver and Receiver attached to insert ear piece. When insert ear piece or stock ear piece was attached to the receiver chances of the receiving getting blocked with these material were less. Also retention of the receiver was easier.

Considerable reduction in A.F.B. may be achieved by placing a physical obstruction between the receiver and the microphone. Whether or not the above materials like Zalgen are used by holding the microphone behind a cardboard (or any other obstruction) slight reduction of A.F.B. could be achieved.

Conclusion

By a careful selection of the proper materials to be used along with the receiver Acoustic Feed Back could be eliminated or reduced to a great extent. Hearing aid trials and later use of high gain hearing aids will become more meaningful to persons with severe hearing losses.

REFERENCES

Dale, D. M. C. (1962) *Applied Audio logy for Children,* Illinois, Charles C. Thomas.

Davis, H. and R. Silverman (1961) *Hearing and Deafness,* New York. Holt, Reinhart and Winston.

Kasten, R. N. (1972) *In Handbook of Clinical Audiology* (Ed) Katz, Baltimore, Williams and Wilkins.