A NEW APPROACH TO IDENTIFY UNILATERAL FUNCTIONAL HEARING LOSS

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Introduction

The main principle of disclosing unilateral functional hearing loss is to confuse the patient regarding which ear is being tested. This principle has been used in almost all tests of unilateral functional hearing loss including Stenger, Speech Stenger, Shifting voice and Switched Speech tests (Newby 1965, Jerger-1963). Using the same principle but on different approach it is possible to disclose unilateral functional hearing loss. The new approach is to make use of 'Binaural summation'. Two methods have been described.

Method I

This method is based on the finding (Hirsh 1952) that the difference between Binaural threshold and monaural threshold at 35 dB above the subject's threshold is six dB.

Instruction to the patient

'You are going to hear atone in your better ear for a few seconds (2-3 sec.) As soon as I present the tone I will indicate that it is No. 1 tone. Have a mental note of its loudness. Immediately you will hear another similar tone for 2-3 secs. Here again, the moment the tone is presented I will indicate that the tone is No. 2. You are required to match the loudness of the second tone (No. 2) with the loudness of the first tone (No. 1). You should say whether the loudness of the tone No. 2 was louder than the first or same in loudness'.

Procedure and Discussion

Present the tone (for example 1 kc/s) monaurally through the better ear of the subject at 35 dB above the subject's threshold for a few seconds (2-3 secs). Present the same tone at some intensity (35 dB SL) binaurally. Now, the tester can expect four types of responses from the subject.

They are: the subject may say that (1) the second tone (Binaural Stimulus) or No. 2 tone is weaker than the first tone. (2) he cannot hear the tone at all (No response) (3) the second tone (No. 2 tone) is louder than the first tone and (4) the second tone is same in loudness to that of the first tone.

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If the subject gives one of the above first three responses, the test can be considered as positive, meaning that he has unilateral functional hearing loss. The increase in loudness of the second tone (Binaural stimulus) is possible only if the suspected ear has .normal hearing (of course same threshold as that of the better ear).

The interpretation becomes difficult if the subject gives, fourth type of response. The reason is that the test is based on the subject's judgment of loudness and that the tester has no reliable means of finding whether the subject is telling the truth or lie. Hence, this happens to be a limitation.

This test has been administered to five normal subjects having equal thresholds for at least one frequency. All the five subjects reported that the second tone (Binaural stimulus) was louder than the first tone. Refer the Table 1 for details.

TABLE 1

Srl No. of Subjects	Abs TH (Thresholds **are** equal in both ears)	Frequency	Subject's report of loudness of the second tone (Binaural Stimulus)
1.	20 dB	500 CPS	Louder
2.	15 dB	1000 CPS	Louder
3.	20 dB	2000 CPS	Louder
4.	10 dB	1000 CPS	Louder
5.	20 dB	4000 CPS	Louder

Subjects' report of loudness of binaural stimulus at 35 dB SL

Advantages:

1. The test is easier and quicker to administer.
2. The test can be administered with the audiometers currently available in India.

Limitation:

1. The test is applicable only in the case of equal thresholds bilaterally.
2. As mentioned earlier, the fourth type of response of the subject makes interpretation difficult.

Method II

This method is based on the finding (Hirsh 1952) that binaural threshold is better than monaural threshold by 3 dB at threshold level.

Consider for example, a case of unilateral functional hearing loss (Rt.). Let Ac thresholds of Rt and Lt ears at 1 Kc's be 60 dB and 10 dB respectively.

Instruction to the patient

'You are going to hear a tone in the better ear (Lt) and you should respond to the tone, even if it is, "very feeble" by raising the finger'.

Procedure

Present 1 k tone at 7 dB HL (3 dB below the absolute threshold of the normal ear) monaurally i.e., through Lt ear. Now, the patient does not respond as it is obvious that the tone presented is below his threshold. Present the tone binaurally at 7 dB HL, if the patient responds, the tester can infer that the test is positive meaning that the patient has unilateral functional hearing loss. On the other hand, if the patient does not respond even when the tone is presented binaurally, the test can be considered as negative. However, negative results do not mean organic hearing loss. In other words, on the basis of negative results we cannot rule out functional hearing loss.

Precautions

1. The audiometer should be in perfect calibration.
2. Threshold measurements of the normal ear should be done very precisely.

Limitation

The test is applicable only in the case of equal thresholds bilaterally.

Conclusion

Two methods for identifying unilateral functional hearing loss have been described. The methods require that the subjects should have equal thresholds bilaterally for at least one frequency and hence by negative results, we cannot rule out functional hearing loss. The first method seems to be a valuable supplementary test for Unilateral functional hearing loss.

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