

ABLB-A TEST FOR FUNCTIONAL HEARING LOSS

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The Alternate Binaural Loudness-Balance (ABLB) test is used as a test for assessing recruitment-an abnormal growth of loudness with increase in intensity of sound. However, it appears that the test can be used to identify unilateral functional hearing loss. Here, an attempt is made to explain how this test could be used as a test for unilateral functional hearing loss.

It is hypothesized by Jagadish (J. AIISH, 1970) that recruitment is not an abnormal phenomenon and that the presence or absence of recruitment can be explained on the basis of absence or presence of tone decay respectively. The reasons advanced to explain that recruitment is not an abnormal phenomenon are: 1) the difference in the loudness perceived by the normal and the abnormal ears is very small; 2) Loudness depends on the energy of the tone reaching the Cochlea and not on the sensation level of the tone ; and 3) In 'Pure' sensorineural hearing loss cases, the Basilar membrane will be stimulated by all of the energy reaching the Cochlea and not just by the energy corresponding to the sensation level.

Also, it is explained how tone decay would influence recruitment (measured through ABLB test) -a unilateral sensorineural hearing loss case with no tone decay shows recruitment because there is no loss in the intensity of the tone reaching the Cochlea and the difference in the loudness perceived by the normal and the affected ear is very small in spite of the hearing loss. On the other hand, if there is tone decay, the subject needs greater intensity due to the 'decay' of the tone and hence shows no recruitment.

We should remember, however, that the influence of tone decay on recruitment is valid as long as the test (ABLB) is administered by manual method (not automatic). In other words, the presence or absence of recruitment cannot be explained on the basis of absence or presence of tone decay, if the test is administered automatically (tones are presented to the normal and abnormal ears alternately and automatically for brief intervals) as it is known that when the tones are presented intermittently the tone decay does not affect the thresholds (Jerger, 1960). Thus all unilateral sensorineural hearing loss exhibit complete recruitment (within the limits of ± 20 dB) at high intensity levels, irrespective of tone decay, when recruitment is measured using ABLB (automatic presentation) test.

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The rationale for the use of ABLB test (automatic presentation) as a test for unilateral functional hearing loss depends on the presumption that all sensorineural hearing loss cases exhibit complete recruitment (± 20 dB) at high intensity levels, irrespective of tone decay when recruitment is measured using ABLB (automatic) test. If a unilateral hearing loss case with no apparent air-bone gap, shows decruitment or no recruitment to ABLB (automatic) test functional hearing loss can be suspected according to the presumption.

Procedure and Interpretation

Instruct the patient that he is required to balance the loudness of the tones to be presented alternately to his two ears. Then, present the tones at 30 dB S.L. (Sensation level) to the two ears (or still higher level in mild hearing loss cases) such that the tones alternate between the two ears automatically for brief intervals. Ask the patient whether the tones are equal in loudness, if not, increase the intensity of the tone presented to the normal ear by 5 dB steps, keeping the intensity of the tone in the suspected ear constant, until he reports that the tones are equal in loudness. Note the hearing level of the tone in the normal ear. If this level is less than the hearing level of the tone presented to the suspected ear by 20 dB or more, functional loss is indicated.

Experiment

To study the actual behaviour of functional hearing loss cases on this test, 5 normal hearing subjects, who did not know the rationale of the test, were asked to feign hearing loss of 60 dB in one ear (Rt.) to 1 Kc/s tone i.e. each subject was asked not to respond in Rt. ear if the tone was less than 60 dB (of course, each subject was made aware of 60 dB tone). Also, each subject was informed that he would hear tones alternately in the two ears for brief intervals and that he was required to indicate when the two tones were equal in loudness. To make the instructions clear, each subject was told to perform *himself in* such a manner that he should not be caught of his simulated hearing loss (60 dB) while balancing the tones. On first experiment, however all the subjects balanced the tones at nearly equal hearing levels forgetting the instruction that they had to feign hearing loss of 60 dB in Rt. ear. After the first experiment, each subject was told of his failure to remember and understand the instructions. Subsequently, on second experiment each subject indicated that the two tones were equal in loudness when the hearing levels of the tones in the suspected ear (Rt.) and the normal ear (Lt.) were 90 dB and about 60 dB respectively.

Discussion

As an explanation, it may be mentioned that the functional hearing loss cases are expected to show decruitment or no recruitment as they tend to balance the

loudness of the tone presented to the suspected ear with a weaker tone presented to the normal ear in an attempt to justify their previously admitted hearing loss as supported by the experimental study with 5 normal hearing subjects. It is to be noted, however, that if the patient shows recruitment, functional hearing loss cannot be ruled out as his 'yard-stick' (Loudness criterion) may be disturbed while doing the task of balancing tones and hence he may balance the tones at nearly equal hearing levels—leading the tester unable to decide whether the results are due to sensorineural hearing loss or functional hearing loss. In such instances, interpretations should be made in the light of other tests' results. As far as the interpretation of the test results is concerned, it is suggested that if the hearing level of the tone presented to the normal ear is less than the hearing level of the tone presented to the suspected ear by 20 dB or more, at the point of balance, functional hearing loss is indicated. The explanation for -20 dB limit is to account for hypo-recruitment error of judgement and thereby to avoid false position results.

Summary

ABLB (automatic) test can be used to identify unilateral functional hearing loss. The rationale of the test is based on the presumption that all unilateral sensorineural hearing loss cases exhibit complete recruitment, (within the limits of ± 20 dB) at high intensity levels, irrespective of tone decay, to ABLB (automatic) test. At the point of balance, if the hearing level of the tone presented to the normal ear is less than the hearing level of the tone (30 dB SL) presented to the suspected ear by 20 dB or more, functional hearing loss is indicated. However, if there is no significant difference in the hearing levels at the point of balance (i.e. if recruitment is present) functional hearing loss cannot be ruled out.

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