BINAURAL HEARING-TEST

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Most methods for detecting disorders in the central part of the hearing system use as test-material speech that has been distorted in some way or other. The speech may be passed through filters, peak clipped, split into halves, interrupted at various rates and so forth. All these methods have in common that the information bearing elements of the speech are reduced and modified. It is only by a greater effort that the central nervous system can gather the information from the manipulated clues, and thus a deficiency of the system is made manifest.

The method I am going to describe is contrary to those mentioned in so far as it does not reduce but double the information offered to the hearing system per unit of time, and that no distortion is introduced.

The apparatus needed is a two channel tape recorder with independent transmission systems, amplifiers and attenuators. Both channels are connected to a set of earphones, one for each channel. The test-material consists of words recorded on the tape. We use different types of words, digits and three syllabic words with articles.

A list of testwords is recorded on the upper trace of the tape in a slow, distinct and scanning articulation with ample intervals between any two words. Monitored by listening to this record through earphone the same speaker articulates a second list of testwords which is recorded on the lower trace of the tape. The words on the upper and lower trace, though different in their main phonetic components, must coincide syllable by syllable. When this tape is played on the two channel apparatus the patient will hear two different words simultaneously: one on his right ear and the other on his left ear. For example on his right ear he hears the word "twenty-four" and on his left ear in exactly the same timing the word "fifty-two".

Before the proper test is performed we make sure that the patient understands this particular test-material on either ear without difficulty. In the typical case of central disturbance there will not be much difference between both sides. But if there is a difference we choose such an intensity on either side that the patient comfortably understands 100% of the words offered in the ordinary monaural way.

After these preliminaries he is presented the pairs of words at the predetermined intensity, simultaneously one word on his right ear the other on his left. He is informed to attend to both ears and repeat all the words he can understand.

There may be 3 types of articulation score:

1. The patient repeats all the words from both sides correctly. This is normal and extremely easy to accomplish.

2. The patient misses some words from his right and some from his left ear, but there is no preponderance of one side. This is regarded as a symptom of lacking concentration or diffuse central disorder as in cerebral arteriosclerosis. One can raise the intensity on both ears and try if this improves the score, but usually the result remains similar.

3. The patient understands all words on one ear and misses all or nearly all the words on the other ear, although monaurally both ears were equally efficient. In this case we augment the intensity on the bad side leaving it constant on the other. Even then it happens that none of the words on this side is understood. In the end, if we make the difference still greater, the patient usually understands some words on his right and some on his left ear, but scarcely both words of a pair at a time. If there is such a marked difference between both sides we would interpret it as a symptom of central disorder, preferably of the temporal lobe of the opposite side.

In this test either ear has to handle its own message. It appears that, for performing this task, the subject makes his attention oscillate quickly between his right and left ear, thus sampling bits of information from either side. Afterwards he collects the pieces remembered and puts them together to form the complete message. Patients who fail in this test frequently comment that the words on one side, although they are noticed acoustically, fade out so fast from their memory that they just cannot grasp them.

In sampling the bits of information from both ears the central pathways seem to be connected in such a manner that either ear is combined rather exclusively with the opposite hemisphere. Either hemisphere is thus thrown upon its own resources to deal with the incoming signal, as the other is busy decoding the message coming from the other ear. If there is a deficiency in one hemisphere the corresponding contralateral part cannot help out as it does in monaural hearing or in binaural hearing under normal conditions with only one message at a time, and this provides a chance to test either hemisphere individually.

EPREUVE DE L'AUDITION BINAURALE

Deux listes de paroles enregistrées sur une bande magnétique stéréophonique par la même voix et coincidantes syllable à syllable sont présentées simultanément par des casques, l'une à l'oreille droite, l'autre à l'oreille gauche. Un sujet normal comprendra facilement toutes les paires de paroles. Dans un cas de lésion centrale, particulièrement de la lobe temporale, l'intelligibilité sera réduite ou totalement supprimée à l'oreille contralatérale de la lésion, bien que, examinée monauralement cette oreille semble normale.

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Reference:

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