

PATHOLOGIC TEMPORARY THRESHOLD SHIFT

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Soon after beginning the intensive use of Bekesy audiometry in 1950, the continuously variable-frequency test procedure was extended to include discrete, constant-frequency threshold measurement also. It was soon learned that the discrete frequency measurement, if prolonged over a few minutes, resulted in several db of tone decay (hereinafter called temporary threshold shift — TTS) in certain pathologic ears, especially at the higher frequency levels. The data agreed reasonably closely with those reported earlier by Schubert (1944) until a patient was encountered who presented an acoustic neurinoma. The dramatic rapidity and extent of the TTS exceeded by far any shift previously observed.

The results of the measurements on this patient were reported in detail by Reger and Kos in 1952. This extremely rapid and marked TTS, associated with cerebellopontine angle tumors, has been verified in a series of three additional papers from our clinic: Lierle and Reger in 1955 (March), Kos in 1955 (August) and by Reger and Kos in 1958 (April). The latter paper reported that pathologic TTS has been observed in a total of seven patients, each of whom was found to have surgically confirmed cerebellopontine angle tumors. The TTS results reported in these articles have since been confirmed in America by Thompson and Hoel in 1957, by Jerger, Carhart and Lassman in 1958 (November), by Yantis in 1959, and in Europe by Sørensen in 1960 and by Pestalozza and Cioce in 1962.

Considerable variation exists in the rate and extent of the TTS experienced by acoustic neurinoma patients at different frequency levels. Usually, however, the shift occurs with dramatic rapidity at all discrete audiometric frequency levels and is limited in extent only by the maximum output of the audiometer. It may be significant that the acoustic neurinoma patients recover their pre-tested threshold sensitivity in less time than that required to produce the shift. Sørensen (1962) reports that: "In all patients with tone decay, the threshold of hearing returns to the pre-stimulatory level within half a minute after the interruption of the tone".

Pathologic TTS also occurs in certain medio-cochlear pathologies other than cerebellopontine angle tumors. One patient who presented a history, physical examination and pathologic TTS suggestive of a unilateral acoustic neurinoma was found to have a severely atrophied VIIIth nerve at surgery. Two patients with multiple sclerosis have been examined within the present year (1962) whose chief otologic complaints were dizziness. Each demonstrated rapid and marked TTS, one unilaterally and the other bilaterally.

The most dramatic TTS observed to date involved a medical student who presented initial symptoms of a sensation of pressure inside the head and difficulty in understanding speech. The clinical pure tone audiometer test indicated essentially normal threshold sensitivity bilaterally. However, discrete frequency Bekesy audiometry indicated shifts as great as 80 db in two minutes in each ear at both low and high frequency levels. Physical examination and surgery revealed a massive pinealoma, which had resulted in a large symmetrical dilatation of the lateral and third ventricles. Hearing tests 13 days after surgery showed complete absence of pathologic TTS and normal speech discrimination. Occasionally, an elderly individual may show a marked shift at a high frequency level for which a severe impairment exists, as previously reported by Schubert (1944).

The pathologic TTS associated with acoustic neurinomas also has been reported by means of tone decay tests performed by means of the ordinary manually operated clinical audiometer or audio frequency oscillator equipped with suitable attenuators. The May 1962 paper by Sørensen is an excellent review and research article on the "Clinical Application of Continuous Threshold Recording" and establishes the fact that rapid and marked pathologic TTS can be measured by means of continuous tones from the ordinary pure tone clinical audiometer.

DEPLACEMENT TEMPOREL PATHOLOGIQUE DU SEUIL

Lorsque la sensibilité auditive est examinée avec un audiomètre de Bekesy à une fréquence fixe unique, une fatigue au seuil pathologique extrêmement rapide et sévère se révèle chez des malades souffrant de tumeurs du nerf acoustique. La fatigue pathologique s'est également révélée chez deux malades atteints de sclérose en plaques, chez un malade souffrant de pinéa-lome et chez un malade au nerf acoustique atrophié. Les sujets retrouvent en général leur acuité auditive première moins d'une minute après l'arrêt du test. L'adaptation pathologique dans le cas de tumeur du nerf acoustique peut également être mesurée au moyen de tons continus émis par l'audiomètre clinique ordinaire à ton pur.

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