

DEVELOPMENT OF SPEECH MASKING LEVEL
DIFFERENCE TEST USING ARABIC
SPONDEE WORDS

THESIS

*Submitted In Partial Fulfilment
Of Master Degree in Audiology*

By

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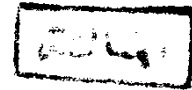
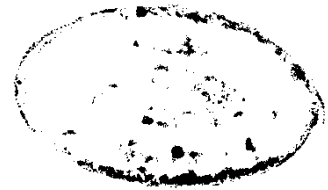
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بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

” وَقُلْ رَبِّ زِدْنِي عِلْمًا “
صَدَقَ اللَّهُ الْعَظِيمُ



Dedication

To the memory of My Mother

You were eager to attend the discussion of this
thesis but for destiny ...

May God bless your soul!

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teachings would give me the confidence I need in my
future career ...

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Introduction

INTRODUCTION

The audiologist tries constantly to refine neuro-audiologic techniques even though there are sophisticated radiological and neurological procedures for detecting anomalies such as brain tumors and strokes . Musiek(1985) offered many reasons for such efforts on the part of the audiologist : The first is that the audiologist may be the first health professional to see a patient who complains of unusual auditory symptoms , possibly indicating a central lesion , and should provide appropriate medical referral . Another reason supporting the use of the refined central auditory tests is that not all disorders are space occupying lesions and can be diagnosed by radiologic techniques . Other disorders such as traumatic , vascular and inflammatory lesions can be examples of non-space occupying diseases that need refined diagnostic procedures . In addition to these factors , the new available information has indicated that the central auditory nervous system [CANS] may be affected secondarily to other auditory disorders . For example , Webster and Webster (1977) have shown that even middle ear effusion can cause degeneration of

central auditory fibers in young animals .

Central auditory tests are valuable in diagnosis of central auditory disorders. Central auditory evaluation includes verbal and non-verbal tests (Calero and Antonelli , 1973 ; Stephens , 1974) .

Masking level difference is one of the non-verbal tests (Noffsinger et al , 1973) and was proved to be a valuable test in diagnosing subtle central auditory lesions (Berlin , 1976 ; Olsen and Noffsinger , 1976 and Quaranta et al , 1978) .

Review of Literature

REVIEW OF LITERATURE

ANATOMICAL AND PHYSIOLOGICAL CONSIDERATIONS OF THE CENTRAL AUDITORY NERVOUS SYSTEM { CANS }

Anatomical Considerations :

The fibers of the auditory nerve originate from the hair cells of the cochlea . Centrally they enter the cochlear nucleus and bifurcate to send a branch to both the dorsal and ventral divisions of the nucleus . Experimental studies by Rose et al , (1960) suggest a tonotopic arrangement with axons from the basal end of the cochlea projecting most dorsally and those from the apical end projecting most ventrally , fig.(1) .

From the cochlear nucleus , there are three main afferent pathways (Strominger , 1971) : that project to the superior olivary complex , the nuclei of lateral lemniscus and the trapezoid body . The superior olivary complex consists of three major nuclei (Olszewski and Baxter , 1954) : the lateral , the medial superior olivary nuclei and the nucleus of the trapezoid body. The

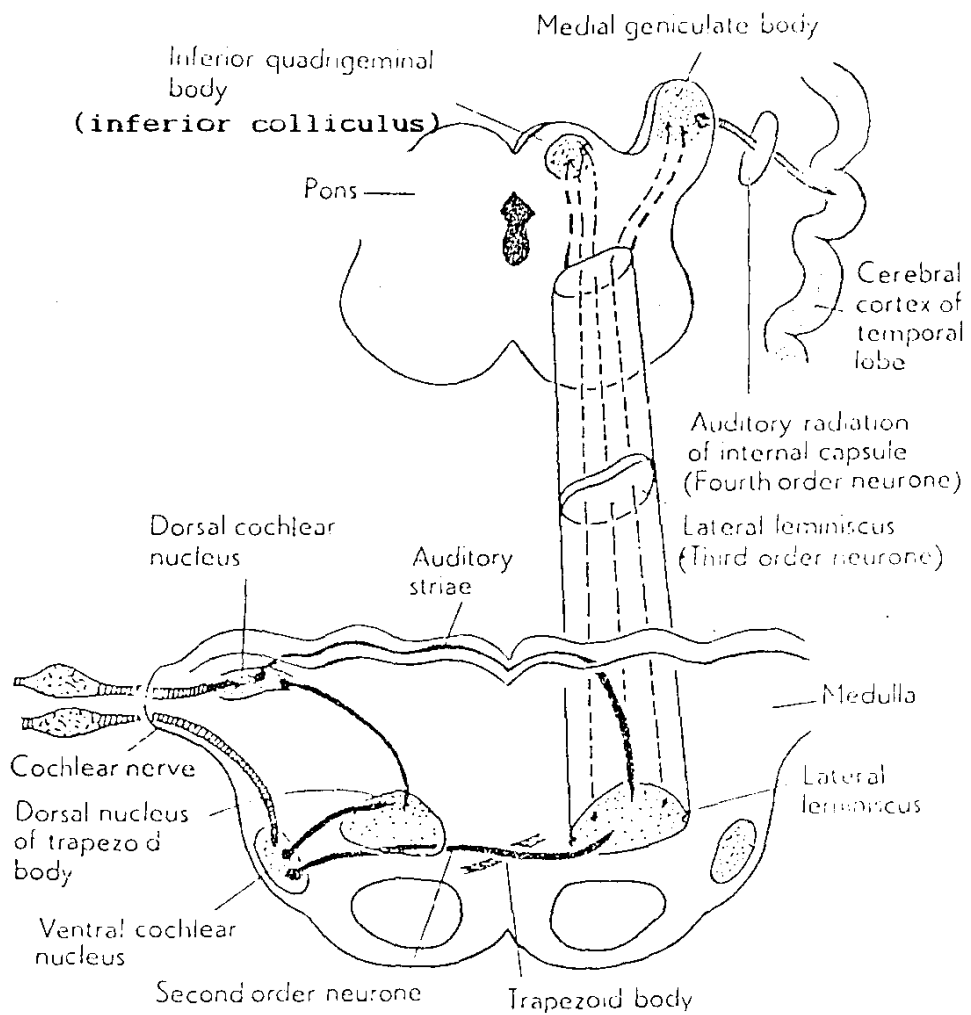


Fig 1 : The central auditory pathway

From: Diseases of the ear: a textbook of otology. Mawson, S.R. and Ludman , H. ed. 4 , The Laveham Press Ltd., U.K.

superior olivary complex is innervated tonotopically so that the whole length of the base of the cochlea project to the lateral nucleus while only the middle and apical portions project to the medial nucleus (Harrison and Howe 1974) . The ascending fibers from the superior olivary complex run tonotopically in the lateral lemniscus to the central nucleus of inferior colliculus . Few fibers from the lemniscal pathways by-pass the inferior colliculi to reach the medial geniculate body in the thalamus directly (Harrison and Howe , 1974). From the inferior colliculi fibers project via the brachium of the inferior colliculus to the ipsilateral medial geniculate body (Jungert , 1958) . The ventral division of the medial geniculate body is tonotopically related to the cochlea by its organization into laminae (Atkin and Webster,1971). From the medial geniculate bodies of the thalamus the afferent pathways project to the auditory cortex .

The auditory pathway is characterized by multiple crossings at different levels namely : the trapezoid body, the lateral lemniscus , the inferior colliculus and the medial geniculate body . These crossings allow bilateral cortical representations of the incoming signal (Jungert,

1958) . The auditory cortex occupies the superior, medial and lateral surfaces of the superior temporal gyrus. Rose (1949) by cyto-architectural techniques could differentiate the auditory cortex into primary, secondary auditory cortex and a further auditory area on the posterior ecto-sylvian gyrus . Later , Rose and Woolsey (1958) showed that the secondary somato sensory area (S II) and the insulo-temporal area (I-T) were considered to be other auditory association areas .

Physiological Considerations :

The auditory pathway has considerable redundancy with multiple representations of the cochlea at all levels of the central auditory system (Durrant and Lovrinic, 1977). This redundancy is due to the anatomical structure of the central auditory system involving alternative pathways for signal perception (Durrant and Lovrinic , 1977) . The central auditory system is characterized by tonotopic organization of its fibers which means that there is spatial orientation of fibers based on the specific tones they transmit. This tonotopic