بسم الله الرحمن الرحيم

MONA MAGHRABY

شبكة المعلومات الجامعية

التوثيق الالكتروني والميكروفيلم

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شبكة المعلومات الجامعية

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جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

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Cortical and subcortical processing of speech in cochlear implant recipients with auditory neuropathy spectrum disorder

Thesis

Submitted for Partial Fulfillment
of Master's Degree in **Audiovestibular Medicine**

By

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List of Abbreviations

Abb.	Full term
ABR	*Auditory brainstem response*
ACC	*Acoustic Change Complex*
AEPs	*Auditory evoked potentials*
ANSD	*Auditory neuropathy spectrum disorder*
APHAB	*Abbreviated Profile of Hearing Aid Benefit*
ASSR	*Auditory steady state response*
AV	*Aversiveness of sounds*
BCNC	*Bony cochlear nerve canal*
BN	*Background noise*
c-ABR	*Complex auditory brainstem response*
CAEP	*Cortical auditory evoked potential*
CAP	*Categories of auditory performance*
CAP	*Central auditory processing*
CI	*Cochlear implant*
CM	*Cochlear microphonic*
CMV	*Cytomegalovirus*
CND	*Cochlear nerve deficiency*
CNS	*Central nervous system*
CPA	*Conditioned play audiometry*
CT	*Computed tomography*
CV	*Consonant vowel*
E-ASSR	*Electrically Evoked Auditory Steady-state Responses*
EC	*Ease of communication*

List of Abbreviations (Cont...)

Abb.	Full term
ECAPs	*Electrical compound action potentials*
ECochG	*Electrocochleography*
ESP	*Early Speech Perception test*
FFR	*Frequency following respone*
FM	*Frequency modulation*
HA	*Hearing aid*
HF	*High frequency*
IAC	*Internal auditory canal*
IC	*Inferior collicullos*
IHCs	*Inner hair cells*
IQ	*Intellectual quotient*
IT-MAIS	*Infant Toddler Meaningful Auditory Integration Scale*
LLR	*Late latency response*
MAIS	*Meaningful auditory integration scale*
MEMRs	*Middle ear muscle reflex*
MLR	*Middle latency response*
MRI	*Magnetic resonance imaging*
MUSS	*Meaningful use of speech scale*
NH	*Normal hearing*
OAEs	*Otoacoustic emissions*
OHCs	*Outer hair cells*
PTA	*Pure tone audiometry*
RECD	*Real-ear-to-coupler difference*
RV	*Reverberation*
S-ABR	*Speech evoked auditory brainstem response*

List of Abbreviations (Cont...)

Abb.	Full term

SIR ..... *Speech intelligibility rate*
SLR ..... *Short latency responses*
SNHL ..... *Sensorineural hearing loss*
SNR ..... *Signal to noise ratio*
SP ..... *Summating potential*
SPIN ..... *Speech in noise*
SRT ..... *Speech reception threshold*
VRA ..... *Visual reinforcement audiometry*

INTRODUCTION AND RATIONALE

Auditory neuropathy spectrum disorder (ANSD) is a form of a hearing impairment characterized by normal hair cell functions as indicated by cochlear microphonics (CMs) and/or otoacoustic emissions (OAEs) and absent or grossly abnormal auditory brainstem responses (ABRs). Patients with ANSD often have difficulty hearing in noise and exhibit speech perception abilities that are disproportionately poor relative to the severity of hearing loss as measured by pure tone audiometry ***(Rance et al., 2005).*** Cochlear implantation (CI) has been used as an option for patients with ANSD who demonstrate limited benefit from conventional amplification ***(Teagle et al., 2010).***

The auditory evoked potentials are one of the objective measures to check the integrity of the auditory function and neuroplasticity ***(Golding et al., 2007).*** The P1 cortical auditory evoked potential (CAEP) has been established as a biomarker for assessing the maturation of the central auditory system in children ***(Sharma et al., 2005; Sharma and Dorman, 2006).*** The obligatory cortical potential consists of three peaks that are recorded within a latency range extending from 50 to 200 ms. The peaks are traditionally labeled individually as P1, N1, and P2.

The P1-N1-P2 recorded from the auditory cortex following presentation of an acoustic stimulus is believed to reflect the neural encoding of a sound signal, but this provides