

// ()
 / / , ,

(VEMP)

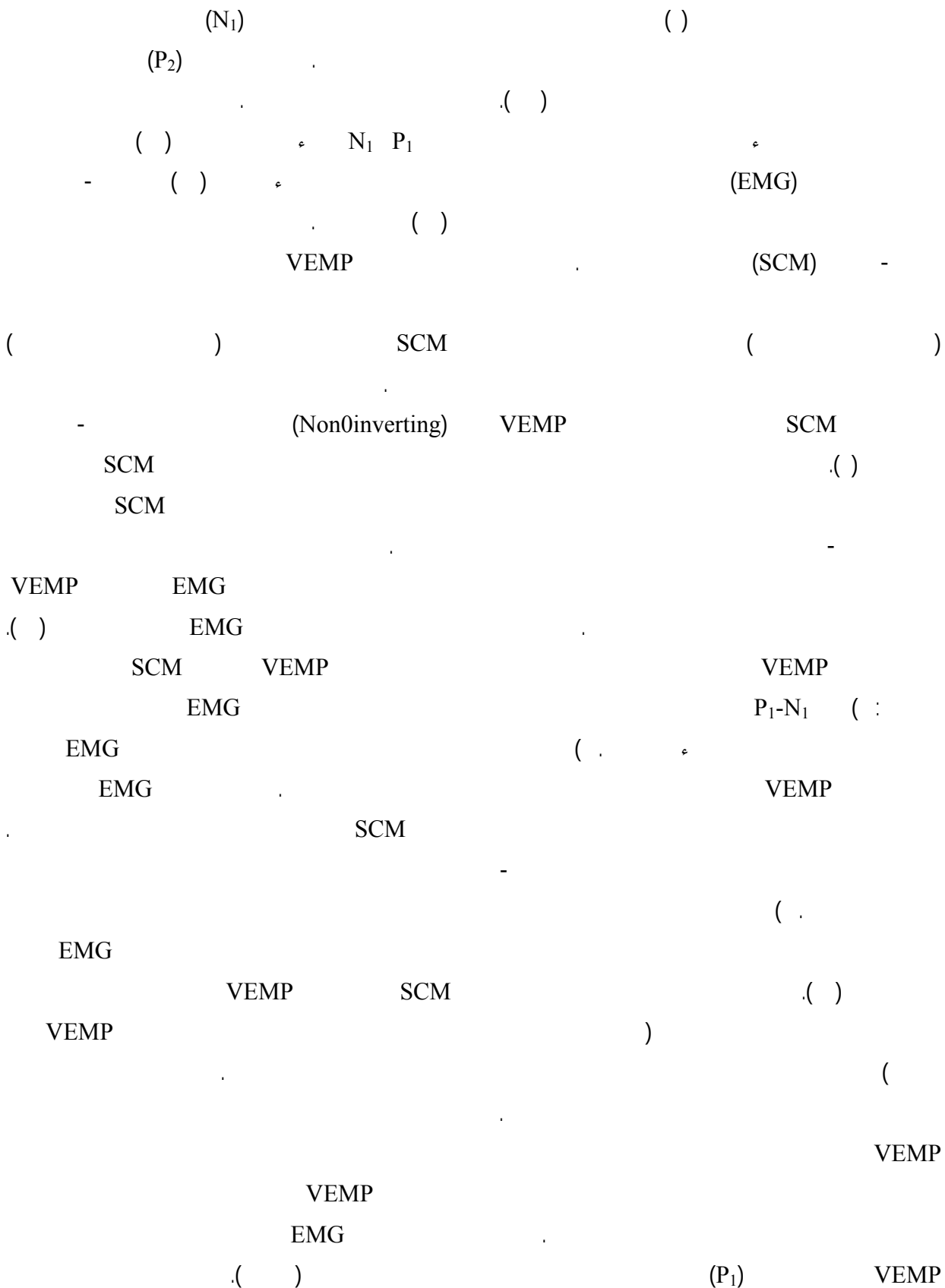
*

(EMG) (VEMP) :
 (SCM) -
 (-) VEMP ,
 VEMP - :
 -
 VEMP - :
 - VEMP dBnHL
 Hz -
 VEMP
 VEMP :
 Hz -
 - :
 -

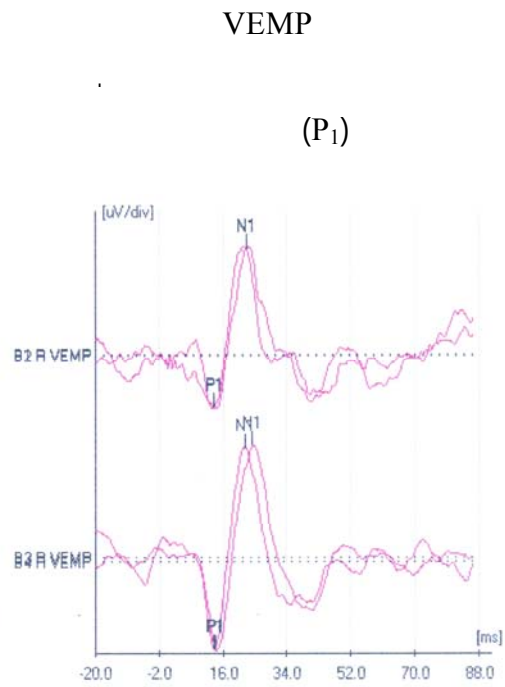
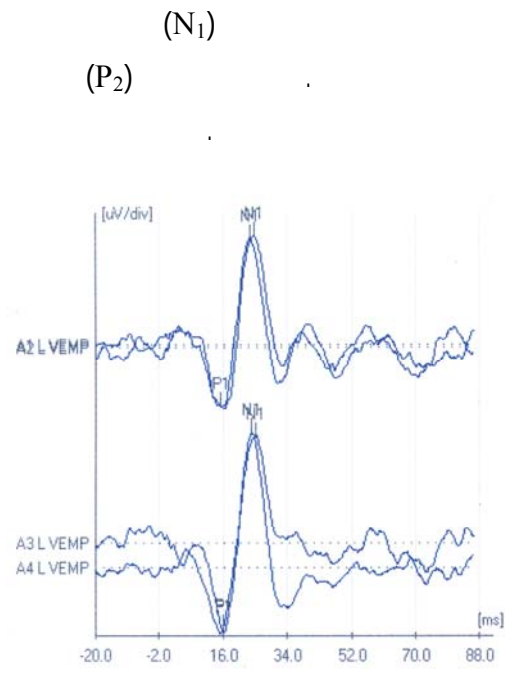
()
 () ()
 VEMP .()

zjafar@uswr.ac.ir :

,
 ,
 ,



/			
VEMP	(		
ENG/	)		
	(		
VEMP	.()		
		mmHg	
	.()		mmHg
VEMP	(mmHg)		
		mmHg	
		VEMP	
		EMG	
	.(-)	VEMP	
		VEMP	
	()		
	()		
(/ ± /)			
	VEMP		
Bio-Logic	AEP	VEMP	-
	AEP System 580-NAVPRO		
/ Hz ()		.()	
	()	-	VEMP
/)		()	
/ dB nHL (		.()	
- Hz			
P ₁	P ₁ -N ₁		
	N ₁	)	



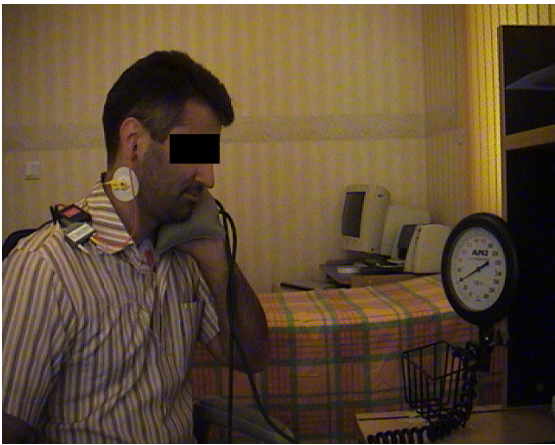
dB nHL

VEMP

-

) SCM

(



SCM

(

)

SCM

-

SCM

SCM

.()

()

-)

(

) VEMP

-

SCM

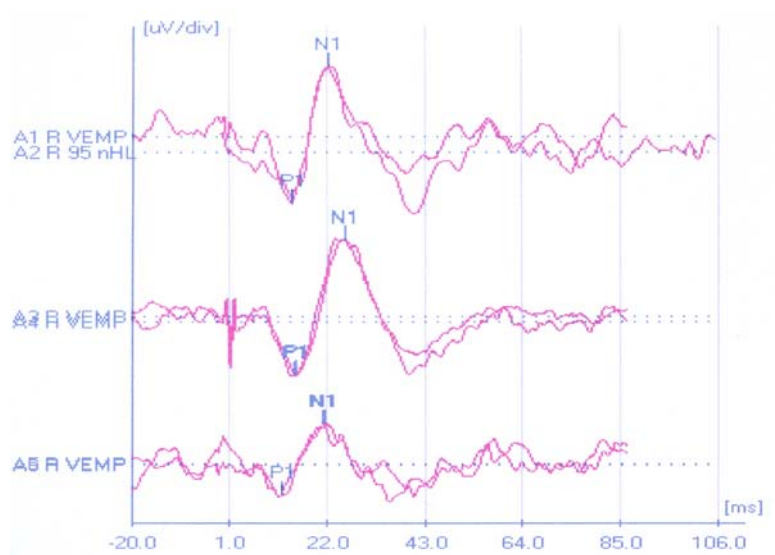
-

(SCM

) SCM

(

P_1-N_1 SPSS 12
 $(\quad / \pm \quad /)$ $(\quad)$
 $/ \pm /)$ $(\quad / \pm /)$. $P < /$
 $(\quad)$
 P_1-N_1
 $(P= /)$ VEMP
 $(P= /)$)
 $(P= /)$ dBnHL $(\quad)$
 $(\quad)$.



dB nHL VEMP -
 SCM

$/ \pm /$ $/ \pm /$ P_1
 $/ \pm /$ $/ \pm /$ P_1-N_1 N_1
 N_1 P_1 VEMP
 $(\quad)$
 $(\quad : P_1$ N_1 P_1
 $(\quad$ $/ \pm /$ $/ \pm /$

VEMP

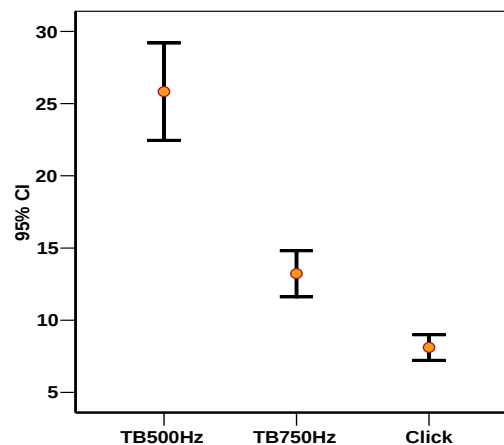
(: N_1

VEMP

VEMP ()

VEMP

()



VEMP

VEMP

()

dBnHL

N_1 P_1

VEMP

(N_1 P_1) VEMP

(-)

()

()

()

()

()

SCM

)

VEMP

VEMP

(

VEMP

VEMP

()

() ()
 (ENG) VEMP
)
 VEMP (VEMP
 () SCM
 SCM VEMP
 VEMP
 EMG
 VEMP EMG VEMP
 VEMP ()
 SCM
 VEMP SCM

REFERENCES

1. Popper A, Plan C, Soidal W. Acoustic functions in the fish ear. Trends Neurosci 1882; 5: 276-80.
2. Moffat A, Capranica R. Auditory sensitivity of the saccule in the American toad (Buft Americanus). J Compo Physiol 1976; 105: 1.
3. Young E, Fernandez C. Goldberg J. Responses of squirrel monkey vestibular neurons to audio-frequency sound and head vibration. Acta Oto-Laryngologica 1977; 84: 352-60.
4. Murofushi T, Curthoys IS, Topple AN, Colebatch JG, Halmagyi GM. Response of guinea pig primary vestibular neurons co clicks. Experiment Brain Res 1995; 103: 174-8.

5. McCue Mp, Guinan JJ. Spontaneous activity and frequency selectivity of acoustically responsive vestibular afferents in the cat. *J Neurophysiol* 1995; 74(4): 1563-72.
6. Bickford RG, Jacobson JL, Cody TR. Nature of average evoked potentials to sound and other stimuli in man. *Ann N Y Acad Sci* 1964; 112: 204-23.
7. Colebatch JC. Vestibular evoked potentials. *Curr Opin Neurol* 2001; 14: 21-6.
8. Akin FW, Murnane OD, Proffitt TM. The effects of click and tone-burst stimulus parameters on the vestibular evoked myogenic potential (VEMP). *J Am Acad Audiol* 2003; 14 (9): 500-9.
9. Halmagyi GM, Curthoys I. Otolith function tests. In: SJ Herdman S, editor. *Vestibular Rehabilitation*. Philadelphia: FA. Davis. 2000; PP: 196-214.
10. Zhou G, Cox L. Vestibular evoked myogenic potentials: histoty and overview. *Am J Audiol* 2004; 13: 135-43.
11. Colebatch JC, Halmagyi GM. Vestibular evoked potentials in human neck muscles before and after unilateral vestibular deafferentation. *Neurology* 1992; 42: 1635-6.
12. Colebatch J, Halmagyi GM, Skuse NF. Myogenic potentials generated by a click-evoked vestibulocollic reflex. *J Neurol Neurosurg Psychiat* 1994; 57: 190-7.
13. Wu C, Young Y. Vestibular evoked myogenic potentials are intact after sudden, deafness. *Ear Hear* 2002; 23: 235-8.
14. Vanspauwen R, Wuyts FL, Van de Heyning PH. Improving vestibular evoked myogenic potential reliability by using a blood pressure manometer. *Laryngoscope* 2006; 116: 131-5.
15. Vanspauwen R, Wuyts FL, Van de Heyning PH. Validity of a new feedback method for the VEMP test. *Acta Oto-Laryngologica* 2006; 126: 796-800.
16. Roberrson DD, Ireland DJ. Vestibular evoked myogenic potentials. *J Otolaryngol* 1995; 24: 3-8.
17. Lim CL, Clousron P, Sheean G, Yiannikas C. The influence of voluntary EMG activity and click intensity on the vestibular click evoked myogenic potential. *Muscle Nerve* 1995; 18: 1210-3.
18. Bath AP, Harris N, Yardley MP. The vestibulo-collic reflex. *Clin Otolaryngol* 1998; 23. 462-6.
19. Li MW, Houlden O, Tomlinson RD. Click evoked EMG responses in sternocleidomastoid muscles: characteristics in normal subjects. *J Vestibular Res* 1999; 9: 327-34.
20. De Waele C. Tran Ba Huy P, Diard J-P, Freyss G, Vidal PP. Saccular dysfunction in Meniere's disease. A vestibular-evoked myogenic potential study. *Ann N Y Acad Sci* 1999; 871: 392-7.
21. Murofushi T, Matsuzaki M, Chih-Hsiu W. Short tone burst evoked myogenic potentials on the sternocleidomastoid muscle: Are these potentials also of vestibular origin? *Arc Otolaryngol Head Neck Surg* 1999; 125: 660-4.
22. Todd NPM, Cody FWJ, Banks JR. A saccular origin of frequency tuning in myogenic vestibular evoked potentials: implications for human responses to loud sounds. *Hear Res* 2000; 141: 180-8.
23. Ochi K, Ohashi T, Nishililo H. Variance of vestibular-evoked myogenic potentials. *Laryngoscope* 2001; 111: 522-7.

-
24. Welgampola MS, Colebatch JG. Characteristics of tone burst-evoked myogenic potentials in the sternocleidomastoid muscles. *Otol Neurotol* 2001; 22: 796-802.
 25. Akin FW, Murnane OD, Panus PC, Caruthers SK, Wilkinson AE, Medley TM. The influence of voluntary tonic EMG level on the vestibular evoked myogenic potential. *J Rehabil Res Dev* 2004; 41(3B):473-80.
 26. McCue MP, Guinan JJ. Acoustically responsive fibers in the vestibular nerve of the cat. *J Neurosci* 1994; 14(10): 6058-70.
 27. Zhou G, Cox L. Vestibular evoked myogenic potentials: history and overview. *Am J Audiol* 2004; 13: 135-43.
 28. Rauch S. Vestibular evoked myogenic potentials. *Otolaryngol Head Neck Surg* 2006; 14: 299-304.