

· William C Koller*

Visual Cues in Essential Tremor

Man-Wook, Seo, M.D., William C Koller, M.D.*

Department of Neurology, Chonbuk National University Medical School
Department of Neurology, Kansas University Medical School*

- Abstract -

Purpose : The pathophysiology of essential tremor(ET) remains unknown. PET studies of ET showed some conflicting data. One study reported significant glucose hypermetabolism of the medulla and thalamus, but other studies reported abnormal bilateral overactivity of cerebellar and red nuclear connections. The previous experimental studies suggested that each PET finding reflects a part of neural circuit which is responsible for ET. So it can be imagined that olivocerebellar oscillation may be transmitted by the way of cerebellar projections to the thalamus in ET. It has been reported that the cerebellar dentate nucleus neurons are involved in the generation and/or guidance of movement based on visual cues. The purpose of this study is to clarify the role of dentato-thalamic tract in ET. **Methods** : Tremor amplitudes were recorded as each patient perform two kinds of task, one involving sensory-guided movement and the other involving memory-guided movement. Each patient was asked to move his/her index finger following a smoothly moving target. He/She also was asked to perform the same movements with his/her eyes closed ET. **Results** : The results showed that average amplitudes of tremor were significantly higher during visually guided task than during memory guided task in ET patients. **Conclusions** : Our results led us to conclude that dentato-thalamic tract might be related to the control of tremor in ET.

Key Words : Essential tremor, Visual cues, Dentatothalamic tract

가 가 가
가 .

가 .

가

634 - 18

TEL) 063 - 250 - 1895, FAX) 063 - 251 - 9363, e - mail) smw@moak.chonbuk.ac.kr

가
Labview
(olovocerebellar oscillation)가

1. PET
40
가
가
10 8 2
10 7 , 3
10 7 , 3
(Fig. 1). 10

Table 1, 2
0.49±0.42 G
0.21±0.21 G
3.78±1.72 Hz
5.56±1.32 Hz
가
Wilcoxon Signed Ranks test
p=0.008(p<0.001)
가
p=0.037(p<0.05)
가

10 (:5, :5, 65.7±4.8) 가

Findley
Koller(1994)
가
가

2 PET
가
가
2 PET

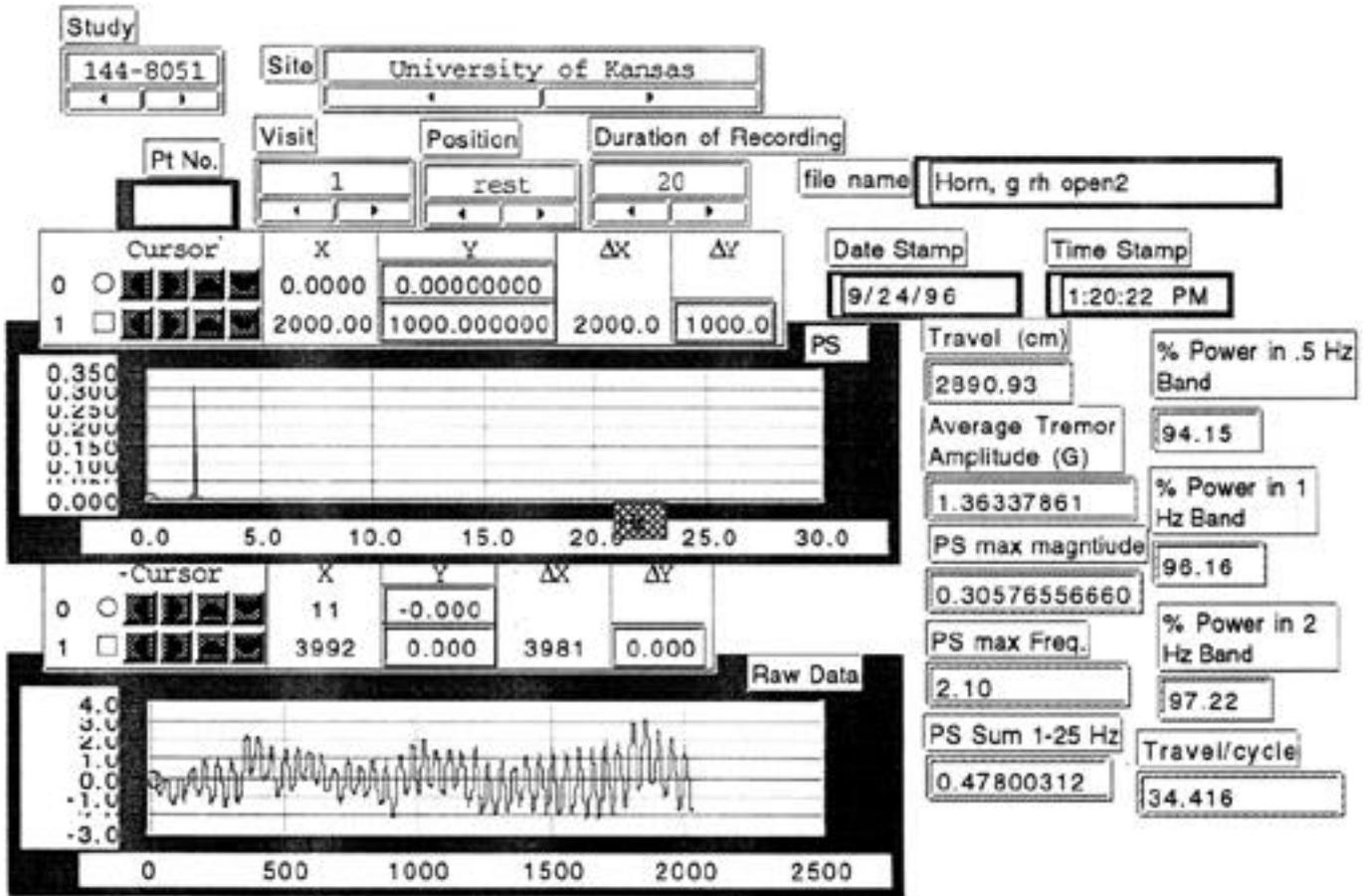


Figure 1. The sample of frequency spectra and strip chart of tremor in ET. Tremor amplitudes were recorded as each patient perform two kinds of task, one involving sensory-guided movement and the other involving memory-guided movement. Each patient was asked to move his/her index finger following a smoothly moving target. He/She also was asked to perform the same movements with his/her eyes closed. ET : essential tremor.

Table 1. Average amplitudes of tremor in 10 essential tremor cases both in eye open state and in eye close state(unit: G).

	1	2	3	4	5	6	7	8	9	10
eye open	0.25	1.45	0.17	0.62	0.10	0.46	0.33	0.72	0.71	0.04
eye close	0.13	0.44	0.04	0.23	0.23	0.24	0.05	0.70	0.03	0.04

Table 2. Most frequent tremor frequencies in 10 essential tremor cases both in eye open state and in eye close state(unit: Hz).

	1	2	3	4	5	6	7	8	9	10
eye open	1.30	4.20	3.60	1.80	6.60	4.60	4.70	4.60	1.50	4.90
eye close	7.00	4.60	4.50	5.30	6.30	4.70	4.90	5.20	8.50	4.60

3

(Fig. 2). 가 , 가

가

Bucher 4

가

가
 Mitoma¹⁴
 가
 (Fig. 2).
 가

1. Deuschl G, Elble RJ. The pathophysiology of essential tremor. *Neurology* 2000;54:S14-20.
2. Jenkins IH, Bain PG, Colebatch JG. A positron emission

- tomographic study of essential tremor: evidence for overactivity of cerebellar connections. *Ann Neurol* 1993;34:82-90.
3. Hallett M, Dubinsky RM. Glucose metabolism in the brain of patients with essential tremor. *J Neurol Sci* 1993;114:45-48.
4. Bucher SF, Seelos KC, Dodel RC. Activation mapping in essential tremor with functional magnetic resonance imaging. *Ann Neurol* 1997;41:32-40.
5. Young RR. Essential tremor. In: Vinken PJ, Bruyn GW, Kalawans HL. *Handbook of clinical neurology*, Amsterdam: Elsevier, 1986;49:565-581.
6. Dupuis MJM, Delwaide PJ, Boucuy D, Gonsette RE. Homolateral disappearance of essential tremor after cerebellar stroke. *Mov Disord* 1989;22:118.
7. Laitinen L. Stereotaxic treatment of hereditary tremor. *Acta Neurol Scan* 1965;41:74-79.
8. Duncan R, Bone I, Melville ID. Essential tremor cured by infarction adjacent to the thalamus. *J Neurol Neurosurg Psychiatr* 1988;51:591-592.
9. Joo-Hyuk Im, Jong-sung Kim, Myoung-chong Lee. Disappearance of essential tremor after small thalamic hemorrhage. *Clinical Neurol & Neurosurg* 1996;98:40-42.
10. Nagaratman N, Kalasabail G. Contralateral abolition of essential tremor following a pontine stroke. *J Neurol Sci* 1997;149:195-196.
11. Longo VG, Masotti M. Effect of tremogenic agents on the cerebellum: a review of biochemical and electrophysiological data. *Int Rev Neurobiol* 1985;26:315-329.
12. Larochelle M, Bedard P, Boucher R. The rubro-olivo-cerebello-rubral loop and postural tremor in the monkey. *J Neurol Sci* 1970;11:53-64.
13. Mushiaki H, Peter LS. Preferential activity of dentate neurons during limb movements guided by vision. *J Neurophysiol* 1993;70:2660-2664.
14. Mitoma H, Mushiaki H, Yokota T. Action myoclonus induced by visually guided movement. *J Neurol* 1993;241:92-95.