

## 정상인과 Malingering 환자의 지각조절검사에서 검사-재검사의 의의

이현순 · 고의경 · 이일우 · 전경명 · 노환중 · 왕수건

### Test-retest Variability of the Sensory Organization Test in Malingering Subjects

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#### —ABSTRACT—

**Background and Objectives** : The clinical use of computerized dynamic posturography (CDP) in diagnosis and treatment of dizzy patient is based on its scoring system. We can assess balance disorder quantitatively with CDP and use it as a follow up test after treatment of dizziness. CDP can identify postural responses when there is suspected malingering, exaggeration of disability for compensation, or conversion disorder. So it can be used on medico-legal problem in work related claim. CDP findings of malingering show two patterns. First, there is poorer performance on sensory organization test (SOT) conditions 1, 2, 3 than on 4, 5, 6. Second, it may show excessive sway with non-overlapping tracing in MCT. To find another objective criteria for detection of malingering with CDP, we analyzed test-retest variability of SOT. **Materials & Methods** : Eighty healthy volunteers (forty malingeringer, forty control) aged 23-31 (mean 28) were assessed by dynamic posturography. 3 cycles of SOT was done 2 weeks interval. In malingeringer, the examinee was asked to pretend he or she was in the following situation. They experienced temporary unsteadiness and dizziness after job related injury. This resolved without treatment. however they are filling worker's compensation claim for disability, and abnormal test result would strengthen their claim. Test-retest variability defined as difference maximal and minimal score of SOTs. **Results** : The obtained results were as follow 1) Mean scores of SOTs in malingeringer lower than that of control in all 6 conditions 2) Except condition 6, test-retest variability of malingeringer is significantly more than 10 compared to control ( $p < 0.05$ ) 3) test-retest variability of control is less than 10 in condition 1, 2, 3. 4) The most common abnormal finding of the malingeringer is COG alignment (80%) **Conclusion** : If test-retest variability of SOT1-3 is over 10, we should strongly suspect malingering. If test-retest variability of SOT4-6 is over 10, we could suspect malingering. Thus it might be suggested that test-retest variability of SOT could detect malingering from true vertigo. (J Clinical Otolaryngol 2002;13:78-84)

**KEY WORDS** : Malingering · Sensory organization test · Dynamic posturography · Test variability.

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: Malingering -  
40 , 20 , 20

## 서 론

(Computerized Dynamic Posturography, CDP)

### 방 법

Malingering

가

Neurocom Eqitest system CDP 2  
3 SOT . SOT

가

(sway referenced vision) 가

<sup>1)</sup>

malingering 12.5 0  
가 100 falling

가 4, 5, 6 1, 2, 3

2, 5 3,

6 가

(anteroposterior sway)

(lateral sway)

Strategy

(sway)

<sup>2)</sup>

malingering

0

100,

3

(test - retest variability)

malingering

2 3

(sensory organization test,

(equilibrium score)

(sensory

SOT) 2 3

malingering

analysis), strategy score,  
(alignment of center of gravity)

## 대상 및 방법

### 자료 분석

Malingering

2 3

대 상

)가

( malingering

cut - off value

malingering

23~31

malinering

가

(per-

centile) 95 가 (2.5 ) (97.5 ) 97.5 cut - off value T - test Chi - square test , p<0.05

malingering 95% malingering 가 1 8.6 , 2 10.9 , 3 9.0 , 4 25.2 , 5 32.9 , 6 24.0 , 12.0 malingering (Table 3).

**결 과**

**지각조절검사의 검사 - 재검사 점수차**

2 3 ma- linging 가 1, 2, 3 가 (Ta- ble 1). 57.7 , 54.5 , 49.3 가 (Ta- ble 1).

Table 3 1, 2, 3 95% malingering 10 malingering 가 10 , malingering 10 가 65%, 62.5%, 50% 가 (p<0.05). 4, 5 가 10 가 22.5%, 25% , malinge-

(SOT test - retest variability) 1, 2, 3 3.1 , 3.2 , 3.9 , malingering 15.4 , 14.9 , 13.6 가 4, 5 7.7 , 7.3 , malingering 12.9 , 11.9 1, 2, 3 가 1, 2, 3, 4, 5 malingering (p< 0.05). 6 (composite score) (Table 2).

**Table 2.** The value of 2.5 and 97.5 percentile of test-retest variability in each condition

Condition	Malingerer		Control	
	2.5‰	97.5‰	2.5‰	97.5‰
1	2.32	46.75	0.00	8.60
2	3.33	58.38	0.00	10.91
3	3.71	67.30	0.00	8.99
4	3.00	48.63	1.00	25.21
5	0.41	37.35	0.38	32.94
6	1.00	34.94	3.00	23.99
Composite score	2.12	23.88	1.00	12.00

**Table 1.** Mean equilibrium score

Condition	Mean ± SD	
	Malingerer	Control
1	57.5 ± 13.2	91.8 ± 2.9
2	54.5 ± 13.6	91.4 ± 2.6
3	49.3 ± 14.0	90.0 ± 3.6
4	38.6 ± 14.1	75.8 ± 8.2
5	40.0 ± 11.4	66.9 ± 8.5
6	34.0 ± 12.4	62.1 ± 9.8
Composite score	41.0 ± 10.0	79.8 ± 4.3

**Table 3.** Mean score of test-retest variability

Condition	Malingerer	Control
1*	15.4 ± 10.0	3.1 ± 2.2
2*	14.9 ± 10.6	3.2 ± 2.2
3*	13.6 ± 11.7	3.9 ± 2.4
4*	13.0 ± 9.4	7.7 ± 5.6
5*	11.5 ± 6.9	7.3 ± 6.1
6	9.9 ± 6.5	10.2 ± 6.1
Composite score	6.1 ± 5.0	4.5 ± 2.6

\* : p<0.05 by <sup>2</sup> test between malingerer and control

:

Malingering

-

**Table 4.** Distribution of subjects by degree of test-retest variability in each condition (%)

Condition	Malingerer	Control	Sensitivity
1	26/40	0/40	100 (26/26)
2	25/40	0/40	100 (25/25)
3	20/40	0/40	100 (20/20)
4	21/40	9/40	70 (21/30)
5	18/40	10/40	64.3 (18/28)

\* :  $p < 0.05$  by chi-square test counted by Bonferoni method between degree of test-retest variability in malingerer

**Table 5.** Sensitivity of test-retest variability of SOT (Malingering criteria 10) (%)

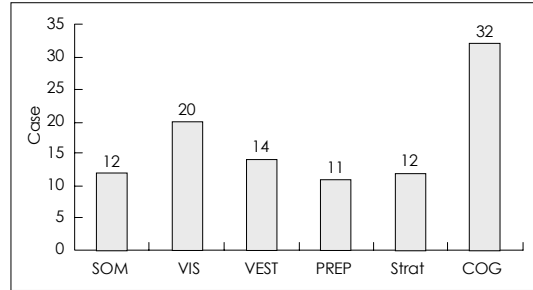
Condition	Malingerer	Control	Sensitivity
1	26/40	0/40	100 (26/26)
2	25/40	0/40	100 (25/25)
3	20/40	0/40	100 (20/20)
4	21/40	9/40	70 (21/30)
5	18/40	10/40	64.3 (18/28)

**Table 6.** Specificity of test-retest variability of SOT (Malingering criteria 10) (%)

Condition	Malingerer	Control	Specificity
1	14/40	40/40	74.1 (40/54)
2	15/40	40/40	72.7 (40/55)
3	20/40	40/40	66.7 (40/60)
4	19/40	31/40	62 (31/50)
5	22/40	30/40	57.5 (30/52)

ring 52.5%, 45% malingering  
가 (p<0.05). 6  
(p>0.1)(Table 1).

- 가 10 malingering  
ing 1, 2, 3  
100% , 4, 5 70%, 64.3%  
(Table 5), - 가 10  
malingering ( , specificity)  
1 74.1%, 2 72.7%, 3 66.7%,  
4 62%, 5 57.5% (Table 6).



**Fig. 1.** Abnormal finding of sensory analysis, strategy and center of gravity (N=40).

**평형점수 이외의 지각조절검사의 소견**

(Sensory analysis)

Malingering  
(vision dysfunction)가 20 (50%) 가 ,  
(vestibular dysfunction)가 14 (31%),  
(somatosensory dysfunction)가 12 (30%),  
(visual preference) 11 (27.5%) (Fig. 1).

Strategy

Malingering 12(30%) hip strategy  
malingering  
hip strategy  
(Fig. 1).

(center of gravity)

Malingering 32 (80%) 가  
(Fig. 1).

**고 찰**

(functional dizziness) malingering

CDP (vestibulospinal reflex)

(postural sway) Krempel <sup>5)</sup>  
 (postural stability) 1 3  
 가  
 가 CDP  
 CDP (nonorganic sway pat- 가 CDP  
 tern)  
 malingering Goebel CDP  
 ring Cevette malinge-  
 malingering ring Cevette  
 Cevette <sup>3)</sup> malingering , , 85.7%  
 , , 3  
 , 2, 6 Cevette  
 가 malingering malingering 1 (2.5%) (ve-  
 , , 39  
 , 1-4 가 malingering Gianoli <sup>6)</sup> 50 , 50  
 5, 6 가 1, 2 95% malingering 50  
 malingering  
 (malingerer), (normal), (vestib- , 가 5 가 2  
 ular weakness group) , 가 1.25  
 Goebel <sup>1)</sup> CDP malingering 가 3, 4, 5, 6 (nonorganic sway pattern)  
 1 가 , 8%,  
 translation) 76%  
 (small and large, forward and backward platform translation) 가 ,  
 가  
 Uimonen <sup>4)</sup> (static posturography) CDP SOT 2  
 , malingering SOT  
 body sway velocity(BSV), body sway  
 area of ellipse(BSE), Romberg quotient -  
 malingering Romberg quotient based sway ve- 1, 2, 3 가 , 4, 5  
 locity 가 , malingering  
 Guidetti <sup>2)</sup> (anteroposterior sway) (p<0.05). 가 6  
 (lateral sway) (sway) (composite score) malin-  
 , , 가 , 가

: Malingering -  
 가 1, 2, 3 10  
 10 1~3 가 100%, 가 74.1%, 72.7%,  
 ing 10 , malingering 66.7% malingering  
 65%, 62.5%, 50% 10  
 , 가 (p<0.05),  
 가 10  
**요 약**  
 malingering 100%  
 . 4, 5 77.5%,  
 75% 10 , malingering 52.5%, (test - retest variability)  
 45% 10 ,  
 가 (p<0.05), - 3 . 23 31  
 가 10 malingering 40  
 70%, 64.3% . 가 malingering 40 2  
 95% 3  
 - 가 1 8.6 ,  
 2 10.9 , 3 9.0 , 4 25.2 , , , , strategy score  
 , 5 32.9 , 6 24.0 , . 95%  
 12.0 malingering - 가 10  
 , 1, 2, 3 -  
 10 malingering 10 가 가 10 , malingering  
 10 malingering 10 가 65%, 62.5%, 50%  
 10 , malingering - 가 10 가 22.5%,  
 10 가 65%, 62.5%, 50% 25% , malingering 52.5%, 45%  
 가 (p<0.05). 4, 5 가 (p<0.05). 6  
 - 가 10 가 (p>0.1).  
 22.5%, 25% , malingering 52.5%, 45% 1,  
 malingering 가 (p<0.05). 2, 3 - 가 10 ma-  
 6 linging , 4, 5  
 (p>0.1).  
 Strategy malingering 12(30%)  
 hip strategy  
 가  
 , malingering  
 (COG alignment) 32 (80%)  
 ma-  
 lingering .

중심 단어 :

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