

시운동성 안진 및 시운동성후안진에 미치는 두위의 영향

홍대영 · 고의경 · 윤종근 · 노환중 · 왕수건 · 전경명

Effect of Head Position on OKN and OKAN

Dae Young Hong, MD, Eui Kyung Goh, MD, Jong Keun Yoon, MD,
Hwan Jung Roh MD, Soo Geun Wang, MD and Kyong Myong Chon, MD

Department of Otolaryngology, College of Medicine, Pusan National University, Pusan, Korea

- ABSTRACT -

Background and Objectives : Optokinetic nystagmus (OKN) is triggered by image slip on the retina. During optokinetic stimulation, activity related to slow phase eye-velocity in the subcortical pathways is stored by "central velocity storage integrator". When the optokinetic stimuli, the integrator discharges, generating optokinetic after-nystagmus (OKAN) with fast phases beating in the same direction as the previous OKN.

Materials and Methods : Horizontal OKN and OKAN were examined in sitting and 90 ° left and right lateral position in healthy adults. Optokinetic stimuli (100 %sec) were given for 45 second using stripe pattern stimulator and then OKAN was recorded for 45 second. Four parameters which were OKN slow component velocity (OKN SCV), initial slow component velocity of OKAN (init SCV), slow cumulative eye position of OKAN (SCEP), and time constant of OKAN (TC) in the sitting position were calculated in 3 positions.

Results : 1) The mean and standard deviation of OKN SCV, init SCV, SCEP and TC in sitting position were 34.9 ± 13.8 %sec, 13.9 ± 6.3 %sec, 211.8 ± 96.5 %sec and 17.1 ± 7.0 sec. 2) In the lateral recumbent position, OKN SCV, init SCV, and SCEP were decreased to 76%, 67%, and 85.6%, but TC was increased to 136.3% of those in sitting position. 3) There was no significant difference in all parameters between clockwise and counter-clockwise optokinetic stimuli. 4. The gravity has no significant effect on OKN and OKAN. **Conclusion :** These results suggest that head position affects OKN and OKAN. (*J Clinical Otolaryngol* 2000;11:60-67)

KEY WORDS : OKN · OKAN · Head position.

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가 가

(optokinetic after - nysta-

(optokinetic nystagmus, OKN)

gmus, OKAN)

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대상 및 방법

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16 31
18 (25.9), 11 (22.5)
29 (Table 1).
Micromedical computerized
ENG system
Micromedical
2 m (optokinetic drum)
2 m
(Figs. 1 and 2).
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Table 1. Age and sex of subjects

Sex	No. of Subject	Age
Male	18	25.9
Female	11	22.5
Total	29	24.2

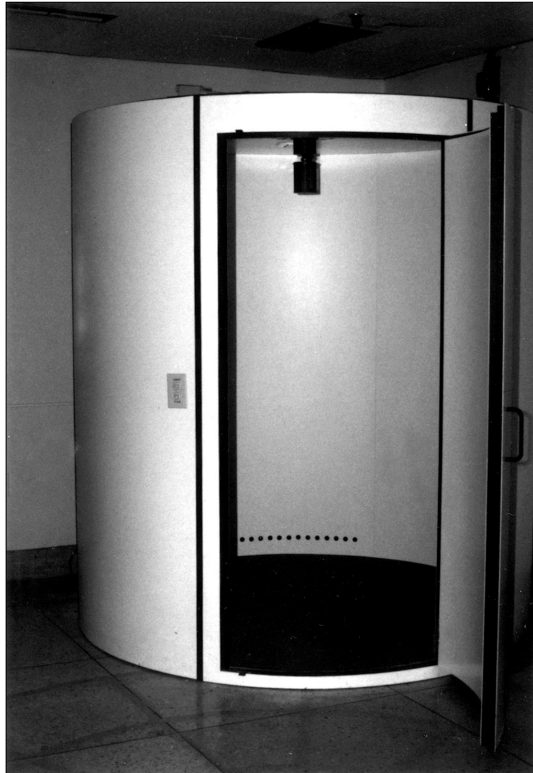


Fig. 1. Optokinetic drum for OKN.



Fig. 2. OKN screen for OKN and OKAN and OKAN in sitting position in lateral recumbent position.

AgCl , OKN 45 (optokinetic
 Electrooculogram(EOG) transmitter, EOG OKAN (initial slow component
 amplifier . EOG amplifier velocity, init SCV), Slow cumulative eye position
 24 Hz low pass filter . (SCEP), (time constant, TC)
 100 OKAN (init SCV) OKAN
 , 45 , 45 2 3
 , OKAN , OKAN SCEP OKAN 45
 10)
 45 OKAN (TC) OKAN
 (sitting position), 90 (init SCV) 가 1/e
 (left lateral recumbent position), 90 7)11)12)
 (right lateral recumbent position) 4 가
 1 , 6 OKN OK - 가
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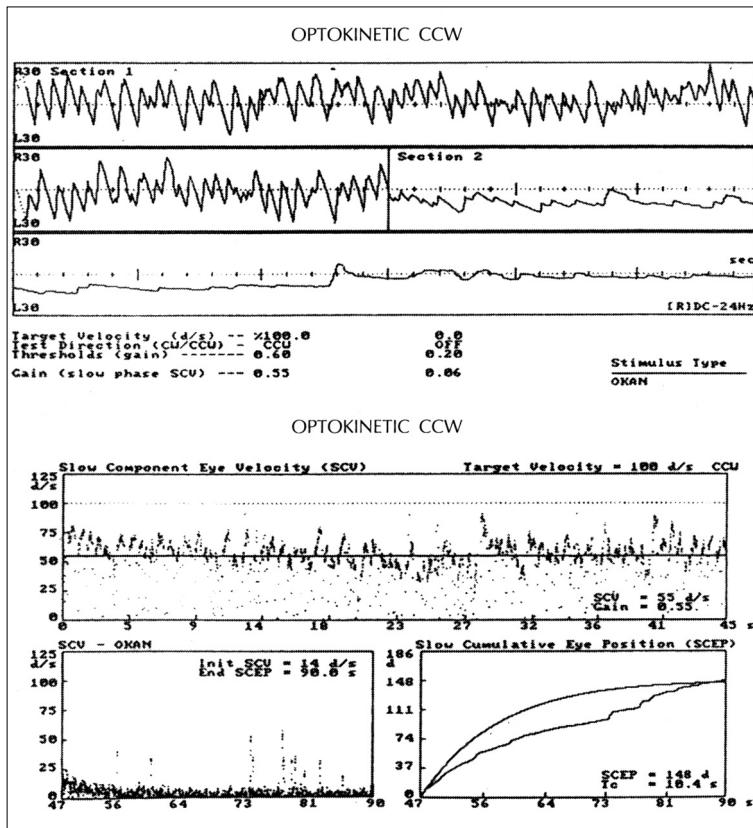


Fig. 3. Result of OKN and OKAN on sitting position (counter-clockwise optokinetic stimulation).

student t - test 13.8 %/sec . SCV 가

2 reverse OKAN 26.1 ± 9.6, 27.5 ± 12.3 %/sec 가 . SCV 34.9 ± 13.8, 26.8 ± 10.3 %/sec 가 (p<0.01) OKN SCV 76%

결 과

각 자세에서 시운동성 안진의 평균 완서상 속도(optokinetic nystagmus slow component velocity, OKN SCV) OKN SCV 34.6 각 자세에서 시운동성후안진의 초기완서상속도(initial slow component velocity, init SCV) ± 14.4 %/sec, 35.3 ± 15.2 %/sec 가 34.9 ± OKAN init SCV

Table 2. Slow component velocity of OKN (OKN SCV) in each position (: %/sec)

Position	Direction		Average
	Clockwise	Counterclockwise	
Sitting	34.6 ± 14.4	35.3 ± 15.2	34.9 ± 13.8*
Lateral recumbent	Rt.	26.7 ± 9.6	26.1 ± 9.6
	Lt.	28.8 ± 12.6	27.5 ± 12.3
	Average	27.8 ± 11.1	25.8 ± 13.0

*p<0.01

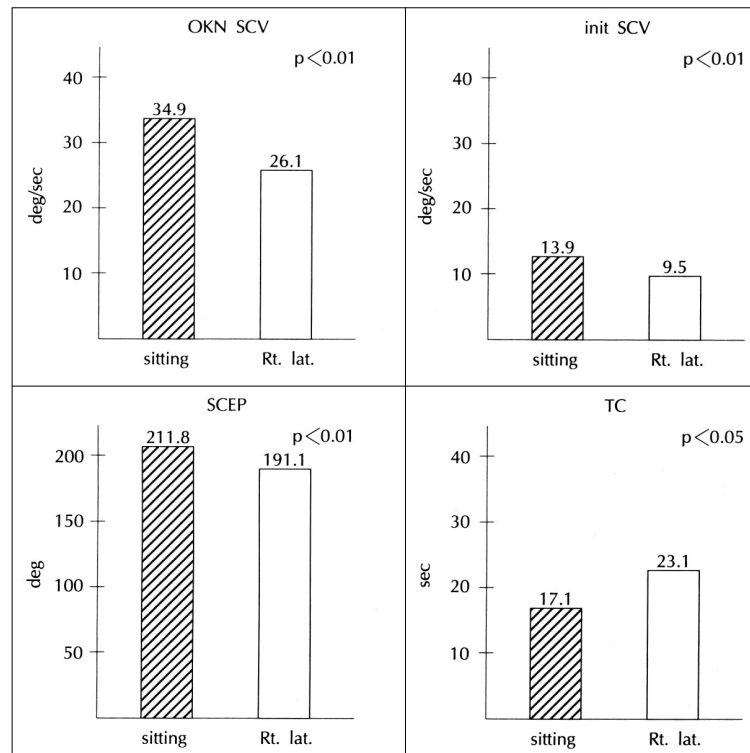


Fig. 4. OKN and OKAN on sitting and Rt. lateral recumbent position.

15.1 ± 7.1 %/sec, 12.7 ± 7.3 %/sec 1 ± 100.7, 171.7 ± 61.8 ° 가
 ± 6.3 %/sec . init SCV 13.9 . SCEP 211.
 가 , 8 ± 96.5, 181.4 ± 76.5 ° OKAN init SCV
 9.5 ± 5.5, 9.4 ± 4.0 %/sec 가 (p<0.01), 85% (Table 4, Fig. 4).
 가 . init SCV 각 자세에서 시운동성후안진의 시간상수(time constant,
 13.9 ± 6.3, 9.5 ± 3.8 %/sec 가 (p<0.01), init OKAN TC 16.3
 SCV 67% (Table 3, Fig. 4). ± 7.3 sec, 18.1 ± 10.3 sec
 17.1 ± 7.0
 각 자세에서 시운동성후안진의 slow cumulative eye po- sec . TC
 sition(SCEP) 가
 OKAN SCEP , 23.1
 222.0 ± 97.6 ; 201.6 ± 103.0 ° ± 10.5, 23.4 ± 14.8 sec 가
 211.8 . 17.1 ± 7.0, 23.3
 ± 96.5 ° . SCEP ± 11.2 sec 가 (p<
 가 0.05), OKAN TC 136%
 , 191. (Table 5, Fig. 4).

Table 3. Initial slow component velocity of OKAN(int SCV) in each position (: %/sec)

Position	Direction	Direction		Average
		Clockwise	Counterclockwise	
Sitting		15.1 ± 7.1	12.7 ± 7.3	13.9 ± 6.3*
	Rt.	8.0 ± 4.2	10.9 ± 8.9	9.5 ± 5.5
Lateral recumbent	Lt.	9.9 ± 5.6	9.0 ± 6.5	9.4 ± 4.0
	Average	8.9 ± 4.4	10.0 ± 7.7	9.5 ± 3.8*

*p<0.01

Table 4. Slow cumulative eye position of OKAN (SCEP) in each position (: °)

Position	Direction	Direction		Average
		Clockwise	Counterclockwise	
Sitting		222.0 ± 97.6	201.6 ± 103.0	211.8 ± 96.5*
	Rt.	186.3 ± 101.1	195.8 ± 110.5	191.1 ± 100.7
Lateral recumbent	Lt.	169.6 ± 72.4	173.7 ± 57.8	171.7 ± 61.8
	Average	178.0 ± 86.7	184.8 ± 84.2	181.4 ± 76.5*

*p<0.01

Table 5. Time constant of OKN (TC) in each position (: sec)

Position	Direction	Direction		Average
		Clockwise	Counterclockwise	
Sitting		16.3 ± 7.3	18.1 ± 10.3	17.1 ± 7.0
	Rt.	23.9 ± 12.7	22.4 ± 13.3	23.1 ± 10.5
Lateral recumbent	Lt.	21.7 ± 18.4	25.0 ± 18.3	23.4 ± 14.8
	Average	22.8 ± 15.6	23.7 ± 15.8	23.3 ± 11.2

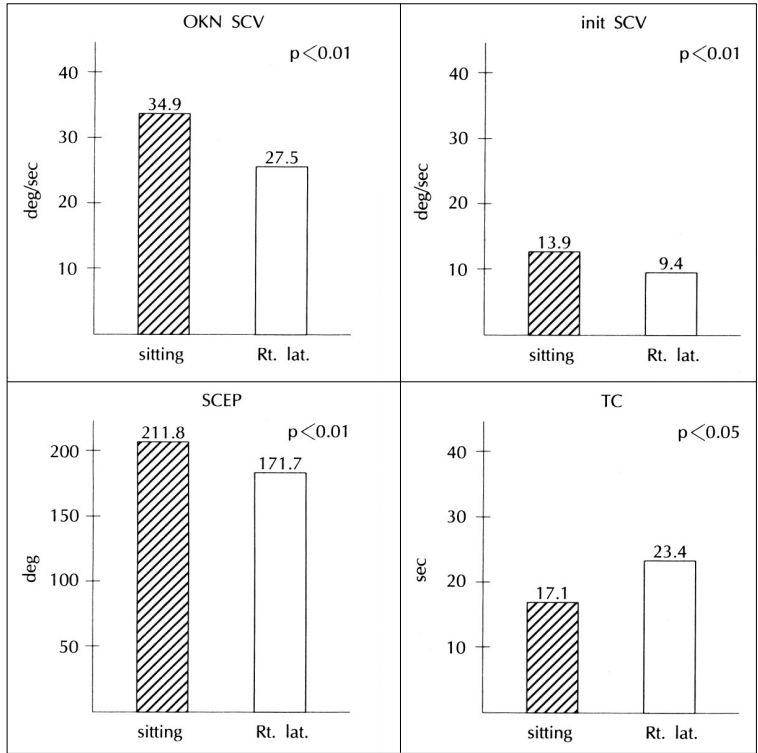


Fig. 5. OKN and OKAN on sitting and Lt. lateral recumbent position.

측위에서 중력방향과 반중력방향의 자극에 의한 시운 동성안진 및 시운동성후안진의 비교

OKAN
가 ,
OKAN
OKAN
(Fig. 5). OKN
SCV, OKAN init SCV, SCEP, TC
OKAN
OKAN
가
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OKAN 100
100
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가
2)3)13) OKAN
Yokota 13)
dot light bar
Ohm

OKN OKAN 가

가 Igarashi²⁰⁾ OKN OK-

OKAN habituation 1 AN 가 OKN OKAN

¹⁴⁾ OKN OKAN

OKN OKAN 가 OKN OKAN 가

OKN OKAN 90 OKN OKAN

KN OKAN O-

cross coupling 요약

(OKN)

, Clement¹⁵⁾ (OKAN) 29

OKAN OKN 90 OKN

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2 (OKN SCV), OKAN (init SCV),

OKAN slow cumulative eye position(SCEP), O-

Raphen Co-OKN (TC) 4가

hen⁶⁾ AN 1)

OKAN

Lafortune¹⁷⁾ 가 cross - coupling 2) OKN SCV, init SCV, SCEP, TC

cross - coupling 34.9±13.8 %/sec, 13.9±6.3 %/

cross - coupling sec, 211.8±96.5 %/sec, 17.1±7.0 sec

3) OKN SCV, init SCV, SCEP가

OKAN 76%, 67%, 85.6% , TC

roll axis 136% 가

OKAN 4)

¹⁸⁾ OKAN

Kalhoun¹⁹⁾

중심 단어 :

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