

## 심상 훈련이 정상성인의 균형에 미치는 효과

### Effects of mental practice on the balance of healthy adults

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#### ABSTRACT

This study aimed to examine the effects of mental practice on normal persons' balance ability. Thirty subjects that participated in the experiment were randomly assigned to an experimental group of 15 subjects and a control group of 15 subjects. Both the experimental group and the control group underwent balance training conducted in a sitting position on a gym ball for 20 minutes per time, five times per week for four weeks and the experimental group additionally underwent mental practice for 10 minutes before balance training. After the intervention, balance measuring equipment (Good Balance, Metitur, Finland) was used to quantitatively measure balance ability. Significant differences in the post-training gains in variable of Medial-lateral, Index of balance function, Time were observed between the experimental group and the control group ( $p < 0.05$ ). Both Application of mental practice with balance training aimed at improving balance ability is considered to have positive effect.

## 1. Introduction

Mental practice is a motor learning method for obtaining and improving motor skills by imagining movement scenes in the head without any body movement. Gerardin et al.1) reported that imagining movement scenes and performing exercises identically activated the frontal lobe of the brain. Although diverse studies of mental practice have been conducted thus far, most of the studies were related to the improvement of upper limb functions of stroke patients and few studies have been conducted on mental practice that improves balance ability. Therefore, the purpose of the present study was to examine the effects of mental practice on normal persons' balance ability.

## 2. Subject and method

Thirty subjects that participated in the experiment were randomly assigned to an experimental group of 15 subjects and a control group of 15 subjects.

Both the experimental group and the control group underwent balance training conducted in a sitting position on a gym ball for 20 minutes per time, five times per week for four weeks and the experimental group additionally underwent mental practice for 10

minutes before balance training2). Among gym ball exercises intended to improve balance ability, maintaining proper postures in a sitting position on a gym ball, laterally moving the body weight, and moving the body weight back and forth were carried out.

After the intervention, balance measuring equipment (Good Balance, Metitur, Finland) was used to quantitatively measure balance ability.

Data analysis was performed using SPSS version 20.0 (SPSS Inc., Chicago, IL, USA). Mean and SD were calculated for each variable. Comparisons of variables before and after training within each group were made using paired sample t-tests. Comparisons of pre- and post-test differences in variables between the experimental and control groups were performed using the independent t-test.

## 3. Results

The experimental group showed significant increments in variable of Medial-lateral, Index of balance function, Time compared to the pre-intervention results ( $p < 0.05$ ). In addition, the control group showed significant increments in the Index of balance function, Time compared to the pre-intervention results ( $p < 0.05$ ). Significant differences in the post-training gains in

variable of Medial-lateral, Index of balance function, Time were observed between the experimental group and the control group ( $p<0.05$ ) (Table 1).

Table1. Comparison of change in characteristics of the experimental group and control group with values presented as mean (standard deviation)

	EG (n=15)		CG (n=15)	
	Pre-test	Post-test	Pre-test	Post-test
Medial-lateral <sup>a</sup> (mm/s)	135.24 (35.62)	110.25 (36.58)*	137.69 (30.24)	130.85 (20.31)
Anterior-posterior (mm/s)	195.21 (38.21)	182.62 (40.21)	193.26 (40.13)	187.84 (41.74)
Index of balancefunction (score) <sup>a, b</sup>	75.43 (12.12)	82.64 (8.56)*	74.23(7.32)	79.35(6.24)*
Time(s) <sup>a, b</sup>	22.72(3.52)	13.52 (2.54)*	23.74(3.62)	18.45(2.45)*

EG, experimental group; CG, control group

<sup>a</sup> Significant difference in gains between two groups,  $p<0.05$

<sup>b</sup> Effect size greater than 0.80

#### 4. Discussion

Mental practice was said to be “imagining movements for body activities without any gross motor activity” 3). Mental practice enables motor skills by imagining proprioceptive senses such as visual senses, auditory senses, tactile senses, motor senses, olfactory senses, and taste senses as if they are actually felt without any external stimulus.

Theories that explain the mechanism of mental practice include first, Paivio’s model4), second, the psycho-neuromuscular theory, and third, the cognitive-symbolio learning theory. Based on the results of previous studies, it can be said that the neuromuscular responses appearing when movement performance is imagined are similar to those appearing when movements are actually performed. Therefore, imagining the movements intended to carry out can be said to be capable of reinforcing the neurologic paths appearing when the movements are actually performed thereby improving the ability to carry out the movements.

#### ■ 참고 문헌 ■

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