

# The Effect of Coordinative Locomotor Training on Physical Factors in Falls and Balance in the Elderly with Mild Cognitive Impairment

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The purpose of this study was to investigate the effect of coordinative locomotor training on physical factors in falls and balance in the elderly with mild cognitive impairment.

Thirty subjects who were diagnosed with mild cognitive impairment by radiological findings, history and physical examination were assigned to each control group(n=15), experimental group(n=15, coordinative locomotor training). Experimental group underwent coordinative locomotor training for 4 weeks, with training sessions 2 times per weeks. Control group were conducted a fall-prevention education for 60 minutes, and did not perform coordinative locomotor training.

To evaluate physical factors in falls, lower extremity strength, cognitive function, depression were measured. To evaluate balance, Korean version of the Fullerton advanced balance scale and biorescue were used. These tests were conducted before training, after training.

The results of 4 weeks of coordinative locomotor training for the elderly with mild cognitive impairment showed that differences between groups were statistically significant, and that experimental group had greater degree of improvement in physical factors in falls and balance. These findings have demonstrated the possibility that coordinative locomotor training may have a functional effect on the fall-prevention and mobility of the elderly with mild cognitive impairment. It is also expected to be a systematic and effective data that can be used as a fall prevention program for the elderly with mild cognitive impairment in each institution.

Key words: Coordinative locomotor training, Mild cognitive impairment, Physical factors in falls, Balance

## The Effects of proprioceptive neuromuscular facilitation (PNF) Pattern Exercise Using the Sprinter and the Skater on Balance and Gait Function in the Stroke Patients

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Purpose: The aim of this study was to assess the effects of proprioceptive neuromuscular facilitation (PNF) pattern exercise using sprinter and skater on balance and gait in the stroke patients.

Methods: Twenty-two subjects were randomly assigned to the experimental group (n=11) and the control group (n=11). The experimental group performed PNF pattern exercise using sprinter and skater for 15 minutes with conventional physical therapy for 35 minutes (matt and gait training for 15 minutes + FES stimulation for 20 minutes), while the control group performed only conventional physical therapy for 50 minutes (matt and gait training for 30 minutes + FES stimulation for 20 minutes). Both groups performed therapeutic interventions for five days per week, for a period of four weeks. Functional Reach Test (FRT) and Berg Balance Scale (BBS) were used for assessment of balance, and Timed-Up and Go test (TUG) was used for testing of gait.

Results: The experimental group showed significant improvements in the FRT and the BBS, while the control group did not show significant changes in two measurements. The experimental group also showed significant improvements, however, the control group did not show significant changes in the TUG. In post-values of three measurements, significant differences were observed between the two groups ( $p<0.05$ ).

Conclusion: This study demonstrated that PNF pattern exercise using sprinter and skater may be used to improve balance and gait function in stroke patients. Thus, we suggested that PNF pattern exercise using sprinter and skater would be a therapeutic intervention in stroke rehabilitation.

Key Words: PNF pattern exercise, Stroke, Balance, Gait

## The Effects of Coordinative Locomotor Training Combined with Climbing on Trunk Muscles Thickness, Balance, and Self-efficacy

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The purpose of this study was to evaluate the effect of coordinative locomotor training (CLT) combined with climbing on the trunk muscle

thickness, balance, and self-efficacy in normal adults, and provide basic data on its clinical applicability.

The participants in this study were a total of 30 college students in their 20s. The number of subjects who participated in all the training sessions excluding four dropouts was 13 persons in the climbing CLT training group (training group) and 13 persons in the group of CLT training on the ground (control group). The trunk muscle thickness, balance, and self-efficacy of the subjects in each group were measured before and six weeks after training. The subjects in each group performed CLT training 3 times a week for 6 weeks for a total of 40 minutes per session, and each session consisted of 10-minute warm-up exercise and 30-minute main exercise.

To investigate the trunk muscle thickness of the subjects, ultrasonography was used to measure the external oblique abdominal muscle, internal oblique abdominal muscle, transversus abdominis, multifidus, and the limits of stability were measured using Biorescue to determine the dynamic balance. A self-efficacy questionnaire was used to assess the self-confidence, individual confidence, or beliefs in specific tasks. A paired t-test was performed to compare the differences between measurements before and after training in each group, and an independent t-test was used to compare the differences between the groups.

As a result, the following results were obtained. First, in terms of the trunk muscle thickness, for the external oblique abdominal muscle, the comparison of variations in each group showed that there was a significant difference in the training group ( $p < .05$ ) and the comparison of measurements between groups showed that there was a significant difference between the groups after training ( $p < .05$ ). For the internal oblique abdominal muscle, the results of comparison of variations in each group indicated that there was a significant difference in the training group ( $p < .05$ ), and the results of comparison of measurements between groups showed that there was a significant difference between the groups after training ( $p < .05$ ). Second, in the limits of stability in the balance, the comparison of variations in each group revealed that there was a significant difference in the training group ( $p < .05$ ), and the results of the between-group comparison showed that there was a significant difference between the groups after training ( $p < .05$ ). Third, regarding self-efficacy, the results of comparison of variations in each group showed that there was a significant difference in the training group ( $p < .05$ ). The results of this study indicated that CLT training combined with climbing increased the thickness of the external oblique abdominal muscle and the internal oblique abdominal muscle of normal adults and positively affected balance and self-efficacy. Therefore, it was confirmed that CLT training combined with climbing is useful for rehabilitation of patients and clinical application of interventions.

## Experimental methods

Experimental group: Climbing CLT (coordinative locomotor training) program  
40 mins, 1 set(40 sec hold), 5 set, 3 times/a week, 6 weeks.

Control group: CLT(coordinative locomotor training) in ground program  
40 mins, 1 set (40 sec hold), 5 set, 3 times/a week, 6 weeks.

#### Outcome measures

##### 1) Trunk muscle thickness measurement

- Achievo CST (V2u Health  
Care, Singapore)

- External oblique muscle,  
internal oblique muscle, transverse abdominal muscle, multifidus

##### 2) Balance measurement

- Center of pressure

(Bio-rescue. RM INGENIERIE, France)

- Static balance, dynamic balance

##### 3) Self-efficacy

- self-questionnaire

Key words: Coordinative locomotor training, Mild cognitive impairment, Physical factors in falls, Balance