3. Dept. of Computer Science and Engineering, Seoul Women's University, Seoul, Korea

Letter to the Editor

*Corresponding Author: Email: ttjeong@swu.ac.kr

Effects of a 16-Week Combined Exercise Program on Isometric Ankle Strength and Gait Velocity in a Selected Sample of Korean Girls

Moon Seok KWON¹, Dong Jun SUNG¹, Wi-Young SO², *Taikyeong Ted. JEONG³

Division of Sport Science, Konkuk University, Chungju-si, Korea
Sports and Health Care Major, Korea National University of Transportation, Chungju-Si, Korea

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Dear Editor-in-Chief

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In clinical practice, regular exercise shows great potential as a method for promoting physical health measures such as weight management and preventing a variety of diseases (1-2). Furthermore, regular exercise has been shown to yield both psychological (e.g., improve anxiety, mood, and depression) and social benefits (e.g., self-esteem and social interaction) (3-4). Several recent studies have reported greater effects of combined exercise on physical fitness and conditions (5-6). However, little existing evidence supports the effects of combined exercise on elementary school students.

Therefore, the purpose of this study was to examine the effects of a 16-wk combined exercisetraining program on isometric ankle strength and gait velocity in Korean female elementary school students.

A sample size of 12 participants was deemed necessary, based on a repeated analysis of variance measure with a 2 x 2 design, an anticipated statistical power of 0.80, an alpha error probability of 0.05, and an effect size of 0.5 (G-power program 3.1.3, Heinreich Heine Universität Düsseldorf, Düsseldorf, Germany). All participants were 8–11yr-old elementary students at the children's fitness center in Seoul, Republic of Korea and had an average age (\pm standard deviation) of 9.00 \pm 1.04 yr, average height of 129.00 \pm 5.34 cm, average weight of 27.96 \pm 3.80 kg, and average body mass index of 16.78 \pm 1.85 kg/m². None of the participants exercised regularly or had any health problems. All participants and their parents submitted written consent forms. All study procedures were approved by the SM Sports Rehabilitation Clinic. Participants were randomly assigned to either the combined eversion (n = 6) or control (n = 6)

combined exercise (n = 6) or control (n = 6)group. All participants in the combined exercise group performed a 60-minmain exercise program that comprised 30 minutes of treadmill running at an intensity of 60-80% of their heart rate reserve, followed by 30 min of resistance training with a maximum of 10-15 repeats for each exercise type. To measure the isokinetic ankle strength, a Pelican 1150 device (Pelican Products, Torrance, CA, USA) was used to determine the muscle strength (kg) of the right ankle in dorsiflexion, plantarflexion, inversion, and eversion. To measure gait velocity, a GaitRite device (CIR System Inc., Sparta, NJ, USA) was used to determine the gait velocity (seconds). A repeated analysis of variance was used to evaluate significant changes in dependent variables before and after the 16-wk combined exercise program in the combined exercise group relative to the control group.

All analyses were performed using SPSS version 18.0 (SPSS Inc., Chicago, IL, USA). The statistical significance level was set at P < 0.05.

Changes in the isometric ankle strength and gait velocity after 16 wk of combined exercise training are shown in Table 1. No significant differences in interaction effects (time X group) were observed on dorsiflexion, plantarflexion, inversion, eversion, and gait velocity were observed between the combined exercise and control groups.

Table 1: Changes in isometric ankle	strength and gai	t velocity after 16	6 wk of combined	l exercise training
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Categories	Exercise	Pre-exercise	Post-exercise	Interaction (Group X Time)	
				F	Р
Dorsiflexion (kg)	Control	7.62 ± 0.92	9.15 ± 2.87	1.685	0.233
	Combined	7.20 ± 1.86	7.18 ± 1.31		
Plantarflexion (kg)	Control	18.38 ± 5.84	18.87 ± 3.60	3.960	0.075
	Combined	12.85 ± 3.43	18.72 ± 5.77		
Inversion (kg)	Control	6.65 ± 2.68	7.07 ± 3.21	0.414	0.534
	Combined	5.57 ± 1.90	7.32 ± 2.79		
Eversion (kg)	Control	6.25 ± 1.94	6.60 ± 3.08	0.101	0.757
	Combined	5.08 ± 2.00	6.03 ± 2.97		
Gait velocity (cm/sec)	Control	61.85 ± 26.44	72.69 ± 34.64	0.653	0.438
	Combined	42.41 ± 17.16	77.92 ± 42.95		

Determined using a 2-way repeated analysis of variance

We concluded that a 16-wk supervised combined exercise program did not affect the isometric ankle strength and gait velocity in our sample of Korean female elementary school students.

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References

- Swift DL, Johannsen NM, Lavie CJ, Earnest CP, Church TS (2014). The role of exercise and physical activity in weight loss and maintenance. *Prog Cardiovasc* Dis, 56 (4): 441-447.
- 2. Kessler HS, Sisson SB, Short KR (2012). The potential for high-intensity interval training to re-

• duce cardiometabolic disease risk. *Sports Med*, 42 (6):489-509.

- Brown HE, Pearson N, Braithwaite RE, Brown WJ, Biddle SJ (2013). Physical activity interventions and depression in children and adolescents: a systematic review and meta-analysis. *Sports Med*, 43 (3): 195-206.
- 4. Eime RM, Young JA, Harvey JT, Charity MJ, Payne WR (2013). A systematic review of the psychological and social benefits of participation in sport for children and adolescents: informing development of a conceptual model of health through sport. *Int J Behav Nutr Phys Act*, 10: 98.
- Sanal E, Ardic F, Kirac S (2013). Effects of aerobic or combined aerobic resistance exercise on body composition in overweight and obese adults: gender differences. A randomized intervention study. *Eur J Phys Rehabil Med*, 49 (1): 1-11.
- Zhuang J, Huang L, Wu Y, Zhang Y (2014). The effectiveness of a combined exercise intervention on physical fitness factors related to falls in community-dwelling older adults. *Clin Interv Aging*, 9: 131-140.

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