



P-ISSN: 2394-1685
E-ISSN: 2394-1693
Impact Factor (ISRA): 5.38
IJPESH 2020; 7(3): 26-28
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www.kheljournal.com
Received: 16-03-2020
Accepted: 18-04-2020

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Applying selected exercises for improving endurance for female athletes aged 15-16 in 800m distance running

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Abstract

The aim of this study was to select and apply exercises for improving endurance of female athletes specialized in 800m distance running. Participants were 18 female athletes aged 15-16, practicing in the Center for Training and Sports Coaching of Nghe An Province, Vietnam. Participants were divided into two groups, control and experiment. Control group included nine subjects, maintained regular training program and experiment group included nine subjects, practiced selected exercises program for increasing endurance. After 12 months of intervention, experiment groups showed better improvement in endurance which examined by four tests. These selected exercises were beneficial for improving endurance and performance of female athletes.

Keywords: Athletes, exercises, 800m distance running

Introduction

In track and field, 800 meters training is a training program that has to be developed to meet the individual needs of the athlete and take into consideration many factors: gender, age, strengths, weaknesses, objectives, training facilities, exercises etc. As all athletes have different needs, a single program suitable for all athletes is not possible. The middle distance runner must undertake a variety of training types in order to develop the necessary qualities such as speed, efficiency, aerobic capacity and lactic acid tolerance in order overcome the tiredness at utmost of capacity. 800m runners have training plans that include both speed and endurance works, in order to improve both the aerobic and anaerobic energy systems, as both of these are used in the race. Therefore, it is necessary to select exercises for training to develop endurance in order to improve performance of female athletes aged 15-16 in 800m distance running.

Methods and design

This was a controlled study. Participants were 18 female athletes aged 15-16, practicing in the Center for Training and Sports Coaching of Nghe An Province, Vietnam. Participants were divided into two groups, control and experiment. Control group included nine subjects, maintained regular training program and experiment group included nine subjects, practiced selected exercises program for increasing endurance and performance. Subjects in experiment group followed selected exercises program within 12 weeks (48 weeks, except 3 weeks of holidays), 6 main sessions per week and 5 supplementary sessions per week. Schedule was: in the morning, from 7.30 to 10.00 a.m, 45 weeks x 6 sessions = 270 sessions, each session last 150 minutes included 30 minutes warm up and cool down, 120 minutes for main part; in the afternoon, from 17.00 to 18.00 p.m, 45 weeks x 5 sessions = 255 sessions, each session last 90 minutes included 30 minutes warm up and cool down, 60 minutes for main part.

Statistical analysis: Independent t test and were performed to analyze the differences between groups. A $p < .05$ was considered to be statistical significant.

Outcomes measurement

To assess the improvement of applying selected exercises for developing endurance and performance of female athletes, the tests, which regularly used in track and field, were applied. These tests are as following:

These tests are as following:

Tests	Purposes
400m running (s)	Assess endurance
600m running (s)	Assess endurance and capacity distribution
10m standing long jump	Assess endurance strength
800m running (minute)	Assess the effects of selected exercises for increasing performance of 800m

Results

Table 1: Results of interview for selecting exercises for increasing endurance for female athletes in 800m running (n=20)

Exercises	Intensity/quantity	Rest
100m running	90% of capacity, 10-12 rep [*] .	4' - 5'
200m repeated running	85 - 90% of capacity, 7-8 rep [*] .	4' - 5'
400m repeated running	85-90% of capacity, 5-6 rep [*] .	2' - 3'
600m repeated running	85% of capacity, 4-5 rep [*] .	3' - 5'
1000m repeated running	80-85% of capacity, 4-5 rep [*] .	4' - 5'
1200m repeated running	80-85% of capacity, 3 rep [*] .	4' - 5'
2000m repeated running	80-85% of capacity, 2 rep [*] .	4' - 5'
Stair climbing (up and down)	85% of capacity, 6-7 rounds	50m slow jog
100m+200m+300m+400m interval running	85-90% of capacity, 2 sets	100m ^{**} ; 400m ^{***}
200m+400m +600m combined running	85-90% of capacity, 2 sets	100m ^{**} ; 400m ^{***}
7 consecutive times standing long jump	5 time/set x 4 sets	45''-1' [†] ; 4'-5' ^{††}
Stand and sit with weight (50kg)	10-15times/set x 5 sets	45'' [†] ; 3'-4' ^{††}
200m running with pulling car tires	With exertion 6 rep [*] .	3'-4'

*repetition; **slow jog for each interval; ***slow jog between sets; †between times; ††between sets; ' =minute

These exercises and their intensity/quantity were the results of interviewing experts, teachers, trainers and coaches who works in the field of physical education, and sport coaching.

Table 2: Results of tests for endurance and performance of control and experiment groups before intervention

Tests	Control group	Experiment group	t	p
	M ± SD	M ± SD		
400m running (s)	64.03 ± 2.57	64.11 ± 2.63	0.73	>.05
600m running (s)	101.21 ± 5.24	101.33 ± 5.35	0.84	>.05
10 consecutive times standing long jump (m)	21.37 ± 1.29	21.24 ± 1.30	0.91	>.05
800m running (minute)	2.24 ± 0.23	2.27 ± 0.17	1.22	>.05

The results of table 2 showed that there were no significant differences in four tests (400m running, 600m running, 10 consecutive times standing long jump, 800m running) between control and experiment groups before intervention with $p > .05$.

Table 4: Results of tests for endurance and performance of control and experiment groups after 12 months of intervention

Tests	Control group	Experiment group	t	p
	M ± SD	M ± SD		
400m running (s)	62.32 ± 2.52	61.34 ± 2.61	2.75	<0.05
600m running (s)	98.33 ± 5.37	96.54 ± 2.62	3.17	<0.05
10 consecutive times standing long jump (m)	22.25 ± 1.33	22.48 ± 1.32	3.53	<0.05
800m running (minute)	2.15 ± 0.23	2.12 ± 0.21	3.92	<0.05

The results of table 4 showed significant improvement in four tests (400m running, 600m running, 10 consecutive times standing long jump, 800m running) between control and experiment groups after 12 months of intervention with $p < .05$.

Discussion

This was a controlled study. Results of the four tests for experiment group were better in comparison to control group. Endurance and performance of female athletes aged 15-16 specialize in 800m distance running were remarkably improved.

Table 3: Results of tests for endurance and performance of control and experiment groups after 6 months of intervention

Tests	Control group	Experiment group	t	p
	M ± SD	M ± SD		
400m running (s)	63.11 ± 2.51	62.34 ± 2.62	1.52	>0.05
600m running (s)	99.27 ± 5.34	98.36 ± 2.55	2.34	<0.05
10 consecutive times standing long jump (m)	21.93 ± 1.24	22.17 ± 1.31	1.47	>0.05
800m running (minute)	2.17 ± 0.25	2.15 ± 0.22	1.62	>0.05

The results of table 3 indicated that there were no significant differences in three tests (400m running, 10 consecutive times standing long jump, 800m running) between control and experiment groups after 6 months of intervention with $p > .05$, except for the test 600m running, which showed significant difference with $p < .05$.

Middle distance running was taken into account in previous findings. Study on effects of hill training suggested that it can significantly improve VO₂ max, speed endurance and race performance in club level middle and long distance athletes for 12 weeks of hill training program [1], and uphill interval running program improve various physiological, biomechanical, and neuromuscular parameters relevant to runner performance [2]. Result of this study is in accordance with the study of Jones which indicated that concurrent strength and endurance training is beneficial for running performance in adolescent endurance athletes [3]. Strength training in endurance of athletes can significantly improve

maximal and reactive strength qualities, running economy, VO₂ max ^[4], and economy, running power and performance ^[5].

Conclusion

After being exposed to the 12-month selected exercise intervention, the experiment group, when compared to the control group, showed significant improvements ($p < 0.05$) in four tests (400m running, 600m running, 10 consecutive times standing long jump, 800m running). These selected exercises were beneficial for improving endurance and performance of female athletes aged 15-16 in 800m distance running.

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