

PE Division, Department of Creative Arts and Physical Education /
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The effects of 6-week rope skipping exercise on physiological responses in school children

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Introduction

- The issue of rope skipping as a method of fitness training is highly concerned by the society.
- Baker (1968) and Jones et. Al. (1962) – an effective means of training the cardiovascular system.
- Jette et. Al (1979), Getchell & Cleary (1980), Town et. Al. (1980) did not support such claim. They indicated rope skipping was too strenuous for sedentary individuals.

Introduction

- Rope skipping can be done indoors and the space requirement is comparatively lower than the other commonly used physical exercises.
- It is therefore a good alternative to other forms of outdoor physical fitness training.

Objective of this study

- To examine the effects of six-week rope skipping on physiological responses in school children and to provide more recent information on the issue of rope skipping.

Method

- Twenty male students, aged 15-16, were randomly recruited from Form Four classes of a secondary school and were evenly divided into two groups (experimental and control groups).
- Both groups took a pretest and a protest on the variables, such as body height, body weight, skinfolds, standing high jump, back strength, heart rate and blood lactate level at rest and after 10-minute rope skipping at the rate of 96 revolutions / minute, 3-minute step test at a rate of 96 beats / minute and recovery heart rate for 30 seconds after 30 seconds, 90 seconds and 150 seconds of the step test.

Method

- The experimental group took 20-minute rope skipping at a rate of 96 revolutions / minute 4 times a week for 6 consecutive weeks between the pretest and protest.
- The control group did not participate in any programmed exercise.
- Paired t-test and two –way ANOVA with repeated measures were conducted to analyze the data.

Results

Variable	Experimental Group		Control Group	
	Pretest	Posttest	Pretest	Posttest
Age	15.4±0.52	15.6±0.52	15.7±0.67	15.7±0.67
Height (cm)	173.57±5.02	173.83±5.05	170.28±6.05	171.21±5.62
Weight (kg)	59.86±5.62	59.93±5.73	55.20±6.49	55.67±6.82
Triceps (mm)	7.82±3.17	7.81±2.88	8.02±2.39	7.6±2.18
Abdomen (mm)	8.01±4.27	7.87±4.15	8.15±2.91	7.85±2.15
Suprailium (mm)	6.39±2.34	6.78±3.24	6.10±1.44	6.62±1.70

Results

Variable	Experimental Group		Control Group	
	Pretest	Posttest	Pretest	Posttest
St. high jump (cm)	57.51±4.77	60.78±5.52	57.15±7.75	59.64±7.45
Back strength (kg)	109.37±15.40	102.2±16.59	89.17±24.79	92.2±19.09
Rest HR	73.1±5.47	61.4±5.23	79.4±4.72	70.5±7.27

Results

Variable	Experimental Group		Control Group	
	Pretest	Posttest	Pretest	Posttest
Blood lactate at rest (mmol/l)	1.223±0.85	1.005±0.44	0.957±0.34	0.874±0.26
Blood lactate after 1 min (mmol/l)	6.455±1.93	7.003±1.29	8.047±2.19	7.481±2.45
Blood lactate after 3 min (mmol/l)	6.785±2.06	6.713±1.73	8.467±2.52	6.993±1.71
Blood lactate after 5 min (mmol/l)	6.589±2.53	6.254±1.96	8.387±2.46	6.805±1.86
Blood lactate after 8 min (mmol/l)	6.031±2.64	5.718±2.33	8.113±2.72	6.239±1.72

Results

Variable	Experimental Group		Control Group	
	Pretest	Posttest	Pretest	Posttest
HR after 10 min rope skipping	175.5±6.11	171.5±8.06	191.8±54.85	178.8±14.98
Step Test Recovery HR after 30s	47±7.01	48±6.78	49.9±6.03	50.6±7.14
Step Test Recovery HR after 90s	40.7±8.65	43.3±6.85	44.6±6.17	45.6±6.69
Step Test Recovery HR after 150s	40±8.00	39.3±5.58	43.6±5.89	41.3±6.57

Results

- Experimental group showed significant differences in
 1. Resting HR ($t = 5.22, p < 0.05$)
 2. Standing high jump ($t = 2.439, p < 0.05$)
 3. Recovery HR after 3-min step test
($F = 9.021, p < 0.001$)
 4. Blood lactate level ($F = 3.304, p < 0.05$)
- Experimental group showed no differences in triceps, abdomen, and suprailium skinfolds, back strength after 10-min rope skipping.

Results

- Control group showed significant differences in suprailium skinfolds ($t = 2.509$, $p < 0.05$) and the resting HR ($t = 9.049$, $p < 0.05$).
- Control group showed no differences in triceps and abdomen skinfolds, standing high jump, back strength, recovery HR in the step test, blood lactate level and HR after 10-min rope skipping .

Discussion

- It revealed that rope skipping was a strenuous activity (Quirk & Sinning, 1982) and (Town et. al., 1980).
- Mean HR after 10-min rope skipping were as follows:
In the pretest:
Experimental: 85% Max HR Control: 94% Max HR
In the posttest:
Experimental: 84% Max HR Control: 87% Max HR
 - These HR were high.
 - Intensity of rope skipping should be increased progressively and monitor carefully.

Discussion

- Blood lactate level revealed that anaerobic power was improved in the experimental group => can tolerate more and attain a higher capacity in skipping.
- Recovery HR (achieved a better cardiovascular fitness) was lower after 6-week of rope skipping in experimental group
- Leg power was also improved in the experimental group (related muscles to exercise in a greater extent and both in a better coordination and recruitment of muscle fibers.)

Conclusion

6-week rope skipping

- Increased leg power, decreased resting HR, exercise HR, recovery HR and blood lactate level after exercise
- No effect on body composition and back strength

Thank You