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Construction of an Added Physical Fitness Training Program to Enhance the Basic Skills in Speed Roller Skate for Young Athletes

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Abstract

Background and Aim: Speed roller skating is a global competitive sport that includes different forms of outdoor road racing and indoor track racing, and has become one of the Asian Games events. The history of this sport combines technological progress, sportsmanship, and globalization, and speed skating has become an important sport in many countries and regions. This research aimed to construct a physical training program to improve the basic skills of starting, straight skating, curved skating, and sprinting of adolescent speed roller skaters.

Materials and Methods: The subjects of this study were 30 female speed roller skaters aged 6-12 years old in Zhuozhou City, Hebei Province, China. They were divided into experimental groups and control groups based on the test results with a systematic sampling technique. The constructed training plan program was validated with IOC at 0.91 (0.80-1.00). The experiment was a two-group pre-test and post-test design, with 15 subjects in each group. The duration was eight weeks, three days a week, with one hour a day. The experimental group trained with a constructed physical training program, while the control group continued the traditional training program. Physical fitness tests and basic skills tests were collected at the pretest and the posttest. The data within groups were analyzed with a paired t-test, and the data between groups were analyzed with an independent t-test.

Results: The research results revealed that: 1) Both the experimental group and the control group improved in physical fitness and basic skills in speed roller skating after training at $P< .05$. 2) The experimental group had greater improvement than the control group on both physical fitness and basic skills in roller skating at $p< 0.05$.

Conclusion: The constructed physical fitness training program could gain more improvement in physical fitness, basic skills in speed roller skate than a traditional training program.

Keywords: Physical Fitness Training Program; Speed Roller Skate; Young Athletes

Introduction

Speed roller skating and speed skating are both speed sports, but speed roller skating is easier to popularize and develop. The following are the specific advantages of this sport:(1) Venue flexibility: speed roller skating can be performed on a variety of venues, such as park trails, stadiums, and even flat streets. Speed skating mainly relies on ice and can usually only be performed on ice rinks or outdoor natural ice in winter. Therefore, roller skating has fewer venue restrictions and is suitable for a wider range of regions and seasons. (2) Climate dependence: speed roller skating is not dependent on cold climate conditions and can be trained and competed year-round. This means roller skaters can train more consistently in areas that are warm or without natural ice, whereas speed skating is often limited by winter weather or artificial ice surfaces (3). Training cost: Training costs for speed roller skating are generally lower than for speed skating. Roller skating equipment is relatively inexpensive and does not require specialized rink maintenance costs. And speed skating requires expensive ice-making equipment and maintenance, which can increase the cost of training and competition. (4) Ease of entry: Speed roller skating is relatively easy to get started with. People can experience roller skating at any time in streets, parks, and other places, but speed skating has a higher entry barrier and requires finding an ice rink and adapting to skating skills on the ice.

Liang (2020). In 2022, the 24th Winter Olympic Games will be successfully held in Zhangjiakou. The speed skating event of the Winter Olympics is a hotbed for my country to "compete for gold and silver medals". When the bid for the 2015 Winter Olympics was successful, there were more than 5,000 registered athletes in winter sports in my country. My country's ice and snow sports teaching, training, competition, and management systems are not sound, school ice and snow sports venues and facilities are backward, and there is a serious shortage of teaching staff. Many conditions need to be improved. This has led to my

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country's inability to continue to export a large number of outstanding short track speed skating and speed skating athletes.

Speed Roller skating is quite similar to short track speed skating and speed skating in competition. Selecting talents from roller skating to the Winter Olympic speed skating event will help to overcome the problem of a shortage of reserve talents, and at the same time, it can also feed back into the development of roller skating. The two can form a good migration effect.

Bai (2022). The original speed roller skating evolved from speed skating and was created for similar skating training during non-ice seasons or regions. Nowadays, it is often used as a training method in ice-free seasons or areas. Speed roller skating is called speed skating, and speed skating is divided into track racing and road racing. (1) Track race: ① Short distance: 300m individual time trial, 500m time trial; ② Middle distance: 1000m time trial; ③ Long distance: 10000m knockout, 15000m knockout. (2) Road race: ①Short distance: 200m individual time trial, 500m time trial; ②Long distance: 10,000m knockout, 20,000m knockout, marathon.

In speed roller skating, basic skills such as starting, straight-line skating, turning, sprinting, and tactical confrontation all require a certain level of physical fitness to complete. In speed roller skating, the physical qualities that affect basic skills mainly include strength, agility, speed, balance, flexibility, and cardiopulmonary endurance. A scientific and effective training system directly affects the competitive performance, technical development, and injury prevention capabilities of speed skaters. The differences in these basic techniques and abilities of athletes will directly become the key to winning on the field.

Physical fitness was critical for young speed roller skaters, working together to enhance athletic performance, technical accuracy, and safety. A reasonable physical fitness training system has many impacts on speed roller skaters. Unreasonable training methods will not only limit their sports performance, but may also have long-term adverse effects on their physical development and sports career. Therefore, it is very important for speed roller skaters to focus on the development of these abilities and use scientific and reasonable training methods for systematic training.

Currently, speed roller skating is an emerging sport. There are few domestic studies on the comprehensive training system for the physical fitness of adolescent speed roller skaters. The specific training model is not yet clear and is still in the exploratory stage. Therefore, this study aimed to construct a physical fitness training system for adolescent speed roller skaters and further study the impact of physical fitness on the basic skills of adolescent speed roller skaters. Through research, we will provide applicable training methods for speed roller skating coaches and physical training researchers, and further enrich the theoretical framework of adolescent speed roller skating athletes.

Objectives

1. To conduct an experimental study on the developed program and compare the results on the effectiveness between the experimental group and the control group on physical fitness and speed roller skating of basic skills.
2. To evaluate the satisfaction and practicality of the physical fitness training program.

Literature review

In this research, the researcher studied documents, concepts, theories, and research related to variables that the researcher searched from academic documents and various research with the following content:

1. Background of roller skates

Yang et al (2024). Roller skating, commonly known as "skating" or "roller skating", originated from ice skating. It is a land competition event that uses shoes with wheels as competition tools. It is a youthful, fashionable, and green daily leisure and entertainment sport. With the country's active advocacy of ice and snow sports, and the successful hosting of major events such as the 2022 Beijing Winter Olympics and the Hangzhou Asian Games, people have a deeper understanding of roller skating, and roller skating has

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become a compulsory course for the transition to ice and snow sports. Roller skating is a fashionable and healthy sport that is highly entertaining and interesting. It can be practiced individually or in groups. It has become a social activity that is respected, favored, and actively participated in by young people, and its social recognition is increasing.

Cao (2018). Roller skating is a very simple and convenient means of transportation. As early as 1100 AD, simple skates made of bones mounted on long leather boots were made for hunters to hunt in winter. Later in 1700 AD, the Scots created the first pair of simple skates that could be used in summer.

After a long period of invention and transformation, roller skates are now divided into double-row roller skates and single-row roller skates.

First, double-row roller skates are composed of upper shoes, bottom plates, bridges, brake PU, wheels, etc. The resistance of double-row roller skates is determined by the hardness of the wheels, and the speed of double-row roller skates depends on the size of the wheels. Therefore, when we choose double-row roller skates, we should try to choose hard, relatively large, and particularly wide wheels.

Second, inline skates are composed of upper shoes, blade holders, and wheels. The quality of the shock absorption of the skates is determined by the softness of the wheels. The speed of roller skating is determined by the size of the wheels, and the size of the contact resistance of inline skates is determined by the width of the wheels. Therefore, when choosing inline skates, you should observe the size and width of the wheels according to your needs, as well as the hardness and softness of the wheels. If you want to skate fast, you should choose wheels with large wheels and narrow widths. Otherwise, you need to choose wheels with small wheels and large widths.

2. Content of speed roller skate

Li (2015) Roller skating was introduced to China in the late 19th century and early 20th century. It first developed in the coastal areas of my country and has now expanded to the whole country. Roller skating is a sport in which the human body slides semi-mechanically on a smooth surface with the help of rolling bearings. It is a multifunctional sports project that integrates leisure, entertainment, and fitness, and requires high balance ability.

3. Specific physical fitness of speed roller skate: Component, Training, and Test.

Jiang et al (2022) conducted an in-depth study on the significance and methods of core strength training for short track speed skating athletes in the proceedings of the Seventh China Physical Training Science Conference. The research shows that core strength training can improve the physical performance of short-track speed skating athletes during sports. Stability, control, and specialized force capabilities improve athletes' performance. In speed skating events, core strength not only maintains body balance and ensures the stable performance of specific and technical movements, but it is also the main link for athletes to coordinate the strength of their upper and lower limbs. It is the hub for the coordinated work of the upper and lower limbs and plays a connecting role during movement. Core strength is the ability produced by the muscles and ligaments attached to the lumbar spine, hips, and pelvic symphysis. It plays an important role in most competitive sports.

4. Skills and techniques of speed roller skate: Component, Training, and Test

Wang & Ren (2023). The article points out that physical training for endurance events is a key link in improving athletes' endurance levels during long-term, high-intensity exercise. Physical fitness training plays an important role in physical training for endurance events. The purpose of this article is to discuss the role of physical fitness training in physical training for endurance events.

5. Training program development

Ren et al (2022), combined with many years of sports training practice and training results, this article explains and demonstrate the special training of young athletes in the sensitive period. The strength training of young people should be based on the principle of comprehensiveness and gradual progress, supplemented by the principle of fun. In practice, we should explore the sensitive periods of different physical qualities of young people, improve the physical quality level of young people by taking reasonable and effective training methods, and enhance the physique of young people. Since the development of physical fitness has

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certain regularity and stages, the development speed of various physical qualities is different in different sensitive periods. Therefore, in the sensitive period, we should do a good job in comprehensive physical training. The training should be detailed rather than rough, and we should not rush it. We should avoid adult training, and the content should be diversified. We should not simply pursue the ability to ensure the scientific effectiveness of the training.

6. Related research

Speed roller skating is a challenging extreme sport that requires athletes to achieve optimal performance at high speeds and technical requirements. First, physiological research has revealed the key role of physiological factors such as the cardiovascular system, lung function, muscle strength, and endurance in speed skating. Second, technical research focuses on the mastery of key skills such as propulsion, turning, balance, and braking, which are essential for successful speed skating.

According to the "Technical Level Standards for Roller Skating Athletes" issued by the General Administration of Sport of my country in 2021, the timing results of the 1000-meter track race are as follows:

International Athlete Women's results ≤ 01:32.400, Men's results ≤ 01.26.300;

Athlete Women's results ≤ 01:34.200, Men's results ≤ 01; 27.200;

First-level Athlete Women's results ≤ 01:38.100, Men's results ≤ 01:29.800;

Second-level Athlete Women's results ≤ 01:43.300, Men's results ≤ 01:37.500;

Third-level Athlete Women's results ≤ 01:50.500, Men's results ≤ 01:45.000.

Qu (2024) The physiological requirements of speed roller skating pose extremely high challenges to athletes' cardiovascular system, lung function, muscle strength, and endurance. In order to succeed in this competitive sport, comprehensive physiological training is indispensable. Zhang (2013) Basic skills are skills that are necessary to develop deeper skills. Scholars believe that the basic skills of children's speed skaters are the basic requirements for achieving good results. Therefore, in speed skating training, emphasis should be placed on practicing basic skills.

Tian et al (2022)., researched on the practical significance, basic requirements and implementation strategies of children's basic motor skills learning, basic motor skills learning can promote the comprehensive development of children's physical and mental health and help children and society The significance of establishing connections, laying the foundation for children's specific sports skills and enhancing the internal logic of progressive physical education courses. In speed roller skating, the basic skills of speed roller skating are the core skills that athletes need to master when skating. These techniques directly affect the efficiency, speed, and safety of skating. Including sliding posture, starting technique, gliding straight, gliding around corners, and sliding rhythm. Therefore, the improvement of basic skills is of great significance to improving athletes' sports performance and promoting athletes to learn more advanced movements.

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Conceptual Framework

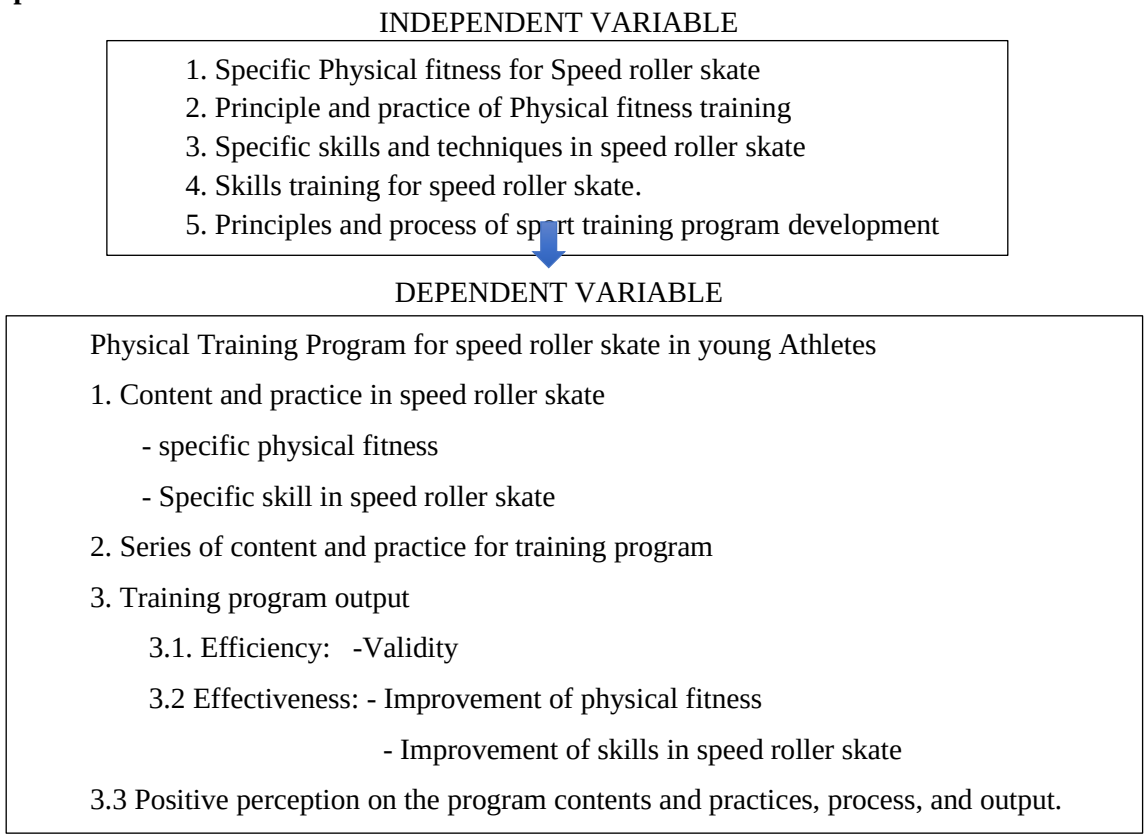

Figure 1 Conceptual Framework

Methodology

Population

30 speed roller skating athletes from Zhuozhou City, Hebei Province were selected. The age difference among the 30 female children was 6-12 years old.

Subjects

The Subjects were 30 young skaters. They tested the specific physical fitness for speed roller skate, then ranked the scores and divided into two groups of 15 each group by systematic sampling technique, then drew into the experimental group and the control group.

Experimental grouping. Combined with the test data before the study, the 30 athletes were divided into two groups, A and B, using the snake-shaped arrangement method. Students in Group A receive physical fitness intervention training in core strength, speed, agility, balance, flexibility, and cardiorespiratory endurance; students in Group B do not receive physical fitness intervention. Before the experiment, statistical analysis was conducted on the height, weight, age, and physical fitness (strength, agility, balance, flexibility, speed, and cardiorespiratory endurance) of the two groups of athletes.

The inclusion criteria are as follows:

(1) Speed roller skating athletes aged 6-12 from Zhuozhou City, Hebei Province, in 2024.
(2) No injuries that would prevent training, and must be approved by a doctor.
(3) Pass the pre-experimental test assessment, and must have sufficient training time.
(4) Voluntarily agree to participate in the program and sign the consent form.

The exclusion criteria were as follows:

(1) Participation in the experiment for less than 80% of the 8-week training period
(2) Participants did not complete the test by the date and time specified by the researcher.
(3) Suffering from illness or injury and unable to continue training.
(4) Requesting to withdraw from the research project.

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Include of subject

During the 8-week experiment, the 30 youth speed skaters aged 6-12 who participated in the experiment participated in the entire experiment without special circumstances.

Research ethics in human research approval

2567/169(14)

Research design

The experiment lasted for 8 weeks, with training three times a week on Mondays, Wednesdays, and Fridays for 60 minutes each time.

Experimental group	O1	T1	O2
Control group	O1	T2	O2

O1 = pre-experimental test
O2 = post-experimental test
T1 = experimental group training program
T2 = control group training program

Research instrument

Item-Objective Consistency Index: IOC

Strength Training Methods: Hands-on training, Free weight equipment training 、Comprehensive equipment training, Comprehensive equipment training, special training method

Speed Training Methods: reaction speed, movement speed, and movement speed.

Agility Training Methods: Obstacle course, Ladder drills, Cone drills

Balance Training Methods: Static balance training, Dynamic balance training、

Flexibility Training Methods: Static stretching, Dynamic stretching、Self-massage, and relaxation

Cardiorespiratory Endurance Training Methods: Aerobic exercise, Interval training, Long-distance gliding

Test method

By analyzing relevant literature such as the "Physique Test Standards for Primary School Students" and "Roller Skating Technology Assessment Standards" and consulting relevant experts and scholars, the test items before, during, and after the experiment were determined:

The core strength test uses plank support; the lower limb strength test method uses the standing long jump; the Upper limb strength test method uses the push-up test.

The speed quality test items were: 50-meter run (seconds).

The agility quality test method was the T-test.

The balance quality test method is: standing on one leg - eyes closed test.

The test method for flexibility quality is seated forward bending.

The cardiorespiratory endurance test method is a 12-minute run.

The comprehensive test method for the basic skills of speed roller skating is the 1000-meter individual time skating.

The starting part of the speed skating basic technology test uses a 10-meter timing test.

The basic skill test of speed roller skating uses a 100-meter timing test for the straight-line skating part.

The curve sliding part of the basic skill test of speed roller skating is tested by recording the curve sliding time.

The sprint part of the speed roller skating basic skill test uses a 50-meter timing test.

Data collection

Collect voluntary training commitments from athletes

Collect health commitments from athletes

Before the study, core strength, speed, agility, balance, flexibility, cardiorespiratory endurance, and 1000m individual time trial performance tests were conducted on young speed roller skating athletes aged 6-12 who met the research criteria.

Before the study, interview experts and scholars in related fields to provide experience and insights for the study.

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Develop a training plan and evaluate its feasibility

Data Analysis

Comparison of Physical fitness test within group by paired t-test and between group by independent t-test

Comparison of Skill test within group by paired t-test and between group by independent t-test

Results

The researcher prepared the data and then conducted a statistical analysis. The results of the analysis were analyzed and presented as a table in the paper, as shown below:

Table 1 Mean and standard deviation of characteristics classified by groups

Variables	Exp. Group	Cont. Group
	$\bar{x}$±SD	$\bar{x}$±SD
Age (year)	8.60±1.88	8.60±1.88
Weight (Kgs)	31.13±7.81	32.87±8.58
Height (Cm.)	134.47±10.74	135.93±10.73
BMI	16.91±1.62	17.44±1.91
Training experience (year)	3.56±0.54	3.45±0.55

Table 1 showed that the means and standard deviations of age, weight, height, BMI, and training experience in the experimental group were age=8.60 ± 1.88(years), weight=31.13 ± 7.81kg, height=134.47 ± 10.74cm, BMI=16.91 ± 1.62, and training experience=3.56 ± 0.54. The means and standard deviations of age, weight, height, BMI, and training experience in the control group were age=8.60 ± 1.88(years), weight=32.87 ± 8.58kg, height=135.93 ± 10.73cm, BMI=17.44 ± 1.91, training experience=3.45 ± 0.55.

Table 2 The comparison of physical fitness at pretest between the experimental group and the control group

No	Test	Exp. Group		Cont. group		t	p
		$\bar{x}$	SD	$\bar{x}$	SD		
1	Plank(sec)	46.80	16.52	49.20	17.00	-0.39	0.70
2	Standing long jump(cm)	133.87	18.08	138.67	10.78	-0.88	0.39
3	Push-up test(rep.)	13.60	3.02	14.13	3.62	-0.44	0.67
4	50-meter run(sec)	9.58	0.76	9.77	0.91	-0.61	0.54
5	Agility T Test(sec)	12.34	0.90	12.30	0.78	.130	0.90
6.	Stand on one leg with eyes closed(sec)	13.40	4.32	13.60	4.94	-0.12	0.91
7	Seated forward bending(cm)	10.20	3.67	10.13	2.80	0.06	0.96
8	12-minute run(m)	1506.67	142.59	1505.53	151.06	0.02	0.98

Table 2, showed that, showed that all 8 tests in physical fitness at the pretest between the control group and experimental group had no difference at the .05 level of significance.

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Table 3 The Comparison of Pretest on Basic Skills of Speed Roller Skate Between Experimental Group and Control Group

No	Test	Exp. Group		Cont. group		t	p
		x̄	SD	x̄	SD		
1	Comprehensive basic skill(sec)	145.60	12.24	145.67	14.46	-.013	0.99
2	Sliding start(sec)	3.89	0.23	3.89	0.20	0.00	1.00
3	Gliding straight(sec)	16.18	1.75	16.16	16.64	0.04	0.96
4	Curve sliding(sec)	4.85	0.46	4.84	0.45	0.04	0.96
5	Sprint(sec)	5.77	0.50	5.73	0.49	0.21	0.41

Table 3, showed that, showed that all 5 tests on basic skills of speed roller skate at the pretest between the control group and the experimental group had no difference at the .05 level of significance.

Table 4 The Comparison of Pretest and Posttest on Physical Fitness Test Within the Experimental Group

No	Test	Posttest		Pretest		t	p
		x̄	SD	x̄	SD		
1	Plank(sec)	46.80	16.52	60.80	14.97	-13.26	.001*
2	Standing long jump(cm)	133.87	18.08	153.80	18.70	-18.96	.001*
3	Push-up test(rep.)	13.60	3.02	19.87	3.56	-17.61	.001*
4	50-meter run(sec)	9.58	0.76	8.45	0.39	7.65	.001*
5	Agility T Test(sec)	12.34	0.89	10.75	0.79	14.88	.001*
6.	Stand on one leg with eyes closed (sec)	13.40	4.32	24.93	5.37	-20.61	.001*
7	Seated forward bending(cm)	10.20	3.67	15.27	3.24	-11.77	.001*
8	12-minute run(m)	1506.67	142.59	1760.67	170.52	-15.21	.001*

*P<.05

Table 4 showed that all 8 tests in physical fitness at the post-test of the experimental group were higher than the pre-test at the .05 level of significance.

Table 5 The Comparison between pre-test and post-test on basic skills tests of speed roller skating in the experimental group

No	Test	Exp. Group		Cont. group		t	p
		x̄	SD	x̄	SD		
1	Comprehensive basic skill(sec)	145.60	12.24	122.47	12.88	18.24	.001*
2	Sliding start(sec)	3.89	0.23	3.07	0.21	26.30	.001*
3	Gliding straight(sec)	16.18	1.75	13.38	1.23	16.09	.001*
4	Curve sliding(sec)	4.85	0.46	3.75	0.35	21.30	.001*
5	Sprint(sec)	5.77	0.50	4.56	0.37	20.47	.001*

*P<.05

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Table 5 showed that all 5 tests of the speed roller skating skills between the post-test and pre-test of the experimental group were different at the .05 level of significance.

Table 6 The comparison of pre-test and post-test results in physical fitness tests of the control group

No	Test	Posttest		Pretest		t	p
		x̄	SD	x̄	SD		
1	Plank (sec)	49.20	17.00	53.80	16.96	-14.34	.001*
2	Standing long jump (cm)	138.67	10.78	140.60	11.51	-4.09	.001*
3	Push-up test (rep.)	14.13	3.62	14.73	3.69	-3.67	.003*
4	50-meter run (sec)	9.77	0.91	9.57	0.80	4.70	.001*
5	Agility T Test (sec)	12.30	0.78	12.09	0.79	7.79	.001*
6	Stand on one leg with eyes closed (sec)	13.60	4.94	16.07	5.87	-7.05	.001*
7	Seated forward bending (cm)	10.13	2.80	11.07	3.01	-4.53	.001*
8	12-minute run (m)	1505.53	151.06	1549.93	144.99	-5.06	.001*

*P<.05

Table 6 showed that all 8 tests of physical fitness in the control group were higher than the pre-test, and .05 level of significance.

Table 7 The comparison between pre-test and post-test on basic skills tests of speed roller skating in the control group

No	Test	Posttest		Pretest		t	p
		x̄	SD	x̄	SD		
1	Comprehensive basic skill(sec)	145.67	14.46	142.80	14.83	8.53	.001*
2	Sliding start(sec)	3.89	0.20	3.81	0.21	7.48	.001*
3	Gliding straight(sec)	16.16	1.64	15.87	1.62	8.18	.001*
4	Curve sliding(sec)	4.84	0.45	4.74	0.45	5.87	.001*
5	Sprint(sec)	5.73	0.49	5.62	0.49	9.02	.001*

*P<.05

Table 7 showed that the post-test of all 5 tests in basic skills of speed roller skating in the control group was higher than the pre-test.

Table 8 Comparison of Posttest on Physical Fitness Test between Experimental Group and Control Group

No	Test	Exp. Group		Cont. group		t	p
		x̄	SD	x̄	SD		
1	Plank(sec)	60.80	14.96	53.80	16.95	1.19	0.24
2	Standing long jump(cm)	153.80	18.71	140.60	11.51	2.32	0.02*
3	Push-up test(rep.)	19.87	3.56	14.73	3.69	3.87	.001*
4	50-meter run(sec)	8.45	0.39	9.57	0.80	-4.84	.001*
5	Agility T Test(sec)	10.75	0.79	12.09	0.79	-4.62	.001*
6	Stand on one leg with eyes closed (sec)	24.93	5.37	16.07	5.87	4.31	.001*
7	Seated forward bending (cm)	15.27	3.24	11.07	3.01	3.67	.001*
8	12-minute run (meter)	1760.67	170.52	1549.93	144.99	3.65	.001*

*P<.05

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Table 8 showed that the scores of the experimental group in the post-test of physical training were higher than those of the control group, except for plank support at 0.05, except for Plank, which did not differ between the groups.

Table 9 Comparison of the posttest in the basic skills of speed roller skating between the experimental group and the control group

No	Test	Exp. Group		Cont. group		t	p
		x̄	SD	x̄	SD		
1	Comprehensive basic skill (sec)	145.63	14.10	132.63	17.12	6.54	.001*
2	Sliding start (sec)	3.07	0.21	3.81	0.21	-9.45	.001*
3	Gliding straight (sec)	13.38	1.23	15.87	1.62	-4.73	.001*
4	Curve sliding (sec)	3.75	0.35	4.74	0.45	-6.62	.001*
5	Sprint (sec)	4.56	0.37	5.62	0.49	-6.58	.001*

*P<.05

Table 9 showed that, in the posttest on speed roller skate skill was significantly different between the experimental group and control group at .05.

Table 10 Conclusion of Program Evaluation by 15 Subjects Who Participated in the Experimental Group

No	Issues	x̄	SD	Level of result
1	Were you satisfied with your overall experience with the physical fitness training program?	4.73	0.45	Very high
2	Does the training program meet your expectations?	4.67	0.88	Very high
3	Training program intensity	4.60	0.50	Very high
4	Improved strength	4.80	0.41	Very high
5	Improved speed	4.73	0.45	Very high
6	Improved agility	4.60	0.63	Very high
7	Improved balance	4.73	0.45	Very high
8	Improved flexibility	4.80	0.41	Very high
9	Improved Cardiorespiratory endurance	4.73	0.45	Very high
10	Improving basic skills of speed roller skate	4.67	0.88	Very high
11	Improve sports performance	4.80	0.41	Very high
12	Is the gliding process more stable?	4.73	0.45	Very high
13	Is the sliding speed increased?	4.73	0.45	Very high
14	You have a deep understanding of a physical fitness training program	1.33	0.48	Very low

Table 10 showed that the subjects in the experimental group responded to the project evaluation in:

1. Very high perception:

(1) Satisfied with your overall experience=4.73 ± 0.45. (2) Training content meets expectations = 4.67 ± 0.88. (3) Training program intensity = 4.60 ± 0.50. (4) Improved strength = 4.80 ± 0.41. (5) Improved speed = 4.73 ± 0.45. (6) Improved agility = 4.60 ± 0.63. (7) Improved balance = 4.73 ± 0.45. (8) Improved flexibility = 4.80 ± 0.41. (9) Improved Cardiorespiratory endurance = 4.73 ± 0.45. (10) Improving basic skills of speed roller skate = 4.67± 0.88. (11) Improve sports performance = 4.80 ± 0.41. (12) Gliding process more stable = 4.73 ± 0.45. (13) Sliding speed increased = 4.73 ± 0.45.

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2. Very low Perceived: You have a deep understanding of physical fitness training program=1.33 ± 0.48.

Subjects in the experimental group who participated in the physical training program had a higher degree of recognition of the benefits, value, and process of the physical training program.

Discussion

Zhu & Yan (2022). The asymmetry of the unbalanced movements was very obvious in the functions of the control group athletes after different training. Lack of core stability and flexibility, especially when performing side kicks. Show compensation. After modern physical training intervention, especially the strengthening of core stability and hip and ankle joints, flexibility and compensation have been significantly reduced, and the overall quality of technical movements has been greatly improved. At the same time, it not only improves movement patterns and obstacles, but also plays a significant role in preventing injuries and improving physical fitness assessment. This study both the experimental group and the control group improved in physical fitness and basic skills in speed roller skating after training at P< .05. Finally, it can be concluded that increasing speed skating physical training can improve the basic sports functions of athletes and improve their sports quality. Wang (2023). The study points out that when developing speed skating, coaches need to focus on physical training tasks. The orderly implementation of this work can fundamentally improve the physical fitness of athletes, and also help improve the mental will of athletes, extend the time limit for athletes, and prevent athletes from being forced to retire due to physical problems. Yanchik et al (2022). This study believes that physical training is a basic task in sports training projects, and the training results will directly affect the athletes' personal competition ability. Taking speed skating as an example, from the perspective of a professional athlete, when conducting physical training, it is usually necessary to accept strength quality, endurance quality, speed quality, sensitivity and coordination, and intensity of training. The advantage of this training is that it can improve athletes' physical fitness, reduce the chance of daily illness, and maintain good physical fitness. You can also hone your will, have the confidence to win the game, and have the mentality to view winning and losing correctly. At the same time, you can increase your chances of winning the game by improving your physical fitness, scientifically master the action skills and physical exertion skills of the game, and then extend your personal career.

Youth physical training aims to improve the overall physical quality of teenagers, such as speed, agility, balance, and other abilities. This study introduces adolescent physical training into speed roller skating, draws on domestic and foreign experience and scientific training methods, and explores the application of physical training in the training of adolescent speed roller skating athletes. In this study, the main goal of the physical training program is to enhance the physical fitness of adolescent speed skaters through the implementation of a physical training program, thereby improving the basic skills of speed skating. The implementation of a physical training plan is crucial to mastering technical movements such as starting, straight gliding, curved gliding, and sprinting. The research aims to build a scientific training system to improve performance, prevent injuries, and support systematic teaching and coaching practices. Its significance is to provide a scientific and reasonable physical training model, enrich theoretical knowledge, and fill the gaps in youth speed roller skating physical training projects.

Conclusion

The research result on “Construction of an added physical fitness training program to enhance the basic skills in speed roller skate for young athletes” revealed that:

1. Participating in a physical fitness training program or a traditional training program for 8 weeks can significantly improve physical fitness and basic speed roller skate skills, reaching a significance level of .05.

2. Physical training has a more significant effect on improving the physical fitness and basic skills of young speed skaters than traditional training. The difference before and after the test is statistically significant (P<.05).

3. The subjects in the experimental group who participated in the physical training program had a high awareness of the benefits and value of physical training, teaching methods, and processes, and accepted the teaching operations and processes.

In general, when training adolescent speed roller skaters, both physical fitness training programs and traditional training can improve the physical fitness and basic skills of adolescent speed roller skaters, but physical fitness training improves the basic skills of speed roller skaters more than traditional training.

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Training is more significant. The practice value, operational value, and process of physical training are highly recognized.

Recommendation

Application of the Research

1. The study provides a scientifically-based training system for adolescent speed roller skaters to enhance their basic skills (Sliding start, Gliding straight, Curve sliding, Sprint). This system supports coaches and athletic programs in improving young athletes' physical performance and reducing the risk of injury through structured physical fitness training.
2. The findings provide actionable insights for physical education teachers and sports trainers to adopt targeted training strategies, ensuring that youth athletes achieve maximum potential in both recreational and competitive settings.

For further research

1. Scientifically select training methods and load applications based on the characteristics of different athletes.
2. Research scientific phased training plans to help young speed skaters achieve excellent sports results.

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