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The Effect of SAQ Training on The Agility of College Students in Higher Education

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ABSTRACT
Agility is an expression of the body's overall ability, and SAQ training is flexible, multilateral, and fun. While the majority of researchers have focused on the impact of SAQ training on basketball, less research has been done on the development of students' flexibility. The aim of this research is to investigate the influence of SAQ training on the flexibility of undergraduates in higher education. METHODS: A SAQ exercise was carried out on 48 PE undergraduates in the year 2023 from Guangzhou Sports Institute of Guangzhou, China. In the control group (24), the conventional agile training was adopted. The experiment was conducted in 8 - week course. The performance indicators of the students' flexibility were evaluated. SPSS Sample T-tests were applied to analyse the variation of the results. CONCLUSION: Eight weeks of experimentation showed that there were significantly different Agility Indicators among the two groups. The difference between the two groups was significant. The difference between the two groups was significant. Both SAQ training and traditional agility training are helpful for college students' agility, but SAQ training is superior to traditional agility training for college students' agility.

Keywords: Agility, College students, SAQ, Training methods.

INTRODUCTION

Agility is a complex function that encompasses multiple elements of motor ability and is influenced by both internal and external factors. Flexibility is one of the most important components of athletic performance, which is a component of physical quality. It can be described as the ability to quickly alter the velocity and orientation of one's whole body in reaction to outside stimulation. It is also a sign of the integrated and competent capacity of a person. Research shows that exercise plays a key role in learning because it increases the level of neurotrophic factors in the brain, improves the quality of the brain, and helps to improve general well-being [1].And agility can help college students master skills in most areas of sport faster and better. Agility is undoubtedly very complex for all athletic qualities, but it is essential. The Dictionary of Sport defines agility as the ability to change body position and posture quickly to adapt to the complexities of movement. Agility is an important part of a student's physical fitness, it is the ability to coordinate the performance of various qualities, it improves the quality of technical movements, and it is necessary for athletes to improve their performance. It is recommended that the overall student agility level be improved and agility ability be strengthened through agility development. Training methods such as lunge turn, standing push-up jump turn, forward and backward sliding jump, bending jump, flying feet in the air, jumping turn, fast backward run, fast folding run and other training methods should be added to enrich the agility exercise methods. Add lessons on agility to enhance students' understanding of agility. Reduce sports injuries in sports and physical training by improving students' agility, improve body coordination, and strengthen the control of the body [2]. Both high-speed resistance training and low-speed resistance training impact agility in college students [3]. Sprint mirroring drill and given lateral mirror drill have a significant effect on students' improved agility [4]. Agility ladder exercises also have an effect on agility in college extracurricular futsal participants[5]. Rapid scaling compound training can even cover a variety of sports, but all sports related to speed, agility, flexibility, sprinting, jumping and so on can be covered. Simultaneously, it stands as the most effective training technique to enhance performance across diverse sports disciplines. Moreover, intensive compound training significantly boosts the agility levels of top-tier male collegiate badminton athletes. [6]. Agility, as an important part of college students' physical fitness, has also received more and more attention from scholars, and the more diverse the training methods are.

SAQ training, S-speed, A-agility, Q-quickness, as a popular physical training method, SAQ training method is versatile, breaking the previous boring training methods, with a certain degree of fun, and has been applied to professional athletes, which can improve the interest of athletes, and better invested in the training. Research shows that more scholars apply SAQ training to ball sports. In the research of various scholars showed that . SAQ training method and traditional agility training method can promote the agility quality of students in soccer-specific classes. However, the SAQ training method is more comprehensive than the traditional training method in improving the agility of male college students specializing in college soccer. In particular, the effects of body direction change, footwork change, body agility and ball combination, and body agility perception were significantly improved. The ability to make decisions quickly was also improved [7]. SAQ training has proven to be a beneficial method for enhancing sprint times over short distances, specifically 5 and 10 meters. However, it does not appear to be as effective for distances of 20 meters, where maximum speed is typically reached, or for improving flexibility. The results show that although SAQ training can improve the speed of a number of footballers, more research is required to determine the best way to improve speed and agility of youth footballers [8]. The Speed, Dexterity, and Agility (SAQ) exercise has a profound effect on the ability to increase the speed, dexterity and acceleration of football players. The SAQ training approach incorporates highly specific and detailed drills designed to help athletes reach peak performance in their respective sports. Moreover, the diverse range of drills and exercises focused on speed, agility, and quickness keeps athletes engaged and prevents monotony in training activities [9]. SAQ training represents a holistic training system that integrates speed, agility, and quick starts. This innovative and distinctive approach enhances athletes' speed, agility, and explosive power while enriching the variety of training tools available. By making training more enjoyable and breaking the monotony of traditional routines, SAQ training ensures a more engaging and effective athletic development experience. The SAQ involves a variety of different movement patterns. According to the comparative analysis of ball and no-ball tests before and after the experiment, SAQ training showed a greater increase in ball-handling tests compared with soft ladder training and conventional training [10]. All of the above studies are on ball sports, and there are fewer studies on the physical fitness of students with SAQ training. Research shows that SAQ training method emphasizes the combination of speed, sensitivity , and quick reaction ability of athletes, and combined with ball sports, it has obvious effect on the improvement of professional athletes' sensitivity quality. At present, it is seldom used in daily training and physical education. So we need to investigate if SAQ training can affect pupils' sensibility. It was found that the flexibility of the pupils had been greatly enhanced by SAQ training for ten weeks, and their footwork, bodily transfer and bodily coordination had been greatly enhanced. This further proved that SAQ training could be used in PE classes. [11] Based on the literature review, there was still considerable lack of study on the effect of SAQ training on the flexibility of university students.

Currently, the field of SAQ training and university students' flexibility is being investigated, but there is little information about the influence of SAQ training on university students' general performance. Thus, the purpose of this paper is to investigate the influence of SAQ on university students' flexibility.Investigating how SAQ training influences agility in this population holds both theoretical and practical importance and is a crucial area of research.Through this study, the training method is applied to college students to explore whether SAQ training can improve college Students agility, which complements the research in the field of SAQ training and college students agility and can provide a reference value for the later to continue the research on SAQ training and college students physical fitness teaching methods.

METHODS AND METHODOLOGY:

Research Target

In this study, 48 students, aged 18-20 years old, majoring in Physical Education in the class of 2023 from Guangzhou Sports Institute in Guangzhou City, China, were selected for the experimental study. Random sampling was used. All 48 subjects were randomized into 2 groups with 24 subjects in the experiment and the control group. Experiment group received SAQ training and routine agile training. Before the trial, the baseline population (age, height, body weight) was analysed by means of an independent sample t test, which was performed by SPSS 27.0. The findings showed that there were no statistically significant differences ($p < 0.05$) on the basis of the baseline data, confirming the suitability of the group allocation for this study.

Inclusion and exclusion criteria

The inclusion criteria were as follows: (a) The academic qualifications of the subjects were all available on the relevant website. (b) Students with no current injuries or illnesses must be approved by a physician. (c) Voluntary agreement to sign a consent form to participate in the study.The exclusion criteria were as follows: (a) Participation in the experiment was less than 80% of the time during the experiment. (b) The subject did not complete the test in the time frame specified for this study. (c) Subjects had poor health conditions during the experiment, such as injuries and illnesses, which prevented them from continuing to participate in the experiment. (d) The subject himself/herself applies to leave this research project.

Experimental design

The experiment was conducted three times a week for 8 weeks on Mondays, Wednesdays, and Fridays. Each session lasted 60 minutes. The exponential change in students' agility before and after the experiment was tested. The training was divided into 4 stages. The experimental group underwent SAQ training, which involved progressively increasing intensity and difficulty levels. The control group participated in conventional agility training. Eight weeks later, the author evaluated the influence of various exercises on the agility of university students through comparison between experiment and comparison. The differences between the two training methods were then analyzed (**Fig 1**).

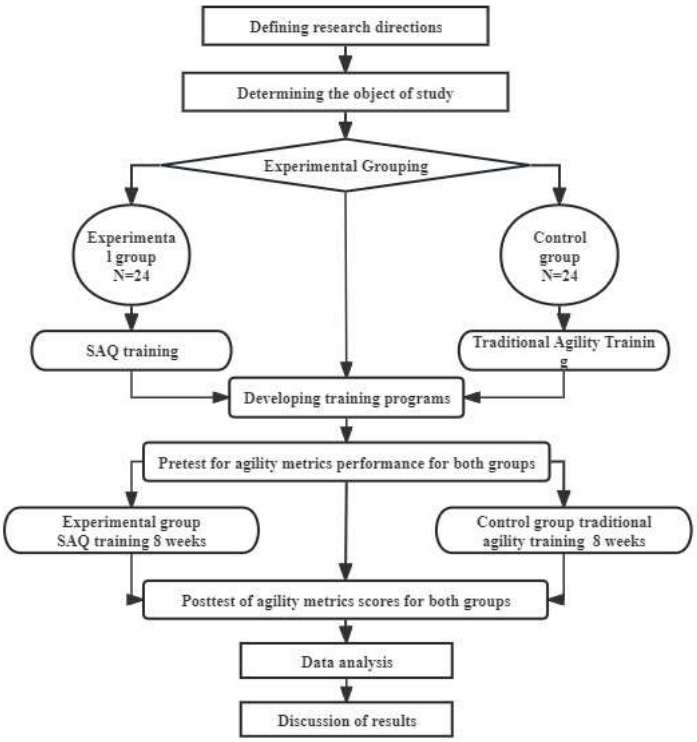

Fig 1: Hexagonal Obstacle Test, Agility Test of 505, Illinois Agility Run Test, and Drill Test of T.

Hexagonal Obstacle Test

Test Method: Competitors will first be placed at the centre of a hexagonal shape, facing Row A. Throughout the course of the examination, the player will be required to keep that direction toward Row A. Once the instruction "GO" is given, the timer will be activated. Next, the player takes a double leap across the line B, goes back to the centre, crosses the C. Then goes back to the centre, and goes on through the D. Each jump over line A and return to the center constitutes one complete loop. The athlete performs a total of three loops. When the third cycle is completed, the timer will be stopped and the time will be recorded. The test shall be repeated after a break. The mean time is computed from both of these dates. Should an athlete make an incorrect leap or fall on a line, the test will have to start again **(Fig 2**).

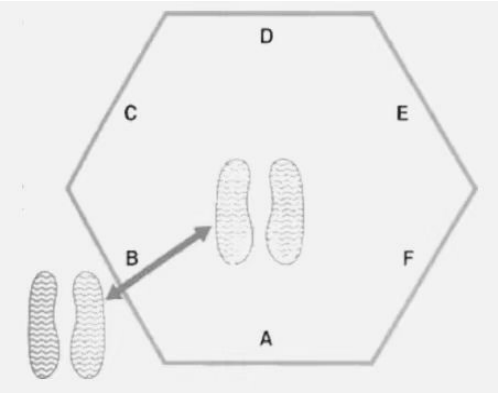

Fig 2

505 Agility Test

Test Method: Indicate the route as shown in the chart. It's ten metres between A and C. From B to C. Runners begin at the start of the track, Row A. Then they move toward the 10 m mark on Line B. As soon as the runner passes the 10 m/s, the assistant will begin the countdown. He will then proceed to the 15 m mark on the C. He will then return to the beginning of the race. When the runner passes the 10 m mark on his return trip, the assistant stops the timer. Note the best time between the two attempts (**Fig 3**).

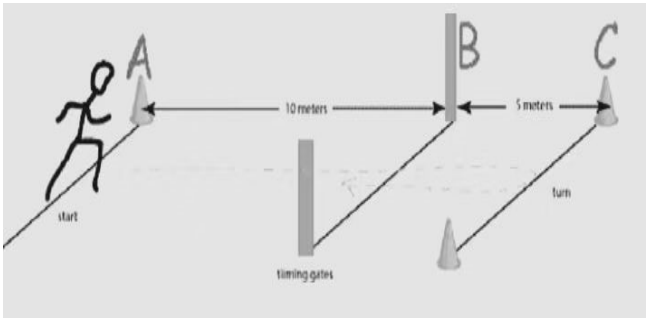

Fig 3

Illinois Agility Run Test

Test Method: The runner starts off with his head on the ground at the start. Following an instruction from an assistant, the player is quick to get up and navigate the course past the cones to the end. The assistant notes the total time spent from the first instruction to the completion of the program. (**Fig 4**).

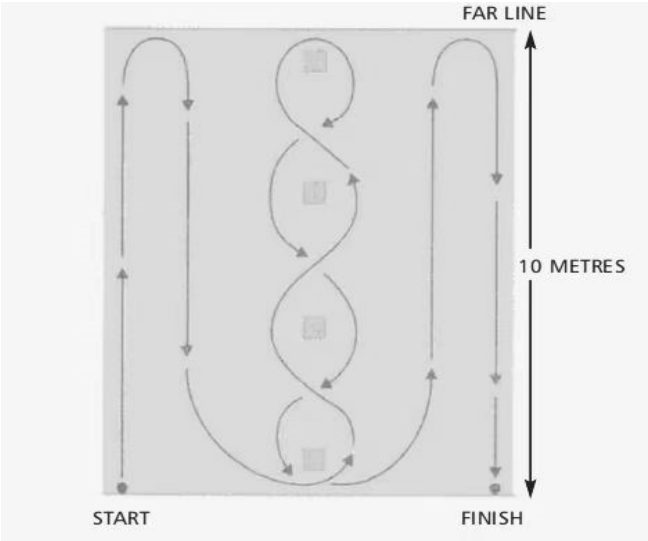

Fig 4

'T' Drill Test

Test Method: Lay out 3 linear cones with a distance of 5 m. Put a 4th cone 10 m apart from the center cone to make a T shape. The athlete starts at the cone at the base of the'T '. As soon as the trainer says "Go" and begins the stopwatch, he goes to the center of the cone and makes contact with it. Then, the player goes up five metres to the right cone and touches it. Then he goes ten metres to the distant cone and touches it. Next, the player will move five metres away from the center cone, where he will touch it once more. Lastly, the runner goes back 10 metres to the bottom of the'T 'and touches that cone. The trainer will pause the timer and keep a tally of the time. (**Fig 5**).

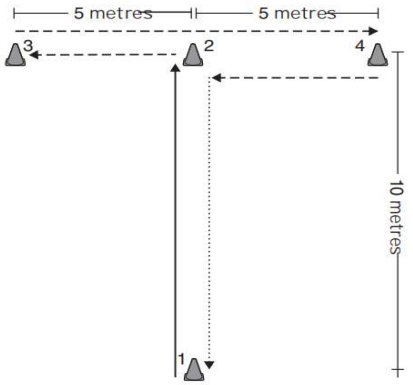

Fig 5

Data Analysis

This research uses SPSS 27 - 0 statistic software to deal with and analyse the intelligence of experiment and control group. The data of both groups were compared with those of pre-and post-training by an independent sample t test. In addition, a matched sample t test was carried out to compare the pre-and posttraining data in each group. All the examinations had a significance level of 0.05.

RESULTS

Pre-trial and control group comparison results Before starting the test, it is important to collect basic information about participants' dexterity. As a consequence, the treatment and control groups were assessed on the basis of the four parameters chosen for the trial prior to the start of the training.

Table 1 Pre-trial comparative efficacy test results between the experimental group (n = 24) and the control group (n = 24)

Variables	experimental group	control group	t	p
Hexagonal Obstacle Test	13.08±1.09	13.36±1.13	-0.883	0.382
505 Agility Test	2.32±0.19	2.31±0.20	0.220	0.872
Illinois Agility Run Test	15.22±0.27	15.22±0.27	0.000	1.000
'T' Drill Test	10.71±0.15	10.65±0.13	1.424	0.161

*p< .05

The Hexagonal Obstacle Test P was 0 382, the Agility Test P was 0. 505, the Illinois Agility Run Test P was 1 000, the'T 'Drill Test P was 0. 161. This homogeneity of the subgroups ensures that the baseline conditions are similar and will not influence the results of the subsequent experiments. Therefore, the study can proceed as planned. However, during the test, we found that the students would have the problem of incorrect force generation and irregular movement details when performing the test, so we should strengthen the instruction of students' movement standardization during the follow-up training (Table 1).

Comparative analysis of test and control groups before and after the test

In order to learn more about the difference in the outcome of the experiment and the control, we compared and analyzed the agility indicators of the two groups.

Table 2 Experimental group (N=24): Analysis of test results pre- and post-experiment

Variables	Per-test	Post-test	t	p
Hexagonal Obstacle Test	13.08±1.09	12.10±1.05	57.588	0.001
505 Agility Test	2.32±0.19	2.11±0.16	19.397	0.001
Illinois Agility Run Test	15.22±0.27	14.26±0.51	9.318	0.001
'T' Drill Test)	10.71±0.15	10.09±0.14	32.432	0.001

*p< .05

Before and after intervention test results were compared: Hexagonal Obstacle Test p 0.001, Agility Test p p 0.001, Illinois Agility Run Test p p 0.001, Illinois Agility Run Test p p 0.001,'T 'Drill Test p 0.001,'T' Drill Test p 0.001, test group p p < 0.05. It indicates significant differences in performance after 8 weeks of SAQ training (Table 2).

Table 3 Control group (N=24): Analysis of test results pre- and post-experiment

Variables	Per-test	Post-test	t	p
Hexagonal Obstacle Test	13.36±1.13	12.84±1.16	38.066	0.001
505 Agility Test	2.31±0.20	2.21±0.18	8.536	0.001
Illinois Agility Run Test	15.22±0.27	14.73±0.24	31.058	0.001
'T' Drill Test)	10.65±0.13	10.38±0.13	25.342	0.001

*p< .05

Hexagonal Obstacle Test p p was 0.001, Agility Test p p was 0.001, Illinois Agility Run Test p p was 0.001, Illinois Agility Run Test p p was 0.001,'T 'Drill Test p was 0.001, and'T' Drill Test p was 0.001.This suggests that there are significant differences in the agility indices before and after the experiment, indicating an improvement in performance after 8 weeks of traditional agility training (Table 3).

Comparison of experimental and control results after the test After the test, we analyzed the agility test results of both test group SAQ training and control group who took traditional agility training.This analysis aimed to elucidate the differences in performance outcomes between the two training methods.

Table 4 Comparison of agility test results between the experiment group (N=24) and the control group (N=24) at the end of the experiment

Variables	experimental group	control group	t	p
Hexagonal Obstacle Test	12.10±1.05	12.84±1.16	-2.305	0.026
505 Agility Test	2.11±0.16	2.21±0.18	-2.080	0.043
Illinois Agility Run Test	14.26±0.51	14.73±0.24	-4.051	0.001
'T' Drill Test)	10.09±0.14	10.38±0.13	-7.634	0.001

*p< .05

The Hexagonal Obstacle Test P was 0.0265,505 Agility Test P was 0.043, Illinois Agility Run Test p was 0.001, Illinois Agility Run Test P was 0.001, and'T 'Drill Test P was 0.001. This shows that after the test, there is a marked difference in the agility indicators of both groups. Despite the fact that there was an improvement in the treatment and in the control group at 8 weeks, the 4 Dexterity Tests showed a significant difference between the experiment group and the control group. The T-test also emphasized a significant difference and showed that the effect of SAQ training was significantly higher than that of the conventional agile exercise (Table 4).

DISCUSSION

A total of 48 undergraduates were chosen for the study. They received SAQ training for 8 weeks, followed by the conventional Agility Training Intervention. Then, four kinds of test targets were chosen: Hexagonal Obstacle Test, 505 Agility Test, Illinois Agility Run Test, and T. Drill Test. The results showed that there were no statistically significant differences in pre-trial and post-trial performance. There was, however, a marked difference in the outcome of the follow-up, where the SAQ training performed significantly more effectively than the control group that had been given conventional agility exercises.This finding suggests that while both SAQ and traditional training methods positively affected the agility of college students, SAQ training was significantly more effective than traditional agility training in enhancing performance.

SAQ training methods, in contrast to traditional agility training, are more varied, innovative, and engaging. These methods better stimulate students' motivation and enthusiasm for training. SAQ training incorporates a range of multi-directional movements, including acceleration, deceleration, and sudden stops, which contrasts sharply with the monotony of traditional agility exercises. Additionally, SAQ training demands higher levels of concentration from students, making it a more dynamic and challenging alternative to conventional methods.

While numerous scholarly studies have established that SAQ training is more effective than traditional agility

training, there remains a gap in research specifically addressing its application for enhancing students' agility. This study contributes to this area by demonstrating that SAQ training is not only beneficial for professional athletes but also applicable to college-level instruction. However, for optimal results, educators must grasp the fundamental concepts of SAQ training and tailor the programs to suit various environments and students' physical attributes. Designing a systematic and scientifically-based training regimen is essential to improving teaching effectiveness and achieving desired outcomes.

CONCLUSION

The Hexagonal Obstacle Test, the 505 Agility Test, the Illinois Agility Run Test, and the'T 'Drill Test were significantly improved after eight weeks of SAQ training.The significant enhancements observed in these agility tests underscore the positive effect of SAQ training on the agility of college students.

The Hexagonal Obstacle Test, the 505 Agility Test, the Illinois Agility Run Test, and the'T 'Drill Test were significantly improved after eight weeks of conventional agility training. All of this has been shown to have a positive effect on university students' flexibility, which is a reflection of the efficacy of conventional agile training.

After eight weeks of training, there was no statistically significant difference in the performance of the Agility Test Indicators between the treatment and the control group, as shown by the Independent Sample T-Test. In particular, the Hexagonal Obstacle Test, Agility Test 505, Illinois Agility Run Test, and the'T 'Drill Test showed significant improvement over the control group.These findings demonstrate that SAQ training has a superior impact on the agility of college students relative to traditional agility training. Furthermore, the results underscore the value of SAQ training in enhancing the physical fitness of college students.

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DATA AVAILABILITY

The data supporting the results of this study are available from the corresponding author.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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