

Effect of 10 Weeks Agility Ladder Training on Agility Performance among Female Wushu Players

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Abstract

The main purpose of this study is the effect of 10 weeks agility ladder training on agility performance among female Wushu players. This study found that 10 weeks of agility ladder training can promote the agility performance of wushu players aged 10-11 years. Agility plays an important role in the performance of wushu players. This study found that agility ladder training is a good exercise to develop agility ability among 10-11 female wushu players. Therefore, coaches could be considered to integrate agility ladder training into routine training.

Keywords: Agility Ladder Training, Agility Performance, Female Wushu Players

Introduction

Wushu is a traditional Chinese sporting event that focuses on internal and external training, and takes the form of practice routines and techniques of attack and defense as its main content. First and foremost, wushu belongs to the traditional Chinese martial arts school that prioritizes defense and attack. Its teachings to kick, hit, fall, take, stab, and other similar techniques primarily utilize one's bare hands, though a weapon may be used to show the extent of an attack or defensive maneuver. Both confrontational fighting and routine sports are based on the traditional Chinese techniques of defense and attack (Huang, 2016).

Wushu movements are composed of speed, height, agility and mobility (Huang, 2016). These movements have high requirements for athletes' physical quality, especially agility, so it is essential to improve the agility of the body when training martial arts routine movements

A study has proved that scientific training methods are the key factors to promote athletes' performance. Agility is the ability to quickly change movements, change positions and adapt to circumstances. And the agility used to be considered a natural ability (Sheppard & Young, 2006). But the new research found that the agile quality can be greatly improved through the intensive training. Agility ladder is also called rope ladder. Scholars believe that the effect of adding agile ladder training to the training of developing footstep agility and coordination ability is remarkable (Li, 2022).

The main function of the agile ladder training is to strengthen the muscle strength of the lower limbs, and also to enhance the function of the small muscle groups of the knee joint and ankle joint, enhance the rhythm of the body movement, and reduce the probability of lower limb injuries. With the deepening of research on physical training, Agile Ladder has been applied in various ball games to varying degrees, and the research results show that the expected effect can be achieved (Wang, 2021).

As a general auxiliary training equipment for all kinds of projects, the agility ladder has been frequently used in football training for many years. Agility ladder training is mainly used for speed and agility training. In relevant research, it has been shown that agility ladder training can effectively improve athletes' speed after changing direction, and can help athletes improve their ability to move quickly in any random situation. Some studies have also shown that as an auxiliary device, it can improve the speed and sensitivity of young athletes, especially the footwork and coordination (Du, 2019).

A study has shown that in the peak growth stage of children and adolescents, their physical fitness and skills also develop simultaneously. In this period, children and adolescents are very sensitive to the impact of the environment. At this time, the appropriate intervention will have a good training effect (Ali et al., 2001). In current studies, limited studies focus on the impact of agile ladder training on the agility performance of female wushu players. Therefore, the purpose of this study is to explore whether 10-weeks agility ladder training could improve agility performance of female wushu players.

Material and Method

Subjects

In this study, 24 female wushu players aged 10-11 were involved in a 10-week agility ladder training. All 24 participants have more than 2 years of wushu experience without sports injury. The researcher randomly divided 24 participants into two groups. The experimental group (n=12) used agility ladder training method as intervention, while the control group (n=12) used routine training as intervention. All training performed three times a week, 20 minutes each time, lasting for 10 weeks.

Training Content

In the agility ladder training method, this study mainly involved six exercises to develop participants' agility ability. Each exercise performs 3 sets with 20s rest.

Agility Ladder Training:

(1) Small step running: Stand facing the agile ladder, slightly bend the knee joint, keep the upper body upright, and slightly lean forward. When starting, the front foot touches the ground, and it is required to move forward continuously step by step. The upper limbs and arms swing back and forth with the footwork. The time for the sole of the foot to contact the ground should be reduced as much as possible, and the rhythm of the upper and lower limbs should be controlled.

(2) High leg lifting: The preparation position is facing the agile ladder. When starting, one leg is raised to the first grid, and the front foot of the support leg exerts force. The upper arm swings forward and backward with the lower leg's foot movement. The hip joint moves forward actively, and moves forward in a circular way step by step, so as to minimize the contact time between the foot and the ground.

(3) Opening and closing jump: The preparation position is to face the agile ladder. After starting, open your feet and place them on both sides of the agile ladder. Then, clap your upper arms upward. Then, quickly jump your feet into the next grid, drop your hands through your side arms, and move forward in a circle step by step. The rhythm is bright and the upper and lower limbs coordinate.

(4) Single leg jump: face the agile ladder, land on one foot continuously at the beginning, jump into the agile ladder and quickly jump out to the second extreme, step by step and move forward continuously, control body balance to keep single group landing, and reduce the stay time of single action.

(5) Lateral z-shaped step forward and backward: take the left side as an example, stand at the side of the agile ladder, start with the left foot first, enter the grid with both feet in turn, and the left foot quickly leads the right foot to the second extra step forward, and then repeat the previous actions to move forward in order to keep the body's center of gravity moving steadily and reduce the time for the foot to contact the ground.

(6) Backward jump: turn your back to the agile ladder, bend your hips back slightly, move your body backward with the power of your front feet, take off and land at the same time with your feet one step at a time, and keep your upper body upright.

Agility Test

Test setup: Set out four cones as illustrated in the figure 1 above (5 yards = 4.57 m, 10 yards = 9.14 m).

Procedure: The subject starts at cone A. On the command of the timer, the subject sprints to cone B and touches the base of the cone with their right hand. They then turn left and shuffle sideways to cone C, and also touches its base, this time with their left hand. Then shuffling sideways to the right to cone D and touching the base with the right hand. They then shuffle back to cone B touching with the left hand, and run backwards to cone A. The stopwatch is stopped as they pass cone A.

Scoring: The trial will not be counted if the subject crosses one foot in front of the other while shuffling, fails to touch the base of the cones, or fails to face forward throughout the test. Take the best time of three successful trials to the nearest 0.1 seconds.

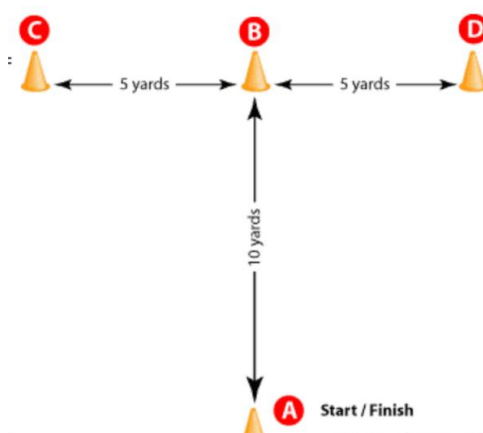


Figure 1 T Agility Test

Result

Table 1 provided the demographic features including age, weight, height, and training years of both two groups. In experimental group, the participants aged 11.3 ± 1.4 , weight 41.3 ± 2.8 , height 158.6 ± 2.4 , and training year 2.1 ± 0.6 . While, in the control, the participants aged 11.1 ± 1.3 , weight 42.4 ± 2.5 , height 159.7 ± 1.9 , and training year 2.3 ± 0.2 .

Table 1

Demographic features of Experimental and Control groups

Variables	Experimental Group	Control Group
Age (year)	11.3 ± 1.4	11.1 ± 1.3
Weight (kg)	41.3 ± 2.8	42.4 ± 2.5
Height (cm)	158.6 ± 2.4	159.7 ± 1.9
Training Year	2.1 ± 0.6	2.3 ± 0.2

As shown in Table 2, the researcher conducted independent sample T test on the measured data of the experimental group and the control group. The t-value of the T- agility test was 0.085, and the P-value was 0.934. Therefore, there was no significant difference between both two groups before intervention.

Table 2

Pre-test comparison analysis of experimental and control group

Variables	Experimental Group X±Sd	Control Group X±Sd	T value	P value
T-test	13.26±0.51	13.19±0.69	0.085	0.934

Table 3 showed that there was a significant difference between experimental and control groups in the post-test ($p < 0.05$).

Table 3

Post-test comparison analysis of experimental and control group

Variables	Experimental Group X±Sd	Control Group X±Sd	T value	P value
T-test	12.47±0.63	12.96±0.58	-2.465	0.024

Discussion

This study found that 10 weeks of agility ladder training can promote the agility performance of wushu players aged 10-11 years. Some theories can be used to explain why agility ladder training could improve agility performance. Some scholars believed that the agility ladder is a good exercise to train leg agility and synchronize motion (Pramukti & Junaidi, 2014). Moreover, other scholars believed that ladder agility training could help athletes to enhance their balance ability, muscle endurance, reaction speed and coordination ability (Bloomfield et al., 2007). Many studies supported these theories. A Hidayat (2019) conducted an experiment, which involved 24 participants. And the result showed that agility ladder training has positive effect on their agility performance (Hidayat, 2019). Robin KV and Dr. YC Louis Raj (2019) examined that 6-weeks agility ladder training significantly improved agility performance among 15 participants (Robin & Raj, 2019). Ratamess (2012) examined that a significant difference could be observed in the agility and change of direction performance between experimental and control groups after 4-weeks (Ratamess, 2012).

Conclusion

This study found that 10 weeks of agile ladder training had improved the agility performance of female wushu athletes, but this study was aimed at female athletes, and this method can be applied to male wushu athletes in future research. In order to comprehensively promote the agility development of wushu athletes. Therefore, coaches could be considered to integrate agility ladder training into routine training.

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