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Outbreak of Bovine Physical Capacity for Extensibility, Knee Flexion, Isometric Force and Lower Limb Power

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Abstract: The purpose of this article is to conduct a systematic induction study of martial arts athletes' sports stretch, knee flexion and other kinetic energy and lower extremity explosive force in conjunction with the study of bovine physical energy burst. The literature data method, test method and mathematical statistics method were used to study the characteristics of the power and lower limb power of the young Chinese martial arts athletes of different ages and grades. The results show that with the increase of age and training years, the momentum of juvenile martial arts athletes' stretching and flexing their knees gradually increases. 20-year-old martial arts athletes have significantly higher dynamics such as knee flexion than 18-year-old athletes, and there is no significant difference between the two. The former has a higher extensor / knee flexion ratio than the latter. On the 10m standing full-speed running test, the performance of the 20-year-old martial arts athletes was significantly better than that of the 18-year-old martial arts athletes. However, there is no obvious difference between the results of standing full-speed running at 30m, standing still vertical jump, and original underground squat vertical jump, indicating that the lower limb explosive power training has not received enough attention with age.

1. Introduction

In recent years, new rules of routines have been tried in national martial arts competitions, making martial arts practitioners have higher requirements on the flexibility and flexibility of the difficult movements of balance and leg method. In the martial arts teaching class, it was found that in the process of physical training, it is more biased to the training of core strength and explosive power of the lower limbs, and the training of flexibility is only ordinary static stretching [1]. This article uses active separation stretching techniques to practice martial arts students' flexibility. Active separation stretching is a relatively new training method introduced from the field of rehabilitation medicine to the sports field to improve the flexibility of the body. And coordination [2]. Active separation has seven characteristics: specificity, active initiation, increased assistance, gentle movement, short duration, multiple repetitions, and deep breathing [3]. Strength is the ability of the human neuromuscular system to overcome or resist resistance while working, and is the

source of power for the body to complete various actions. In competitive sports, strength is one of the important signs of the development level of athletes' physical fitness training, and it is the basic quality of all physical qualities. Explosive power is the main manifestation of fast power, and it is an important quality basis for many sports, especially fast power [4]. The level of explosive power is the dominant factor that determines the level of athletes' athletic ability. It can not only overcome resistance, but also cause huge displacement speed of objects. Because the level of athletes 'explosive power determines the level of athletic performance, coaches attach great importance to the development of athletes' special technical action explosiveness in sports training, and even its importance is more important than any other quality [5].

The role of each training method is specific. Without some all-around training method, the effect of any training method is the unity of specificity and non-specificity [6]. Specificity refers to the main role of a method. Nonspecificity refers to the impact of a training method on other qualities. For example, the power gained from exercises such as weight-bearing half-squats and snatches cannot significantly improve the performance of sports such as sprints [7]. Strength training is more conducive to the improvement of the activity ability of the exercises used in training.It does not make other forms of activity ability synchronously improve.Seveleville of the United States believes that super-isometric training such as single-foot jumps and step jumps can be effective. Link pure strength training with practical skills for competition [8]. A large number of research results at home and abroad have confirmed the effect of ultra-isometric training. Super-isometric strength is closely related to the type of muscle fiber, the contraction speed, the mobilization of neuromuscular muscles, the metabolic characteristics of muscles, and the transfer of kinetic energy. Romanenko, V pointed out that "some female sprinters have strong explosive power, but their special results are not outstanding [9]. The main reason is that too much high-strength exercises are performed too early, and continuous fast-strength exercises are ignored. Through pedagogical experiments on women's sprinters in Shanghai Xuhui Junior Sports School, it was found that "multiple jumping exercises such as single-foot jumping, rice stepping and continuous hurdle jumping are good for the development of young women's sprinters, and can directly increase the special Achievement [10]. It is recommended that the explosive training of young female sprinters should be based on jumping exercises, supplemented by light equipment.

With the advancement of science and technology and the enhancement of international exchanges, the concepts and methods of physical training at home and abroad have been continuously updated. In recent years, European and American sports powerhouses have many new ideas and methods in the research of sports physical fitness training. The concept of functional physical fitness training has been popularized in most sports [11]. In China, the importance of physical training has gradually received the attention of coaches at all levels, and some new methods of physical training have been gradually introduced in training, but the research on special physical training for different projects is not systematic and complete, especially The research on physical training methods, testing and evaluation methods of martial arts projects is even more insufficient. Through the search of related literatures, it was found that the relevant researchers and coaches have begun to apply the rapid expansion and compound training to explosive training, and have achieved good training results [12]. Therefore, this article will study the impact of rapid telescoping compound training on the lower limb power of martial arts athletes, and explore the impact of rapid telescoping compound training on the lower limb power of male sprinters. The purpose of this study is to provide reliable factual basis for the application of rapid telescopic compound training in the field of explosive power, and to broaden the application scope of rapid telescopic compound training.

This article consults and collects a large amount of literature about rapid expansion and compound training, uses the experimental method, then obtains the data, and uses mathematical

statistics to obtain the corresponding data. By comparing the final results of the experimental group with the control group, by comparing the martial arts of 24 men Athletes test and train various indexes of lower limb explosive power before and after the experiment, and explore the effects of rapid telescoping compound training on male martial arts athletes 'standing long jumps, standing triple jumps, vertical jump heights in place, and 30 meters of four lower limb explosive power indicators. The degree of improvement is to explore the positive impact of the rapid flexion compound training on the explosive force of the lower limbs of male secondary sprinters, and to provide factual basis for the application and promotion of the rapid flexion compound training in the field of physical martial arts.

2. Proposed Method

2.1 Research on Explosive Power

(1) The concept of explosive power

Explosive force is the dominant factor that determines the athlete's athletic ability in speed-force events. In sports technology, the product of force and speed is often called explosive force.It is not a simple force, but a combination of force and time. This form of expression. Some scholars believe that explosive force is the ability of muscles to generate huge acceleration during rapid and powerful contraction, so as to overcome the resistance imposed by the outside world. Others believe that when the muscle is subjected to external tension, it constantly stimulates the muscle, and when it contracts at a very fast rate, it has the ability to generate powerful explosive power. When the muscles bear a load of 80% of the force from the outside in a very short period of time, the ability to produce the maximum acceleration is called explosive force, which is a component of fast force. From the perspective of training and analysis of the research results, it can be seen that explosive power is the ability of the human body to apply the energy of strong muscle contraction to external resistance, but the premise is also very strict, that is, it must be completed within a short period of time. In addition, in the study of explosive power, some people think that explosive power is the ability to generate instantaneous maximum power in an instant [13]. In summary, when the body is in a certain environmental condition, when the muscle tension starts to increase, the muscle strength is increased at a relatively fast speed to complete the action, but the flexibility of the nerves and the force generated when the muscles expand and contract also have In the training, we should pay attention to increasing the maximum strength, speed, and muscle contraction length while also paying attention to the flexibility of the nervous system and maximizing the development of explosive exercises.

(2) The role of explosive power in Wushu sports

The level of athletes' explosive power can directly determine the sprint performance.Some experts and scholars believe that speed and explosive power training is a very important factor to improve athletic performance.Some people use jumping practice to conduct research, and some use weight-bearing practice to conduct research. The comparison between the two methods shows that weight-bearing exercises have not improved the sprint athletes 'performance, while those who have been trained with jumping practice methods have greatly improved their sprint results. In the middle and long-distance running event, the pain around the tibia of the calf often occurs after running, and the reason for the pain is that the body acts on the ground during the decline of its own gravity during the running of the body, and the ground bounces back to make the muscles around the calf. Vigorous contraction, the muscle is in a tense state for a long time and clings to the periosteum, it will be involved every time you run, and this will cause a small tear in the periosteum for a long time, and the blood vessels will be dilated and congested and cause pain. There are many reasons for incorrect movements. The rapid telescopic compound training not only enhances the explosive

force of the lower limbs, but also improves the running posture and adjusts the running rhythm.It is also necessary to try to find a flat and non-hard plastic track training to reduce the blood lactic acid accumulation speed and ground reaction force generated during running. To play a better level in the middle and long distance running.

From this we can know that we should choose high-quality training grounds and scientific training methods according to the characteristics of the middle and long distance running events, and combine these organically to ensure the rational arrangement of the training structure and take advantage of the convenient conditions brought by modern high technology to ensure safety. Under the premise, improve athletes' performance. The students from the Department of Physical Education were selected as the experimental subjects for the research and conducted a 14-week explosive power training. He used standing long jumps, squats in place, and vertical jump heights as the test indicators of the experiment. After statistical analysis, he reached a conclusion. There are significant differences in the test indicators, which can reflect the importance of deep jump practice on the fixed long jump. There are also factors such as the take-off angle, thigh swing, folding angle of the big and small legs, and instant explosive power, all of which will affect the quality of the triple jump [14]. However, we found that from the top-down jumping practice, the body's gravitational potential energy acts on the lower limbs and also on the joints, which will generate a strong impulse. If this impact force is too large, it is even greater than the joints. The scope will bring unimaginable damage to athletes. In view of this situation, coaches should always pay attention to the training status of athletes to avoid and prevent the harm caused by physical injury. The requirement for explosive triple jump is relatively high, so you should not focus on the training of maximum strength during training, but you should intervene in the lower limb explosive force training and strength training to work together, so for the establishment of triple jump That said, explosive power training is very important.

2.2 Relationship between Explosive Power of Lower Limbs and Martial Arts

In martial arts, the strength of athletes' explosive ability in the lower limbs is inextricably linked to martial arts specific technical movements. In the daily training of martial arts, many athletes are very good both in height and consciousness, but they are often in a disadvantaged position in ordinary competitions. For example, if the defense is not in place, the ability that should be available during the offense cannot be exerted, errors occur, and the strength is not enough. The emergence of these problems is related to the lack of explosive power of the athletes. Therefore, the explosive ability of martial arts athletes is mostly reflected in the lower limbs. Explosive power plays a key role for athletes in both offense and defense. In general, the ability of martial arts athletes to lower the power of their limbs largely determines the athlete's level of competition and special skills.

Explosive force refers to the ability to overcome resistance with maximum acceleration in the shortest time. Explosive power is a combination of maximum speed and maximum power. The explosive power of the lower limbs is particularly important in martial arts. Whether in offense or defense, whether it is starting, accelerating to get rid of, or taking rebounds, athletes need sufficient explosive power in the lower limbs. For a simple example, if two athletes have the same weight, then the members with good explosive power in the lower limbs must be good both in speed and jumping ability. Training must strengthen the improvement of physical fitness. The main principles of explosive power training are: first, increase the muscle's maximum strength by improving the innervation ability of the muscle, thereby increasing the athlete's explosive power; second, increase the muscle's maximum power by increasing the cross-sectional area of the muscle, thereby increasing the explosive power of the muscle [15]. Therefore, in training, one is to increase the

muscle's maximum strength and explosive power through the development of muscle coordination, that is, the innervation ability, and the other is to increase the cross-sectional area of specific muscles through specific load strength training stimulation.

(1) Physiological basis of muscle contraction

Muscles are composed of two kinds of muscle fibers, the outer spindle muscle and the inner spindle muscle. Extrafusal muscle fibers contain myofibrils, which are responsible for muscle contraction, relaxation, and stretching. Myofibrils can be divided into segments, and each segment is the smallest contractile unit sarcomere in the muscle. The sarcomere is composed of two types of muscle filaments, myosin and actin, which are staggered and connected longitudinally. The joints that are regularly arranged on myosin and protrude outward are called transverse bridges.When the extrafusal muscle fibers receive nerve impulses from the brain, a series of chemical reactions occur, resulting in transverse bridges and actin muscle. This phase is called "excitation-contraction", and then actin is pulled to slide the two types of muscle filaments closer to each other. The whole process is called the theory of muscle contraction. The intrafusal muscle fibers are also called muscle spindles, parallel to the extrafusal muscle fibers. The muscle spindle is a proprioceptor in the muscle, and it can sense changes in muscle length.

(2) Mechanism and physiological basis of enhanced training

Reinforced training is the use of pre-stretching or reverse motion to shorten and shorten the cycle to produce fast and powerful movements. There are two currently recognized models for enhanced training, namely mechanical models and neurophysiological models. The so-called mechanical model is that during the elongation and shortening cycle, muscles and muscle keys will store elastic potential energy due to centrifugal contraction, and then convert it into kinetic energy in the subsequent centripetal contraction phase, thereby increasing the total kinetic energy. There is another explanation: the elastic component in series, which is one of the components of the mechanical model. The tandem elastic component includes the muscle bonds and the actin and myosin bridges of the muscle. During the centrifugal contraction phase, the muscles and muscle keys are stretched, and the elastic component in series is like a spring being stretched and stores elastic potential energy. The elastic potential energy is about to provide huge energy for the next jump [16]. Studies have shown that when explosive martial arts athletes take off, their feet touch the ground for a short time. Because if the contact time is too long, the stored huge elastic potential energy will gradually disappear in the form of thermal energy, so the energy conversion rate will be reduced.

3. Experiments

3.1 Experimental Data Set

In the experiment, the characteristics of the power of the thigh and knee flexion of the young martial arts athletes of different ages and grades from 16 to 20 years of age in China and the characteristics of explosive power of the lower limbs were studied. The experimental period is 3 months, training 5 days a week, training once a day in the afternoon, training on Tuesday and Thursday according to the experimental content, each training session is 90 minutes, the entire training process, the first minute of preparation activities, and then Group training. The experimental group used a combination of single-leg training methods for training, and the control group used a combination of two-leg training methods for training. 15 minutes after the training session, active forms of relaxation were used: such as jogging, static pull, hand pressing, pressing, Rubbing muscles and other means. The experimental data was collected and pre-processed, and imported into EXCEL 2010 to facilitate the next experimental data calculation.

3.2 Experimental Environment

Empty playground, equipped with stopwatch, measuring tape, adjustable height jump box, railing, mat, barbell, solid ball. The data processing part mainly includes statistical analysis software SPSS 20. The system hardware requires CPU core i5, 8GB memory, 512 hard disk.

4. Discussion

4.1 Comparative Analysis of Various test Results before and after the Experiment

(1) At present, scholars agree that the most effective method for indirectly evaluating the explosive power of athletes' lower limbs is 30 meters, 60 meters, standing long jumps, vertical jumps in place, and throwing solid balls forward. These indicators can reflect the lower limb muscle groups. The ability to quickly shift from centrifugal contraction to centripetal contraction, thus reflecting whether the athlete's lower extremity explosive power has been improved. The rapid expansion and compound training method improves the muscle elastic potential energy, not only has a good effect on the starting ability of the 30-meter run, but also improves the ability to accelerate after the start.In this way, it will further shorten the time to complete the action; decide The important factors for the performance of the 60-meter run are the ability of the feet to land quickly after leaving the ground and the ability of the thighs to twist and shear quickly, and the fast-retracting compound training method we use is to use the principle of muscle stretch reflection to improve the ability to swing the legs quickly; The performance of standing long jumps and vertical jumps on the spot is often good in a short period of time.Good coordination of upper and lower limbs and a firm and stable body state can perfectly show explosive power, which is compounded with rapid expansion. The training objectives are complementary to each other. In the daily training, the overall stability of the joints of the body should be strengthened. If this is done, the body can maintain the correct posture and land smoothly when it is vacated. And more emphasis is on how to better transmit the force to the upper limbs and then throw the ball quickly, and to this physical fitness index A rigorous test and statistical analysis of the measured data will be more beneficial to indirectly evaluate the lower limb explosive power of high school athletes.

Before the training begins, the physical fitness indicators of the two groups of subjects are strictly tested to detect and analyze whether the physical fitness of the two groups of subjects is qualified. If the differences in the performance of the physical indicators are not obvious and do not affect the experimental results, then you can for the next training, the specific analysis results are shown in the following table 1:

Table 1. Comparison of physical fitness test indexes between the two groups before the experiment

	30m (s)	60m (s)	Standing long jump (m)	Vertical jump height in place (cm)	Throw solid ball forward (m)
Experimental group before experiment	4.55±0.44	8.34±0.74	2.30±1.2	45.7±0.88	15.25±0.24
Experimental group after experiment	4.86±0.40	8.33±0.65	2.28±0.46	44±0.76	14.16±0.38
P value	-3.81	0.4	0.39	0.78	-1.39

From Table 1, it can be concluded that the average values of the five tests at 30m, 60m, standing long jump, in-situ vertical jump, and throwing a solid ball forward are 0.11, 0.82, 0.98, 0.89, and

0.18 respectively. With statistical analysis, it can be considered that there are no significant differences in the five test indicators (P> 0.05), that is, the physical fitness levels of the experimental group and the control group are equal, and the experiment can be continued as shown in Figure 1.

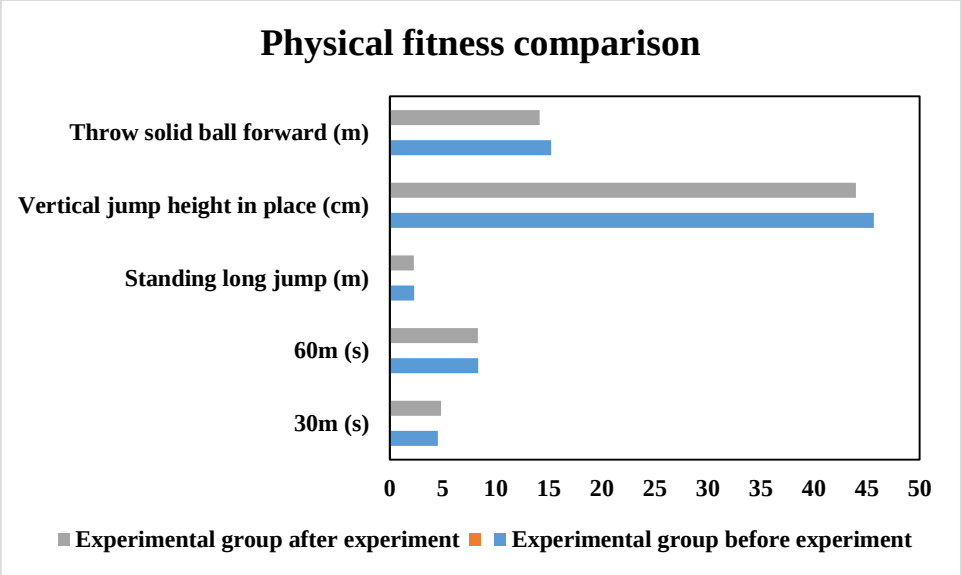

Figure 1. Difference in physical fitness between the experimental group and the control group

(2) In order to better verify the training effect for 8 weeks, the experimental group tested the results of 5 physical fitness indicators after rapid intervention training intervention, compared with the test results before the experiment and the analysis results are shown in Figure 2.

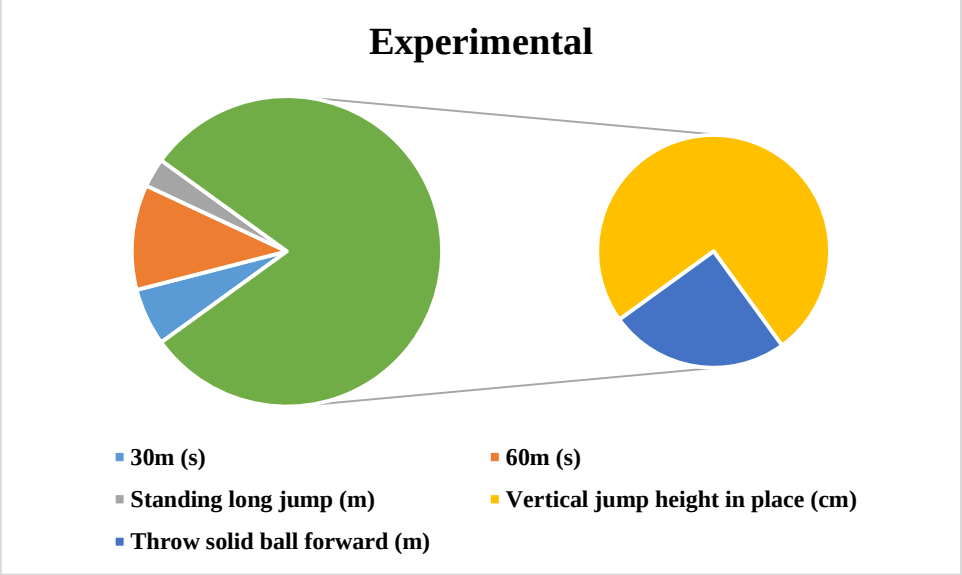

Figure 2. Analysis of test indicators before and after the experiment in the experimental group

4.2 Comparative Analysis of Basic Force Data before and after the Experiment

(1) Explosive force is the body's conversion of chemical energy into mechanical energy, the maximum output power P = F * V, explosive force is an effective combination of power and speed, and strength is the basic condition of explosive force. In the women's handball event, the physical

confrontation is particularly fierce, and athletes need to have a good basic strength as a guarantee to prevent or reduce the occurrence of sports injuries. In the design of the plan, the first stage focuses on the development of the correctness of the basic strength and movement and the stability of the core.If basic strength training is not performed on the correct movement; it will easily cause sports injuries and greatly affect the training progress and efficiency. The first stage focuses on standardizing training movements and developing basic strength. After interviews with relevant experts and coaching teams, squats, bench presses, and high turns were used as the three indicators to evaluate the basic strength.

Table 2 shows the maximum 1RM values of the squat, bench press and high turn of the athlete's basic strength before and after the experiment. When testing the athlete's maximum strength, the indirect test method is used. Because the test of the maximum muscle strength is extremely easy to cause sports injury, In order to prevent the loss from occurring, the 3RM value, 4RM value, 5RM value, and 6RM value are measured, and the 1RM value is indirectly calculated, as shown in Figure. 3.

Table 2. 1RM value of basic strength test before and after the experiment

	Squat 1RM value (kg)	Bench Press 1RM (kg)	High turn 1RM value (kg)
Experimental group before experiment	115	44	78
Experimental group after experiment	112	78	90

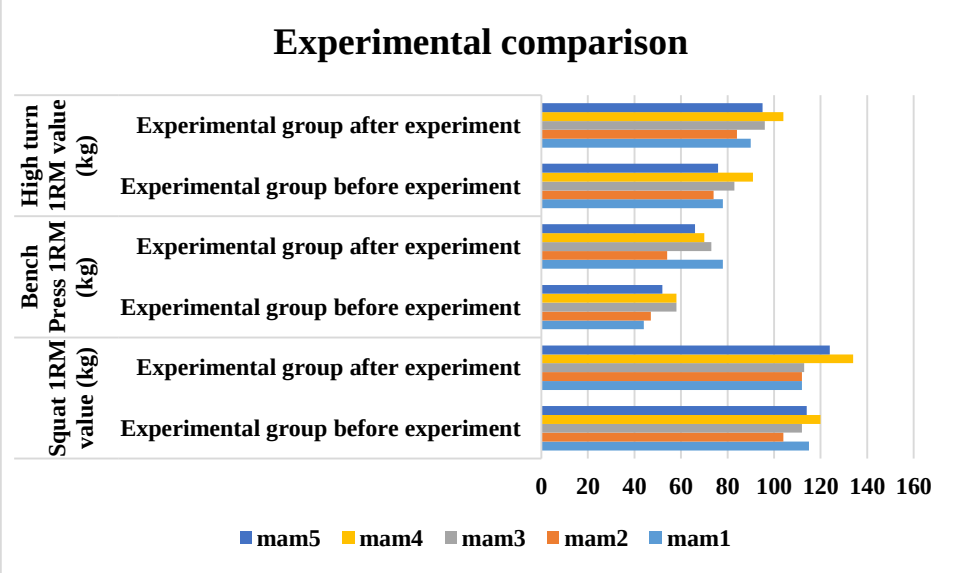

Figure 3. Comparison of basic strength before and after the experiment of different players

(2) Comparative analysis of the average values of the basic strength squats, bench presses, and high rolls before and after training. The results show that the average 1RM of squats before training increased from 113 ± 27.16kg to 128.43 ± 29.98kg, a growth rate of 13.2%; before and after training The average 1RM of bench press increased from 51.87 ± 6.01kg to 65 ± 7.45kg, with a growth rate of 25.31%; the average value of 1RM before and after training increased from 78.81 ±

10.09kg to 92.62 ± 12.89kg, with a growth rate of 17.52%. The basic strength data before and after training were statistically analyzed, and the 1RM values of squats, bench presses, and high-turns were significantly improved ($p < 0.05$) as shown in Figure 4.

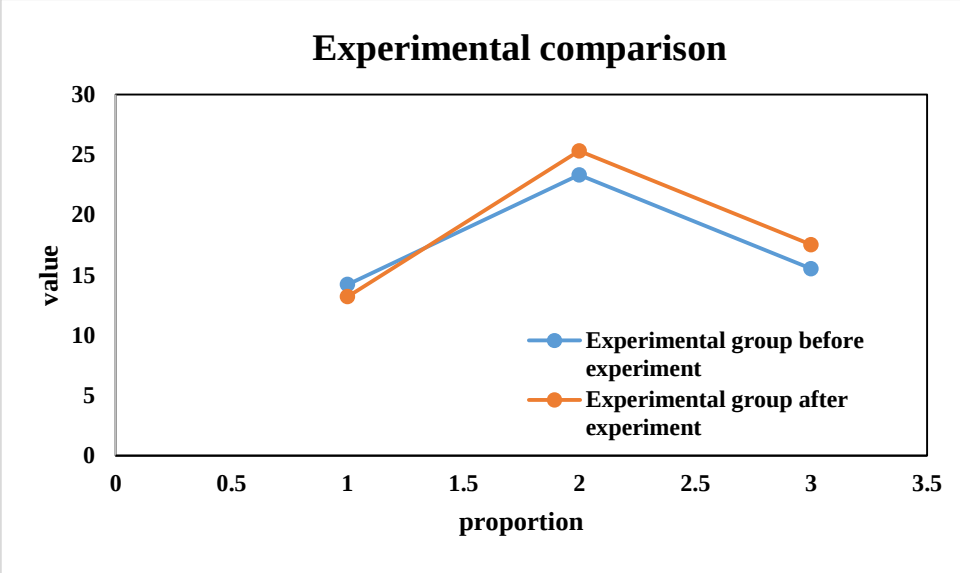

Figure 4. Comparison of different standards after training

5. Conclusions

The minimum value of the maximum power of the bench press before and after training increased from 333.8w to 399.0w with a growth rate of 19.53%; the maximum value of the maximum power increased from 560.6w to 641.8w with a growth rate of 14.48%; the average maximum power increased from 422.51 ± 58.45w To 516.5 ± 66.43w, the growth rate is 22.24%. The minimum maximum power load increased from 25.0kg to 33.1kg, with a growth rate of 32.4%; the maximum maximum power load increased from 37.8kg to 46.3kg, with a growth rate of 22.48%; the average maximum power load increased from 30.6 ± 3.72kg to 38.8 ± 4.89kg, with a growth rate of 26.96%; there was no significant change in maximum power speed; the average maximum force increased from 50.4 ± 6.01kg to 64.07 ± 7.98kg, with a growth rate of 26.97%. Through statistical analysis of the above data, the athletes' bench press maximum power, maximum power load, and maximum strength were significantly improved ($p < 0.05$).

As with all sports training, enhanced training has a certain risk of injury, so the fitness coach must consider how to reduce the probability of injury as much as possible when preparing to train a martial arts athlete. Assessing athletes: Before performing enhanced training, the fitness coach must first understand whether the athlete's injuries will affect the training. Athletes must now understand and master correct reinforcement training movement techniques, and have certain strength, speed, and balance ability to perform reinforcement training adequately. The following guidelines are mostly based on statements from the American Physical Fitness Association. Technology. The correct training movement technology can not only effectively reduce the probability of injury, but also improve the quality of training. There are many jump movements in the lower extremity training. Therefore, the athlete must be able to master the hip flexion, knee flexion, ankle flexion and swing arm movements, and can complete the sequence of movement force to complete the transmission of power, so as to correctly complete the take-off and landing techniques, which will improve the quality of training It is vital to reduce the probability of injury.

In practice, we try to add ball practice to the rapid telescoping compound training, so as to

explore a more rapid telescoping compound training method that is more suitable for martial arts. Due to the lack of experience and objective material in this study, the evaluation indicators are not comprehensive and accurate. It is recommended that more scientific methods and more accurate experimental instruments be used for further discussion. Because the sample size selected in this study is small and the training time is short, it is not possible to conduct more explorations from a comprehensive perspective. It is recommended that future researchers build on this research to target the combination of rapid flexion compound training and common resistance training. , Participation proportion, training intensity and more.

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