

Research on Specialised Physical Training for Competitive Taekwondo Youths under the Perspective of New Rules

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Abstract: Competitive taekwondo belongs to the fighting confrontation project, and the new rules of the implementation of the three-bureau competition system for athletes with high physical requirements, in taekwondo training physical fitness is the basis of all technical and tactical implementation. In order to improve the competitive level of China's youth taekwondo athletes, this paper adopts the literature method, interview method, logical analysis method of competitive taekwondo youth special physical training research, analyses the role of youth physical training, basic physical training, special physical training, as well as designing the corresponding training methods and the targeted training adopted. The study provides theoretical references for relevant scholars, coaches and athletes in China.

1. Introduction

Competitive taekwondo is an official Olympic sport, which belongs to the group of fighting and confrontational sports dominated by technical and combat skills, and physical fitness is particularly important in confrontational sports. Since China's loss in the Tokyo Olympics taekwondo, the State General Administration of Sport has emphasised the importance of basic physical fitness and made physical fitness testing the ticket to national and provincial competitions, a measure that has significantly improved the physical fitness level of taekwondo athletes. Basic physical fitness is closely related to specialised physical fitness and is the basis for developing specialised physical fitness. The 14th National Games taekwondo event competitions also used fitness tests as admission tickets. In this year's 2022 World Championship international competition, China returned to the world's first-class team with excellent results. Physical fitness is essential to achieve such results, and the work has laid the foundation for the harvest of the event's results. Physical training is not only in the training of top athletes need to pay attention to, in the youth stage physical training cannot be ignored, and need to carefully plan and design arrangements for the cultivation of outstanding sports seedlings to lay a solid foundation.

2. Research Methods

2.1 Literature method

The author searched through the databases of China Knowledge and Wipro with the keywords of

"youth physical fitness", "taekwondo physical fitness", "taekwondo rules", etc., in order to obtain the required theoretical foundation.

2.2 Interview survey method

The author exchanged views with coaches engaged in youth training and listened to related opinions and suggestions.

2.3 Logical Analysis Method

The author adopts induction and other forms to organise the relevant literature and coaches' opinions logically.

3. Analysis and Discussion

3.1 The role of physical training for young people

Scientific physical training helps to stimulate the vitality of the body, strengthen the physical quality from the body coordination, flexibility, strength, endurance, speed, alleviate "obesity", "overnutrition", "easy to feel tired", "fuzzy mind" and many other sub-health phenomena in daily life. ", "over-nutrition", "easy to feel tired", "fuzzy mind" and many other daily life in the phenomenon of sub-health. Physical training also improves the sensitivity and responsiveness of the body and mind, strengthens physical fitness and ability, encourages people to develop good exercise habits, forms a correct exercise posture and prevents physical injuries caused by improper exercise. Taekwondo has a wide audience of thousands of practitioners around the world and young athletes are the main force, through scientific basic physical training and special physical training can not only improve the performance of Taekwondo athletes, but also help to correct the poor posture of young people. However, many movements used in taekwondo competitions are not standard movements, and many movements are actually compensating for the muscles, and if they are compensated for a long period of time, even though there will be no short-term injuries, it will certainly shorten the athletic life of young athletes in the long term, which will not be conducive to the cultivation of outstanding young talents for our country. Secondly, through the special physical training can enhance the stability of joints and core, Taekwondo has a lot of change of direction, stopping action and belongs to the confrontational project through physical training can prevent sports injuries to a certain extent. In addition, when arranging the basic physical training and special physical training, it is necessary to make reasonable arrangements according to the different stages of growth and development of young athletes, the training stage and the level of sports. The athletes' preparation period is mainly based on basic physical training, supplemented by special physical training, the strengthening period is generally based on special physical training, and the competition period is mainly based on special physical training to the highest state of the competition, the intensity is increased and the load is small.

3.2 Basic physical training

Basic physical training is closely related to specialised physical training. Basic physical training is the foundation of specialised physical training while specialised physical training is the extension of basic physical training. Secondly, the basic physical training method should be matched with the force characteristics of the specialised movement form, so that it can cause benign migratory transfer, if it can't cause benign migratory transfer, then its training is ineffective.

3.2.1 Endurance training

The energy supply of Taekwondo athletes is a mixed energy metabolic system of 60%-70% anaerobic (and glycolysis is predominant) and 30%-40% aerobic. In Taekwondo competitions the rules have changed from the previous two-set system to the current three-set winner competition system with two minutes per set. Today's rule change does not allow the posting of encourage athletes to use more offensive movements to make the game faster, to the athletes in the game buffer time has been shortened a lot, requiring athletes to enhance the sustained athletic ability and in taekwondo games require athletes to change the speed of the technical movements and frequent use of a variety of offensive and defensive techniques, which requires athletes to have a good fast power and explosive power and anaerobic endurance also have higher requirements ^[1]. This requires athletes to have good fast power and explosive strength and higher requirements for anaerobic endurance ^[1]. However, the three sets of the game also put forward higher requirements for athletes' aerobic endurance, who can maintain better physical fitness level in the third set will play a decisive role in the victory or defeat of the game in the case of an even match. Coaches organise aerobic endurance training methods as follows: (1) running at a constant speed, cross-country running, duration of 30 minutes, heart rate of about 150 beats per minute (2) jumping rope for about 10 minutes, which can train aerobic endurance as well as enhance the ability of the ankle joints as well as the coordination and sense of rhythm (3) cyclic training. 10-12 stops, 8-12 repetitions at each stop, 2-3 groups of cyclic, and set up the basic physical action for each stop. (3) Circuit training. Coaches organise anaerobic endurance training methods as follows: (1) 30m, 50m fast sprinting for 3-5 consecutive groups, with a 1-3 minute interval between groups (2) fast high leg running steps for 3-5 groups with a 1-3 minute interval, which can significantly improve the anaerobic metabolic capacity of the lower limbs. (3) 800 metres timed run. This item belongs to glycolytic energy supply, Taekwondo item belongs to aerobic anaerobic energy supply mixed energy supply system, and this training method can significantly improve the sustained attack ability in Taekwondo competition.

3.2.2 Speed training

In Taekwondo competitions, athletes are required to use very fast legs to strike and fast pace to advance or avoid the opponent's attack, so speed training is especially critical in basic physical training. Speed training is divided into three types of training: reaction speed, movement speed, and movement speed. In the organisation of the training process, according to different stages, the task requires the use of scientific training methods. Good speed training needs to pay attention to the development of speed power, which is the combination of speed and power. Speed can also be improved through strength and flexibility training. Coaches use speed training methods as follows: (1) a variety of short-distance sprint running (at the fastest speed), 30-metre run, 10-metre return run (steering stirrups fast). (2) Slope running, traction running. (3) 10s high leg lifting or small step repetition of 2-3 groups 1 minute break between each group. (4) According to the signal suddenly issued by the coach, the athlete reacts with corresponding fast basic physical movement at rest or during movement. (5) Accepting balls from different directions and throwing them during movement, using balls suddenly coming from different directions to improve the reaction speed of the athletes' upper limbs.

3.2.3 Strength Training

In the electronic protective gear competition athletes need a certain value of hitting power value protective gear score will respond, and the power also affects the speed, in all the confrontation project strength training is very important. In strength training, athletes must follow the theory and science of sports, first practice large muscles, after training small muscles, and youth athletes' strength

training is mostly used to overcome their own body weight exercises can also be appropriate to increase some small load training but cannot be imposed on the large load training in order to cause harm to the athletes' physical health^[2]. Adolescent strength training more power training less static training, do not do breath-holding training, and secondly, the form of strength training movements should be in line with the developmental characteristics of adolescents and the characteristics of sports mechanics. Related research shows that the development of adolescent athletes is characterised by 8 years of age after the male and female strength began to show, the sensitive period of the absolute strength of the boys natural growth for 11-13 years old, and then the absolute strength of the slow growth rate of 25 years old around the largest. Girls 10-13 years old absolute strength growth rate is fast, three years in the total absolute strength can be increased by 46%, 13-15 years old absolute strength growth rate decreases, 16 years old after the beginning of the decline to the age of 20 years old can basically reach the maximum strength.^[3] Childhood is a sensitive period for the development of speed and strength after the age of 13, boys grow faster than girls. Taekwondo athletes use kicking techniques when the lower limbs play a major role in the muscle groups are gluteus maximus, biceps femoris, rectus femoris, medial femoris, lateral femoris, skeletal girdle muscle, gastrocnemius and other extensor muscles, so the need to pay attention to the lower limbs of the strength training directly affects the athletes' sports performance. In addition, the boxing technique and pushing technique are frequently used in the rule changes in these two years, so it is also necessary to strengthen the strength training of upper limbs. The coaches use the following strength training methods: (1) front rack position deep squat (small weight can be carried out), the body keeps leaning forward, in preparation for the high flip, which can improve the explosive power. (2) Single-leg, double-leg half squats or deep squats can be performed with or without weights. (3) Lunge push straight down (can be loaded with both hands) to strengthen core stability, lower body strength, knee and hip stability. (4) Plank support exercises that exceed 30 seconds need to increase their complexity and add dynamic movements. (5) Bench press exercises to consider the difference between the maximum power and fast power, fast power control in the role of 20kg, maximum power control in the 50kg or so, pay attention to the number of times and the number of groups cannot be too much. (6) Continuous long jump can significantly enhance the lower limb explosive force of athletes. (7) The use of Russian rotation can exercise to the waist and abdominal rotation strength, 20 times a group interval 1-2 minutes, repeat 3-5 groups.

3.2.4 Coordination Training

Sensitivity and coordination refers to the ability of young athletes to complete various movements quickly, agilely and in a coordinated manner in a variety of complex environments. Taekwondo sport is a fighting sport with comprehensive development of strength, speed, endurance and whole-body co-ordination, with the use of hands and feet. In the training process, the coach requires the athlete to have a high degree of coordination to complete the professional movement, because coordination affects the speed and strength of the quality, which in turn affects the completion of the professional movement, this type of training will help the athlete to improve reflexes, start, change the direction of speed, and be able to master difficult techniques more effectively. In Taekwondo, according to different timing, athletes need to quickly make the transition movement and need to be combined with the pace, which not only puts forward higher requirements on the coordination and sensitivity of the athletes, but also puts forward higher requirements on the athletes' neural excitability. Sensitivity and co-ordination training should be carried out throughout the whole training, and the training should be co-ordinated with other quality training, and the sensitivity and co-ordination training should be arranged in different periods and different training stages, otherwise it will affect the linkage of pace and technical movements as well as the articulation of various combinations of movements, thus affecting the success or failure of the game. The training time should not be too

long, the number of repetitions should not be too much, too much training will make the athlete's excitement state reduce, and in the fatigue state of the practice will reduce the effectiveness of training, this training should be carried out in the first half of the training session. The training methods used by the coaches are as follows: (1) Pedal exercises. Including left-right foot change, left-right leg change, left-right split-leg pedalling and other exercises, a total of 5 groups, each group of 20 times, with a 30-second interval between groups. (2) Rope ladder exercises. Including small step running, cross-step running, one-legged jump, small step running and into a variety of specialised movements need to pay attention to the hands and feet synergistically, action in the process of movement should be fast, the phosphoric acid system to supply energy as much as possible to last less than 10 seconds, with an interval of 30 seconds. (3) Sensitivity game practice, such as plastering. (4) Agility circle exercises. Including exchange steps, front and back step-ups, cross jumps, and various specialised movements.

3.2.5 Balance training

Balance ability refers to the ability of adolescent athletes to resist external forces that disrupt balance during exercise in order to keep the body form in a stable state. Balance ability is the basic ability of all static and dynamic activities. The kicking action in Taekwondo belongs to the unilateral limb support project, and Taekwondo has many rotational techniques, so the balance ability of athletes has higher requirements. Coaches training methods are as follows: (1) holding a barbell piece to do the launch tightening training and stand on one foot support for 10 groups. (2) Agility circle one-legged cross jump. (3) fence jumps, marching between the left and right leg jump, can train dynamic balance training. A group of two people holding each other's other leg to move quickly between rows can exercise the ankle joint ability can also exercise to the balance. (4) Jump deep practice, pay attention to the landing of the knee and hip joint and ankle posture, can train the balance after landing.

3.2.6 Flexibility training

Taekwondo mainly uses the lower limbs to fight against each other, and has high and extended movements, so flexibility is very important. Improve the flexibility quality as much as possible can not only improve the height and distance of striking, but also favourable to the speed of kicking, and the speed and power of athletes who are not good at flexibility in kicking and striking the high position movements are also obviously slowed down. Each session should be targeted flexibility quality training, 30 minutes before the class for dynamic stretching, 20 minutes after the class for static stretching. Coaches can choose flexibly according to the training task and the actual situation of the athletes. At the same time, we can not take stretching training as the only means to improve flexibility, coaches can also arrange jogging and with some strength exercises, which is also a way to develop flexibility training for young taekwondo athletes.

3.3 Specialised physical training

3.3.1 Specialised physical training of pace

Any single technique or combination of techniques in competitive taekwondo requires pace to support the completion of technical movements, and the flexible and changeable pace is one of the characteristics of competitive taekwondo, which can also be called the soul of competitive taekwondo. The pace of Taekwondo is roughly divided into forward slide, backward slide, step up, backward step, cross step, whirlwind step, and the pace of the movement form in the competition is accompanied by the characteristics of the sharp stop, sharp start, change of direction, etc., which is the basis of the use

of technology and tactics. Taekwondo pace training in addition to pure pace training also need to strengthen the knee and ankle training, these two joints are the key to the pace can be used freely. Pace requires athletes to have stable reaction (including lower limb strength and core strength) and rapid reaction ability. Coaches train in the following ways: (1) use agility circles and fences to do a variety of pace changes, jumping fences can improve the athlete's ankle and knee joints, and immediately do the pace training through the landing to improve the sensitivity of the pace (2) a group of two people stand parallel to do the pace of the follow-up training, one side to follow the other's pace of the follow-up training to try to keep pace with each other and improve the athlete's reaction ability Duration 20 seconds interval 1-3 minutes (3) pace marching between attack and defence exercises, one in and one out, can improve the athlete's ability to perceive the distance (4) pace combined with shoulder touching exercises

3.3.2 Specialised physical training for leg technique

In today's electronic protective gear era of Taekwondo leg kicks require fast speed, hidden movements, rapid strikes, compared to the traditional protective gear era of heavy power, action wide open and closed there is a clear difference, and in the power compared to the traditional protective gear era of the past a little weaker, but not not heavy power^[4]. Taekwondo leg kicks to complete rapid strikes need to meet the two conditions of the start and knee lifting, which is why Taekwondo training is accompanied by knee lifting this training. Secondly, Taekwondo kicking is a unilateral support of the limbs and is accompanied by a confrontation with the opponent, so it requires the ability to balance, core strength, and lower limb strength. Coaches use the following training methods: (1) lunge / horse stance to start the knee (can be used with a small load), the lower limbs to withstand the force of the rapid stirrup conversion, the need for both feet at the same time the synergistic force, to strengthen the speed of the start and the speed of the knee. (2) Step knee lift, the lower leg fully stomping extension, torso stability without offset, do not continuously do the main emphasis on stomping to lift the knee for a moment, emphasise the start of the explosive force, improve the propelling ability of the supporting foot. (3) Single-legged support on the balance ball to do single-leg kicking, improve the stability of the lower limb. (4) Partial load lunge deep squat, in line with the unilateral limb movement and the core of the force (5) miniband resistance knee lift training, improve the speed of adolescent knee lift. (6) single-click technical reaction target practice, is conducive to improving the athlete's neurological excitability, reaction speed, starting speed, the number of times should not be too much 10 times, with a 1-minute interval, repeat 3-5 groups. (7) Pimp training method, complete 5 groups, 15 legs of a group, intervals of 30, helps to improve leg strength and leg speed. (8) Auxiliary leg control method, 30 times a group, left and right exchange.

3.3.3 Upper limb specialised physical training

In the past, the traditional protective gear era athletes have less application of boxing and scored fewer points, electronic protective gear era in the past two years under the rules of the changes in the frequency of boxing, and straight punch has become part of the athlete's favourite technique to win. The training of Taekwondo athletes should focus on the explosive power of the punch, and the straight punch is a good reflection of the explosive power. Attention should also be paid to the blocking training when punching, and the timing development of meeting and attacking straight punches. Upper body confrontation in the competition has been changed a lot in the rules in the past two years, which seldom emphasised on the upper body confrontation in the era of traditional protective gear, so the upper body strength training is particularly important. The training methods used by the coaches are as follows: (1) Using elastic bands to do single and rapid punching exercises, lasting less than 6 seconds with a 1-minute interval. (2) Use the barbell piece to do two-handed push out and

retrieve movements lasting 20 seconds, with a 3-minute interval, and repeat for 2-3 sets. (3) Push back exercise in a group of two, the person being pushed needs to do resistance exercise, simulating the upper body push and confrontation technique in real combat, duration 10 seconds.

3.3.4 Specialised Endurance Training

In terms of endurance training, in addition to the basic physical fitness training endurance, at the same time, specialised physical training also needs to train endurance, so that athletes can adapt to the intensity of training and competition intensity, and can be more reasonable distribution of physical strength in the game. At the same time, the training of special endurance needs to simulate the environment of the game, the size of the pressure of the athletes in the game has a direct impact on the athletes' physical consumption, so through simulation training to improve the effectiveness of training. The training methods used by the coaches are as follows: (1) 2-minute free target/free guard exercise with 1-minute intervals, repeated in 3-5 groups, to simulate the competition environment and improve the glycolytic metabolism of the athletes. (2) 2-minute basic leg kicks, single-movement continuous target kicks with 1-minute intervals, 6 or more sets. (3) Circuit exercise. Athletes adopt footwork and taekwondo kicks, arrange 10-12 stations, 8-12 times per station, repeat 2-3 groups, and rest for 3 minutes between groups, which is conducive to improving anaerobic metabolism.

3.4 Recovery physical training

The main task in this stage is to adjust the physical and psychological state and restore the athletes' athletic ability and physical function. Taekwondo athletes will be tired after physical training, but if they rest immediately is not conducive to the recovery of athletes' physical functions. Coaches should adopt certain positive recovery methods such as games, aerobics, etc. to help athletes slowly recover their physical state and relieve physical fatigue. In addition, the coach can also adopt some physical methods, such as soaking in hot springs, massage, and adjusting the diet to help the athlete recover their body functions quickly^[5].

4. Conclusion

In the new rules of competitive games, the three-set winning system requires more specialised physical fitness of athletes. The design of physical training for young people should not be the same as that of adults, but should be arranged according to the physical development of young people and their developmental characteristics. Secondly, it is also necessary to develop a scientific special physical training plan according to the training task, taekwondo training rules, the actual training level of the athlete, and the stage of training. Taekwondo special physical training must start from the competition, combined with the special form of competitive taekwondo, the characteristics of energy supply and technical and tactical characteristics of training. Competitive taekwondo programme's leg method is variable, small range of action out of the leg hidden, followed by the need to strengthen the agility of the footwork, flexibility and body coordination and sensitivity training. In taekwondo physical training in the basic physical training strength, speed training, sensitivity and coordination training accounted for a large proportion, combined with the current stage of the competition rules to strengthen the special endurance training. Taekwondo is an aerobic and anaerobic mixed energy sports, in Taekwondo special physical training, physical ability training (including the start of the knee training) occupies a very important position. Coaches should be clear that the training benefits gained from training fitted to the speciality will be transferred to the speciality, otherwise it will be useless. In the special physical training for young people, attention should be paid to the intensity and intervals, and secondly, young athletes should not carry out large loads of weight-bearing exercises

in order to avoid causing sports injuries and affecting the sports career. Therefore, in the process of designing and arranging special physical training should be carried out according to the scientific way. In youth taekwondo training, physical training and technical and tactical training are equally important, and both promote each other to help athletes get excellent results in the competition.

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