Problems and Countermeasures of Chinese Sprinters Strength Training for 2020 Olympic Games in Tokyo

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Abstract. Strength is the primary and important physical quality of sprinters, and sprinters’ strength training is also one of most important elements of sprint training. Because of the achievements and experience that achieved for a long time in China, innovation and development in strength training is overlooked, especially strength training’s specialization. Due to the insufficient knowledge of macro training ideas and specific training methods of strength quality, the developing of sprints in China has been greatly influenced, which was validated by the facts in three Olympic games from 2008 to 2016. From 2008 to 2016, most Chinese male and female sprinters can’t even meet the Olympic games registration standard, especially female sprinters, so basically they had no chance to participate in 100 to 400 meters, and 100 meter hurdles games, while the condition is little improved when in 2016 Olympic Games a Chinese male sprinter got the fifth place in 100 meter game. Using the methods of literature consultation, expert interview, case study and logical analysis, the paper analyzes three basic theories and nine rules that should be obeyed in sprint strength training, points out the three problems existing in the current sprint strength training, and further puts forward three countermeasures of sprint strength training, which would have certain reference significance and enlightenment for Chinese sprinters’ preparation for 2020 Olympic Games in Tokyo.

Preface

Measures of sprint strength training are extensive and multilevel. From the current Chinese sports teams’ actual situation, strength training is basically following the traditional training ideas. However, in recent years, international experts’ researches about the relation between strength and other qualities had a great breakthrough, which is showed that each sports event has put forward that strength should be given priority to development, then it can drive and have influence on speed and endurance. The theory of strength quality priority has been widely accepted by the coaches and athletes all over the world. At the same time, people have realized that improving the function of the nerve - muscle system and strengthening the force of muscle contraction are the most direct and effective ways to improve athletes’ performance.

To sum up, the traditional understanding and methods of sprint strength training have played a huge role in the due process, but also have obviously deficiencies and defects, which was verified by the facts in three Olympic Games from 2008 to 2016. From the 2008 Beijing Olympic Games, the 2012 London Olympic Games and the 2016 Olympics in Rio, most Chinese male and female sprinters can’t even meet the Olympic games registration standard, especially female sprinters, so basically they had no chance to participate in 100 to 400 meters, and 100 meter hurdles games, while the condition is little promoted when in 2016 Olympic Games a Chinese male sprinter got the fifth place in 100 meter game. Based on years of practice to recognize and reflect on success or failure, its purpose is to find out the gap and continue to develop the sprints, to get more Chinese sprinters participate in the 2020 Tokyo Olympics, to make sprint movement catch up with the world level as soon as possible, to strive for a large breakthrough and progress in the 2020 Olympic Games in Tokyo.
Basic Theories in Sprint Strength Training

According to the investigation and analysis of the characteristics of the individuality and commonness of sprint strength training, this article proposes that three basic principles should be followed in sprint strength training:

1. Sprint strength training should be carried out according to athletes’ individual differences (mainly age, sex, sports life of athletes, exercise levels, physical conditions, the ability to bear the load, the tactical level and psychological quality and so on), sports events’ characteristics, sports load characteristics.

2. Sprint strength training should be carried out and targeted on the competitive state basis according to characteristics of physical quality and techniques oriented events and sequential requirement of muscle development.

3. Sprint strength training should follow principles of super compensation according to the combined characteristics of recovery and nutrition.

Training Rules of Sprint Strength Training

Sprint specific strength refers to strength quality, which is closely related to promoting sprint specific techniques and improving sprint specific ability. Theoretically speaking, following specific requirements must be met in training:

1. To be extremely similar to the structure characteristics of specific technique movement;
2. To be extremely similar to the force-solving characteristics of specific technique movement;
3. To be extremely similar to the energy-supplying characteristics of specific movement;
4. To be extremely similar to the ultimate load technique for generating the most powerful strength.

Sprint specific strength training is not totally opposite to traditional sprint strength training method. It was conducted on the basis of the traditional method, and can be thought of as the inheritance and development of traditional method. All traditional methods which have been proved correct and effective will continue to be used and improved.

In recent years, the power quality has been changing both in the macroscopic training ideas and concrete training methods in the following three aspects:

1. The refinement of strength classification [1]. The refinement of strength quality classification not only reveals the connotation of strength and broadens the understanding of the strength quality, more importantly make strength quality training more micro and concrete, and prompts us to reflect the training contents, tasks, methods and means of the traditional strength training.
2. Attaching great importance to the cultivation of “innervation ability” in the strength training. Nerves perform their domination ability to muscles first on the muscle fibers. In addition to the differences in the structure of muscle tissues (myoglobin, mitochondria, and oxidase, etc.), there are large differences between different types of muscles in the anatomical structure and physiological function of nerves.
3. The expansion of strength training to cyclical endurance projects. Cyclical endurance projects attaching great importance to strength training is the result of dramatic increase of aerobic exercises [2]. Aerobic training occupies an important position in cyclical endurance projects. Therefore, a highlight point of the current cyclical endurance projects is to pay more attention to strength training.

The traditional strength training method’s classification in the foundation strength (mainly barbell exercises) - fast strength (mainly jumping exercises) - complementary strength (mainly integrated practice) is not completely suitable for the requirements of the specific strength training; sprint specific strength is only defined by specific techniques and specific capabilities to solve problems.

A sprinter must bear in mind that his job is mainly strength training and to get the main points of training. On this basis, specific training could be the improved, for example, sprint specific training could be centralized and could be scattered, and even could be scheduled as a daily job. Daily strength training is no longer a mere phrase.
The ranges and methods of the sprint special training ought to be comparatively wide and continuously developing, varying from person to person in certain aspects. The sprint strength training should not only be confined to “strengthen” itself, but also ought to take physiological and biological mechanism of strengthen quality, individual differences of sprinters and characteristics of sports events into considerations to consider thoroughly from different angles and levels in a targeted manner.

Sprint specific strength training would give priority to gluteus maximus muscle, biceps femoris muscle, semimembranosus and semitendinosus muscles, triceps surae muscle, waist and back muscle, shoulder joint muscle and iliopsoas as muscle as its focal points of constructive training. By adopting the methods of resistance and overcoming the weight to systemically develop these muscles to make these parts of the muscle group’s cross-section enlarged and strength increased in order to change the unbalanced phenomenon of strength development to meet the needs of the sprint technical movement.

In the process of using various methods, characteristics of the specific energy supply should be taken into consideration as much as possible; the relation between the speed of action completion, time and load factors should be pay attention to; too many optional ingredients and no strict conditions during the training in the past should be changed; which will guarantee the growth of specific strength.

Flexibility exercises of body muscles should be seriously strengthened to ensure the effective utilization of specific strength.

Major Issues of Sprint Strengthen Training in China

(1) Due to one side understanding of strength training, too much attention is paid to barbell exercises, but barbell exercises is not equal to strength training. Many people’s understanding of sprint strength training is one-sided and narrow, and cannot get rid of the phenomenon of “barbell ticket” on the strength training means and methods, such as the barbell squat, snatch, high intensity, which are the main content of each strength training section and the only standard of evaluation of athletes’ strength training.

(2) Specific training methods and equipment which are consistent with the characteristics of modern sprint technique is lack. In the competition, the integrity and effectiveness of excellent sprinters’ technical movements fully embodies in the importance of the hip muscle group and trunk muscle group and the. But in the current training, in addition to some basic strength training means to develop lumbar muscle group, there are few strength training methods which are combined with the specific event to improve the hip muscle group and trunk muscle group, let alone the training aiming at improving the greatest power and fast power of a joint muscle group.

(3) Strength training is lack of quantitative criteria, especially in the process of basic strength and specific strength training which are the lack of comprehensive objective criteria to evaluate the load factors, such as the operation speed and trajectory of barbell, the elasticity and tension of rubber, and coaches often can only rely on subjective feelings and experience to demand actions and control training for these factors.

Breakthrough Approaches of Sprint Strengthen Training in China

(1) Great importance must be attached to relative balanced development of each muscle strength’ link of the whole body and the strength of the key parts of the body. Human body in the sprint movement is finishing the periodic motion of lower limbs to realize the balanced forwarding displacement at a high speed. However, in order to effectively finish these technical actions, the synergistic effect between the trunk and arms swing techniques are also needed. Therefore, in order to achieve the simultaneous enhancement of upper and lower limb of human body in the sprint sport, the speed and strength ability of upper limb need to be enhanced simultaneously on the basis of improvement of lower limb’s strength and speed.
(2) Pre-muscle group and post-muscle group strength must be promoted synchronously to limit the advanced development of local muscles greatest power. According to the differences between pre-muscle group and post-muscle group strength and the difficulty of training, innovative training means and methods must be adopted to make each link of pre-muscle group and post-muscle group of human body match up organically and improved synchronously.

(3) Modern sprint movement technical characteristics is the important basis of design and selection of specific strength training. For sprinters, the body’s muscles work is similar to sports movement technical structure to a certain degree. The greater the benign shifts between qualities is, the higher relativity it is with specific performance. That is to say, the selection and design of specific strength training methods must conform to the technical characteristics of modern sprint movement to make the muscle contraction directions, strength properties and movement ranges and speeds be similar to specific technical structure.

Conclusion

Modern sprint movement’s technical characteristics is the important basis of design and selection of specific strength training. The sprint strength training should explicit the characteristics of generating force of actions in the movement in order to adopt appropriate measures.

No matter in macroscopic training or in specific training methods, the sprint strengthen quality has tremendously changed in the following three aspects: (1) refinement of strength classification; (2) paying attention on the cultivation of Innervation ability in the strengthen training; (3) the expansion of the strength training towards periodic endurance events.

The sprint strength training ought to focus on the movements’ angels and the forcing point of muscles, and choose the strength training method according to the actions structure of sprint and characteristic of forcing point of muscles.

The sprint strength training should arrange the training content and method according to the sprinters’ individual characteristics, and control the training time and muscle relaxation.

The sprint strength training measures should be combined with the techniques of specific sprint and choose the strength training method according to the actions structure of sprint and characteristic of forcing point of muscles. The sprint strength training measures must conform to the technical characteristics of modern sprint movement to make the muscle contraction directions, strength properties and movement ranges and speeds be similar to specific technical structure.

The sprint strength training should not only be confined to “strengthen” itself, but also ought to take physiological and biological mechanism of strengthen quality, individual differences of sprinters and characteristics of sports events into considerations to consider thoroughly from different angles and levels in a targeted manner.

References


