

# The Application of the Theory of “Block Training” in the Pre-Competition Training of CBA League

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**Keywords:** Games, Before training, Monitoring

**Abstract:** The fundamental purpose of theory; training is to improve sports level, create excellent game results, and improve athletic performance is decided by many factors, the National Games preparation period bedding have an important effect on the competition cycle, a partial pre small cycle belongs to the preparation period, many trainers get it in before a month or so, in the arrangement of the training of athletes at the same time, planning and adjust how training is worthy of discussion, this paper uses the logic analysis, expert interview and field survey on the twelve National Games and foreign scholars in the 2003-2014 about block training innovations , physiological and psychological adjustment is analyzed.

## 1. Introduction

As early as the 20th century, statistical studies showed that even with a perfectly developed and executed year-round training programme, the number of athletes who set personal bests at major competitions was no more than 25-30%. The statistics also showed that more than 75-85% of Olympic and World Championship medallists set their personal bests in these competitions that year. Therefore, it is entirely feasible to develop a CBA pre-competition training model for athletes to train to and reach their peak performance in major competitions. Relevant experts[1] conducted a series of studies on the application of the “block theory” in the CBA league, especially in physical training. A good state of play is an important condition for good performance in major tournaments, and a good state of play depends on a variety of factors, of which the regulation of mental and functional state plays an important role. The psychological state of the athlete is usually caused by a poor pre-competition psychological state, so pre-competition psychology is of great importance to the athlete. Researches have shown that it is necessary to integrate targeted pre-competition training and recovery, to integrate training, recovery and specialised nutrition, to improve the diagnosis of functional status, to improve the regulation of training response, and to have a set of physiotherapeutic measures and psychological conditioning methods to help athletes cope with each competition. In this paper, the application of block theory in the CBA league and pre-competition training and monitoring are analysed in an innovation-driven context.

## 2. Pre-Competition Training Pattern Changes

### 2.1 Overview of Pre-Competition Training Theory

Pre-competition training is specialised training for athletes to excel before major competitions. The purpose of this training is to enable athletes to perform at their best in major competitions and to produce excellent sporting results. It is therefore of some relevance to study the methods and

means of pre-competition training. It was reported in the papers that sprinting is generally 4 weeks (Zha Yake, 1987); weightlifting is 7 weeks (Huang Qiang Hui, 1986; Vernadev, 1982); judo is 8 weeks (Liu Wugong, 1987); and long-distance running is 10 weeks (Yi Weibei, 1987). According to the data, the minimum length of pre-competition training is 4 weeks and the maximum length is 10 weeks, during which time the “block training” can effectively regulate the athletes' competitive condition

## **2.2 Application of Training Cycle Theory**

### **2.2.1 Origin of the Training Cycle Theory**

The Soviet expert Matveyev proposed the theory of cycles in the mid-1960s [4]. Matveyev developed the theory of annual single and double cycles by summarising the experience of the Soviet national swimming, weightlifting and track and field teams in their preparation for the Helsinki Olympics and for the World Championships in the early 1960s. Based on the cycle of states and stages of the human body, the formation of a state requires “acquisition”, “maintenance” and “disappearance”, he divided the training process into 3 separate periods: the preparation period, the competition period and the transition period, based on the annual training cycle. There are 52 weeks in a year, with one or two major competitions per year, and athletes train in a series of events that revolve around winning the competition [5]. The improvement of the body's athletic ability is cyclical in nature. Each time a load is applied, the body is depleted, fatigue is generated, followed by the release of fatigue and the gradual recovery of work capacity.

### **2.2.2 Application of Training Cycle Theory**

The purpose of the training cycle is to achieve excellent results in major competitions, and the basis for the training cycle is the objective regularity of the athletes' development. The process of development of athletes' performance includes three phases: acquisition, maintenance and temporary loss of performance. These three phases are the natural basis for the classification of the preparation, competition and transition periods in the training cycle. These three periods are continuous and have different tasks and consist of a mid-cycle and a mini-cycle of training with different characteristics. In this form of cycle, the athlete has a major event once a year or so, therefore the training plan for the whole year revolves around the competition point, and the athlete's various exercises and intensity are regulated towards the competition point for the whole year, which can be very effective with a low frequency of competition.

## **2.3 Increasingly “Small Cyclicity”**

The competition in modern athletics is so fierce that countries are constantly innovating in training and technology to make training more scientific and to push the limits of the human body [6]. The multi-training cycle is characterised by a systematic maintenance of training levels with the aim of completing multiple competitions a year or qualifying for a competition. High level athletes need to compete multiple times to achieve results and the cycle theory is no longer designed to meet the needs of athletes competing multiple times. The year-round training cycle is often artificially fragmented into many small periods of time based on different competition practices, and there is no way to ensure systematic training for athletes. The researcher Braakhuis (2014) [13] conducted a field test on small cycles of training and found that the stress state of athletes' bodies in small periodised training was significantly different from the annual cycle. Irineu [18] (2014) tested a comparative block training experiment through the military training of 48 Special Operations Brigade soldiers, with the experimental group propelling significantly enhanced loaded jump squat ability and 20m sprint speed (16% and 14%).

## **2.4 Innovative Use of “Block Theory”**

### **2.4.1 Origin of the Development of the “Block Theory”**

Verchoschanskij (1988) innovated the training cycle by studying it in depth from several angles. He believed that the cycle theory was no longer applicable to today's training, and after

experimenting with it, they proposed the Block model. Special breakthroughs were achieved with a constant total load [8]. The emphasis in the block on the improvement of single physical qualities, such as explosive power and absolute strength, cannot be improved by training at small intensities for long periods of time. After high volume training at small intensities, athletes' explosive strength improvement lacks an energy base, explosive strength is not improved and finally athletes only improve their aerobic endurance. Bezodis (2014)[14] and other experts carried out a practice on block theory and found that sprinters' training needs to be reinforced with block quality implantation.

#### 2.4.2 Basic Links between the Two Theories

Ronnestad (2014)[11] carried out an experiment on both theories and found that athletes guided by block theory had better aerobic endurance than athletic training controls guided by cycle theory. Bartolomei (2014)[22] performed an experimental study on cycle theory and block theory. The results showed that block training theory was significantly more effective when applied to upper body strength training, while it was less effective when applied to lower body training. The small cycle training model is not contradictory to the annual training cycle, but is still designed according to the planning and the goals and tasks of the phase. The small cycle model has the advantage of being more flexible and adaptable to the regulation of athletes' performance in multi-competition conditions [7]. There is no essential conflict between the two training cycle theories and therefore the differences and links between the sports training theories must be understood before they can be implemented in a targeted manner. A small cycle can have only one block, or several.

Table 1 Differences between Cycle Theory and Block Theory

Basic process characteristics	“Traditional model”	“Block theory”
Thoughts characteristic	Take into account “all abilities”	Training highlights
Load characteristics	Various load application	Develop core quality
Organization character	Preparation-competition-transition	The blocks are combined
Competition characteristics	Compete according to the competition cycle	Compete during “late training”

#### 2.4.3 Basic Features of “Block Training”

James [12] (2014) used block theory in the strength training of athletes, using the half squat, bench press and standing long jump as a block implant, and the athletes' strength improved over time. “Block training” is selective training over a period of three to four weeks, allowing high level athletes to be stimulated by a concentrated block training load, allowing the effects to be checked by medical indicators during the block. Therefore, the preparation period and the game are highly integrated, so that athletic skills can be achieved through the game, but also through the training of the game can reasonably strengthen their own quality. The “block training” has the characteristics of high intensity and flexibility, each block is compact and reasonable and has to complete the corresponding tasks, for the CBA league athletes basic ability is not the focus of pre-competition training content, the key is to strengthen the training of core game ability.

### 3. Pre-Competition Training Content Highlights

#### 3.1 Training Content Implementation Block

##### 3.1.1 Feedback Monitoring of Training Content

In addition to repeated attempts at pre-competition training programmes, CBA pre-competition training uses a combination of “post-competition” and multiple games and tests to infer comprehensive indicators of pre-competition training. Current CBA high-level athletes try to arrange friendly and instructional games on a regular basis after games to deduce a reasonable content structure for the pre-competition training block based on the effects of consecutive games [10]. David (2014)[15] conducted a teaching experiment in which the implementation of block training reduced the chance of injury to athletes during competition. Saraiva (2014)[20] found that

the use of block training requires a balance of strength development across all muscle groups.

### **3.1.2 Pre-Competition Training Content Design**

CBA pre-competition content design is a core element of theory application and match practice. The pre-competition training content design consists of the following components. I. In the pre-competition adjustment section, the Mini Small Cycle is easy to grasp and fine-tune the condition of the athletes, especially the precise timing of the “over-recovery” condition adjustment. Secondly, the Mini Small Cycle is arranged as an alternating cycle of high intensity loading and a secondary micro-cycle with a recovery focus, the fast paced alternation of cycles prevents over fatigue. The structure of high-intensity training built by the rules of competition, using Mini Small Cycle arrangement, can be flexible and can also adjust the athletes' best competitive state from the perspective of physiological function. Fourth, the training content structure is designed with the athletes participating in special competitions, with the basic characteristics of being targeted and synchronised with the competition, and the training content should also reflect the content of improving the athletes' adaptability to the competition.

## **3.2 Special Feature Analysis Block**

### **3.2.1 Analysis of the Structure of Special Capabilities**

Athletics is an open system consisting of a system of people, athletic goals, athletic information and athletic media, with athletic goals acting as sequential parameters governing athletic activities. The coordination, synchronisation, competition and synergy of the various parts of the competitive system and the interaction between the system and the environment are the basic conditions for the ordering of the process. The micro-state of the system also fluctuates over a period of time due to changes in the various state parameters and disturbing effects, so that ups and downs occur. However, after a period of evolution, the fast and slow covariates in the competitive phase space move in a relatively stable and synergistic manner due to mutual constraints, as the mechanisms of interaction between the elements within the system change. The analysis of the specialised capacity structure should be reasonably assessed according to the phases of rise and fall in the competitive phase, and all disturbing effects should be eliminated to promote a reasonable transformation of the micro-state of the system.

### **3.2.2 Athletic Ability Characteristics Analysis**

The improvement of athletic competency is the focus of pre-competition training for major events. Competitive ability characteristics are an important proposition in theoretical research on athletics, and are an urgent applied research problem in sports science. According to relevant research results and opinions, “athletic ability characteristics are a collection of general, item group and special characteristics, with multidimensional and multi-dimensional characteristics; item group characteristics have structural and cross-cutting characteristics; the carrier of item group multi-class characteristics is the composition of athletic quality, movement structure, psychological personality, load nature and other factors. The weighting and variation of the constituent factors is the origin of the multi-category characteristics of the event groups”. The analysis of athletic ability is a key element of pre-competition training for major events, and how the various factors of athletic ability are adjusted to the state is a key point to be grasped in time.

## **3.3 Pre-Competition Load Adjustment Block**

### **3.3.1 Pre-Competition Load Targeting Implementation**

The CBA home and away season system is characterised by a long season, many games, short intervals between games and short training cycles. Under the new system, it is very important for coaches to make reasonable training arrangements according to the characteristics of the home and away system to maximise the athletes' performance. Martin Buchheit (2013)[16] found that the intensity of the content of block training needs to be controlled based on 90% of the athletes' maximum oxygen uptake. Debaere (2013)[17] observed that block training needs to be based on

high intensity interval training. During the competition period, especially in pre-competition training, the organisation of the exercise load is key to adjusting to competitive performance[4]. The intensity can be slightly higher at the beginning of pre-competition training, but absolute intensity should be controlled. Seiler (2013)[21] conducted an experiment on the load in block training and found that a 32-minute exercise with a 90% maximum heart rate was more effective than a 16-minute exercise with a 95% maximum heart rate.

### 3.3.2 Pre-Competition Training Load Characteristics

The training of athletes in the pre-competition phase of major events requires greater control of the total load. This can be achieved by monitoring the presence of blood in the urine, sleep, response to practice and diet, and by making adjustments based on feedback. For example, the Chinese men's trampoline team has the following characteristics in the 10 weeks before the competition: firstly, the intensity of training is high in this cycle, staying above 80% most of the time, with only the 1st and 6th weeks being around 60%. This is due to the characteristics of trampolining, which are characterised externally by strict accuracy in time and space, and internally by the sensitivity to proprioception and control of body posture. In order to meet these requirements, athletes are required to perform almost every set at a higher intensity than in other sports to ensure quality. Pre-competition training for major events requires a precise set point and the use of load regulation to create an 'overload recovery' at the set point, which is a fundamental consideration that should not be overlooked.

## 4. Pre-Competition Functional Conditioning Block

### 4.1 Competitive Conditioning Block

The task and requirement of a pre-competition training programme is to bring athletes into good condition. After scientific and systematic training, an athlete's performance is at its highest and most stable level during a competition, i.e. the best performance occurs on the scheduled competition date. The development and appearance of athletic condition varies according to the sport, the athlete and the task [23]. During these phases, the adequacy of the pre-competition training programme will have a direct impact on the athletes' ability to get themselves into the best possible condition for competition. Pre-competition conditioning covers a wide range of elements that can be mobilised to help athletes achieve excellent performance.

### 4.2 Refinement of the Training Programme Content

One of the characteristics of today's CBA pre-competition training is that the cycle is divided to reflect multiple training sessions and high intensity [24]. Multiple sessions, high intensity and fast paced refers to the content reflecting the board. The content needs to be sensibly embedded according to the changing state of the athletes. The micro-cycle reflects fast paced and conducted compactly in terms of time. The overall weekly schedule is a continuation of the cumulative effect of the previous one, allowing the level of exercise to rise from low to high (see Table 2) [25]. To achieve league results, athletes need to maintain a certain level of stress in their pre-competition training, further strengthening the development and improvement of core competencies based on the theory of “block training”, and conducting enhanced block training before the competition to promote the formation of a good pre-competition stress state [26]. The training content needs to take into account all factors of winning, and coaches need to motivate athletes and provide them with the right level of stress to enable them to compete better [27].

Table 2 Overall Arrangement Of High Intensity Anaerobic Small Cycles(Bondarchuk)

Lesson s	Basic structure of training content	Monday	Tuesday	Wednesda y	Thursday	Friday	Saturday	Sunday

1 <sup>st</sup> lesson	Main training means	Anaerobic endurance training	Anaerobic endurance training	Maximum strength training	Lactate resistance training	Anaerobic endurance training	Maximum strength training	Adjustment
	Secondary training means	Technical detail exercises	Lactate resistance training	Anaerobic endurance training	Anaerobic endurance training	Technical detail exercises	Lactate resistance training	
	Load size	Submaximal	Submaximal	Maximum load	Medium	Maximum load	Submaximal	
2 <sup>nd</sup> lesson	Main training means	Maximum strength training	Adjust training mode	Adjustment	Anaerobic endurance training	Adjust training mode	Rest	Adjustment
	Secondary training means	Lactate resistance training	Technical detail exercises		Maximum strength training	Detail exercise		
	Load size	Medium	Small load		Submaximal	Small load		

### 4.3 Advantages of the Block Implementation Model

The application of block training theory in pre-competition training shows basic advantages due to its relatively concentrated content and load, which facilitates the formation of athletic condition. I. The implementation of block training can cause training traces to be superimposed and training effects to be cumulative after training. block training allows for the emergence of having multiple peaks in the year, thus maximising race gains [32]. II. The detection effect of training is stronger and the centralised implementation of content is conducive to quantitative feedback and control of training goals [29]; III. The sport requires concentration and athletes highly focused on a quality in pre-competition training can develop a good psychological state, more confidence in competition and a more reasonable ability to regulate their appropriate stress state during competition [30]. IV. As the block emphasizes intensity, the high protein nutrition intake of athletes can be increased after training, and the explosive force of athletes can be enhanced [31]; V, Block mode can reduce the possibility of sports injury on the basis of not changing the total load [28].

### 5. Conclusion

At the 18th National Congress, China clearly proposed that “scientific and technological innovation” is a strategic support to improve social productivity and comprehensive national power, and issued the important document “Several Opinions of the State Council of the Central Committee of the Communist Party of China on Deepening the Reform of Institutional Mechanisms to Accelerate the Implementation of the Innovation-driven Development Strategy”. Moreover, training before a major event is a difficult and demanding process. With the changing social situation, many new features and problems have emerged in sports training, thus requiring us to use dynamic thinking to innovatively solve problems under an innovation-driven vision. As the core of the “training cycle” theory is to reveal the cyclical law of athletes' developmental stages, it provides the basis for the division of athletes' annual training process cycle, which must be followed by athletes of any level of athletic training practice under any competition system. Therefore, it is not only suitable for guiding the training of professional athletes, but also conforms to the laws of sports training under the new competition system and remains at the core of sports training practice. The “Block Training” theory is an innovative solution to the need to improve one or two core qualities in a short period of time for high level athletes and was developed in response to the requirements of the times. In the dynamic changes of competitive sports, the understanding and application of the “block training” theory cannot be mechanised and dogmatic, but should be treated dialectically and dynamically, only in this way can the “block training cycle” theory play a guiding role in sports training practice. Only in this way can the “block training cycle” theory play a guiding role in sports training practice.

## Acknowledgement

Fund Project: 2018-2019 Key Research Project of Guangdong Sports Administration, GDSS2018N122.

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