

Research on the Changes of Body Serum Function Indexes and Psychological State of Women Football Players at Different Stages

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Abstract:

According to the characteristics of serum biochemical indexes and mood changes of women football players in different training and competition stages, to explore the change rules of athletes' function indexes in different stages, and to provide scientific experimental basis for physical fitness and psychological monitoring of training and competition. Before training, physical training, technical and tactical training, and the competition stage, 22 Beijing women's football players were tested by fasting venous serum test in the morning within three days after the training and competition. T), cortisol (C), serum urea (BUN) function indicators, record the FA Cup competition stage from March 2019 to October 2019, specifically 2 times before the game (March 28, April 7), physical fitness Two training periods (April 17, April 28), two technical and tactical training periods (May 10, May 25), and two competition periods (August 17, October 10), a total of 8 serum tests were collected. Indicators, these 8 stages are P1 stage to P8 stage respectively; record psychological and emotional feelings (POMS scale), and complete it in 10 minutes. In the pre-competition stage: compared with P1, there was a significant difference in T ($p < 0.05$), a significant difference in C ($p < 0.05$), a very significant difference in T/C ($p < 0.01$), and no significant difference in HB Difference ($p > 0.05$), CK appeared very significant difference ($p < 0.01$), BUN appeared significant difference ($p < 0.05$). There was no significant difference in TMD value ($p > 0.05$). There was no significant difference in T value between P3 and P4 during physical training ($p > 0.05$), no significant difference in C ($p > 0.05$), no significant difference in T/C, HB, BUN ($p > 0.05$), and CK appeared Very significant difference ($p < 0.01$). There was no significant difference in TMD ($p > 0.05$). In the technical and tactical training stage, compared with P6, there was a significant difference in T ($p < 0.05$), a significant difference in CK ($p < 0.05$), and no significant difference in C, T/C, and BUN ($p > 0.05$). There was no significant difference in TMD ($p > 0.05$). Competition stage: There was a significant difference in CK between P7 and P8 ($p < 0.05$), and there was no significant difference in HB, BUN, C, T, and T/C ($p > 0.05$). There was a negative correlation between serum indexes and changes in mood state ($r = -0.82$). The serum index changes greatly in the pre-competition training stage. The athletes' functional metabolism does not have a good adaptation to the pre-competition training, but changes greatly. The changes in the technical and tactical and physical training stages are the smallest. It has a good adaptation to the intensity of exercise load, and most of the functional indicators in the competition stage appear to a reasonable level, and have a more objective reflection on the achievement of

performance and the prevention of sports injuries and fatigue. The total score of emotional disturbance (TMD) of the overall mood state change is high, and the fatigue value is large. There is no obvious "iceberg-like" image in the mood state profile before and after the game, which may be related to external interference and the physiology of women's football itself characteristics related.

Keywords: *Women football players, Serum index, Mood changes, Physical state*

I. INTRODUCTION

Modern football is a sport with heavy exercise load, high exercise intensity, long running distance, long duration, and intense competition. It has high requirements on athletes' physical fitness, technical and tactical ability and mental ability. A good athlete must have good physical conditions, perfect technical tactics and mature and stable psychological changes [1]. Football is a very intense sport, which requires physical fitness to play a very important role in it. With the development of football sports, in order to achieve good results and spectator power, modern football is required to speed up the transition between offense and defense, and the degree of confrontation. More intense, which puts higher demands on physical fitness. While exploring scientific training and reasonable technical and tactical drills, people also pay attention to the study of the changing laws of football players' functional indicators and the characteristics of mood changes in training and competitions. The performance of functional index changes and mood changes in different periods of training content [2]. The most important element in physical fitness is physical quality. Having a good physical fitness state is the eternal pursuit of every athlete and coach. The key factor that determines physical fitness is the athlete's functional state. In fact, the two are a unity, and both are better to formulate training intensity and load, and rationally formulate competition and training arrangements. The main difference lies in their different forms of expression. Sports training can improve the mental state of athletes, and reasonable activities within a certain range can adjust the psychological changes of the body, improve sleep, psychological discomfort, etc., while heavy-duty exercise will make people restless, fearful, and affect life and training competition. Normal performance affects the improvement of sports performance [3]. In 2019, researchers systematically collected and analyzed the changes in various functional indicators of the Beijing Baxi Women's Football Team that participated in the FA Cup, as well as the POMS questionnaire survey and analysis of the women's football players before and after the game. The purpose of this study is to clarify the characteristics of serum biochemical indicators and mood changes of women football players in different training and competition stages, to explore the changing laws of athletes' functional indicators at various stages, and to provide a scientific experimental basis for physical fitness and psychological monitoring in training and competition.

II. RESEARCH METHODS

2.1 Documentation Method

Consult a large number of domestic and foreign literature, understand the relevant situation of function monitoring and POMS scale, collect data, analyze and organize.

2.2 Experimental Method

The 22 Beijing women's football players in the pre-match, physical training, technical and tactical training, and during the competition stage were tested for fasting venous serum collection in the morning within two days after the match, to test the functional indicators of hemoglobin, serum creatine kinase, serum testosterone, cortisol and serum urea, the athlete's level is national level, and the sports years are 5.13 ± 1.45 y. During the FA Cup competition stage from April 2019 to October 2019, a total of 8 functional indicators were collected and measured. The POMS scale was measured before and after the training and competition of 22 Beijing women's football players in different training and competition stages. The specific measurement time was the day before the training competition and within three hours after the competition. The completion time was based on the actual situation of the 22 players. Psychological and emotional feelings are completed in 10 minutes. (Table I)

Table I. Test methods of main functional indicators

Test indicators	Test Methods	instrument	Reagent test kit
HB	Colorimetry	German BA hematology analyzer	Bayer's reagents
CK	Acetylcysteine method	Italy 224 semi-automatic biochemical analyzer	Zhongsheng Beikong kit
BUN	two-point dynamic method	Italy 225 semi-automatic biochemical analyzer	Zhongsheng Beikong kit
C	radioimmunity	American DPC1000 fully automated analyzer	DPC company kit
T	radioimmunity	Domestic DFM-96 discharge free counter	Tianjin Jiuding kit

2.3 Questionnaire Method

Through the questionnaire of the athletes (N=22), the basic information such as the athletes' sports years, height, weight, position in the competition, whether they are the main force, and whether there is a history of sports injuries can be obtained, and the answers to the questionnaires can be screened scientifically and accurately.

2.4 Mathematical Statistics

Each test value is expressed as mean \pm standard deviation ($X \pm SD$), and SPSS 23.0 is used to test the collected data; analysis of variance (ANOVA) is used for significance test; paired T test is used for comparison before and after exercise; The correlation was analyzed by Bivariate's Pearson correlate, with $P < 0.05$ as a significant difference, and $P < 0.01$ as a very significant difference.

III. RESEARCH CONTENT

3.1 Changes in Serum Parameters

The serum testosterone concentration increased from $49.64 \pm 9.31 \mu\text{g/dl}$ to $55.42 \pm 15.26 \mu\text{g/dl}$, the serum cortisol concentration increased from $11.83 \pm 4.33 \mu\text{g/dl}$ to $18.58 \pm 4.77 \mu\text{g/dl}$, and the T/C value increased from 4.32 ± 1.15 in the pre-competition period decreased to 2.93 ± 1.11 , hemoglobin concentration decreased from $128 \pm 15 \text{g/l}$ to $123 \pm 13 \text{g/l}$, serum creatine kinase activity value increased from $125.4 \pm 55.2 \text{U/L}$ to $233.5 \pm 78.2 \text{U/L}$, BUN increased from $7.25 \pm 1.73 \text{mmol/l}$ rose to $10.62 \pm 2.27 \text{mmol/l}$. In technical and tactical training and physical training, the T value in the functional indicators decreased from $58.77 \pm 5.57 \mu\text{g/dl}$ to 56.52 ± 12.47 , the serum cortisol did not change significantly, and the CK decreased from $253.3 \pm 75.3 \text{U/L}$ to $164.8 \pm 39.6 \text{U/L}$, the CK value decreased significantly during the competition, from $223.3 \pm 75.3 \text{U/L}$ to $165.8 \pm 38.6 \text{U/L}$, and there was no significant change in HB, BUN, C, T, and T/C. as table II

Table II. Changes in HB, CK, T, C, and BUN of football players ($\bar{x} \pm s$)

	pre-match stage		physical training phase	
T($\mu\text{g/dl}$)	49.64 ± 9.31	$55.42 \pm 15.26^{*}\#$	58.77 ± 5.57	56.52 ± 12.47
C($\mu\text{g/dl}$)	11.83 ± 4.33	$18.58 \pm 4.77^{*}\#$	15.46 ± 2.13	16.61 ± 1.98
T/C	4.32 ± 1.15	$2.93 \pm 1.11^{*}\#\#$	$3.79 \pm 0.96\#$	3.40 ± 0.87
HB(g/l)	128.2 ± 15.4	123.7 ± 13.8	129.6 ± 11.1	131.7 ± 14.8
CK(U/L)	125.4 ± 55.2	$233.5 \pm 78.2^{*}\#\#$	253.3 ± 75.3	$164.8 \pm 39.6\#\#$
BU(mmol/l)	7.25 ± 1.73	$10.62 \pm 2.27^{*}$	7.77 ± 1.56	7.86 ± 1.39
F value	15.17		17.90	
P value	< 0.01		< 0.01	

Note: Compared with the base value*: $p < 0.05$, **: $p < 0.01$ Compared with the previous value#: $p < 0.05$, ##: $p < 0.01$

3.2 Changes in TMD Value of POMS Scale

The TMD value increased significantly from 117.5 ± 23.9 to 124.6 ± 29.6 in the pre-competition stage, and there was no significant change in the TMD value in the physical training stage, technical and tactical training, and competition stage. The tactical and physical training phases are combined into one phase. Table III below:

Table III. Changes in the mood state of Beijing women's football players at different stages

(N=22)	Before the game		training phase		competition stage	
	Before	after	Before	after	Before	after
self esteem	48.4±9.7	51.7±10.4	49.4±7.9	50.4±8.2	54.7±7.4	60.8±11.38#*
nervous	44.2±6.4	48.4±6.2	45.0±8.1	42.4±5.5	44.4±6.7	39.8±4.9#
anger	46.5±4.6	49.2±5.7	47.5±6.4	45.9±7.1	44.8±5.3	42.7±4.8
fatigue	50.4±5.8	60.1±8.9	51.3±7.4	52.4±6.7	45.8±5.8	44.7±6.2
depression	41.3±3.7	44.5±3.5	47.5±5.4	43.4±7.2*	40.4±5.7	40.1±6.4
energy	48.2±7.2	44.7±5.7	53.4±5.8	51.7±4.9	55.5±7.2	52.4±6.7#
panic	44.5±5.2	46.6±5.4	44.6±4.6	43.8±5.5	45.8±7.4	41.5±4.8#
TMD	117.5±23.9	124.6±29.6	132.4±22.4	118.3±20.5	113.7±21.4	106.4±17.6

Note1: March-April is the pre-match period, April-June is the technical, tactical and physical training period, and June-October is the Women's Football League competition period

Note2: Compared with pre-competition values*: $p < 0.05$, **: $p < 0.01$ Compared with physical training values#: $p < 0.05$, ##: $p < 0.01$

There was a significant difference in the TMD value of the mood state change in the competition stage ($p < 0.05$), and there was no significant difference in the TMD value of the mood state scale in the technical and tactical, physical training stages, and before and after training before and after the competition ($p > 0.05$). The mood state profiles of training, physical training, and technical and tactical training show relatively gentle changes, and there is no iceberg-like standard profile for elite athletes. The peak is not the energy worth score, but the fatigue worth score T score. Compared with the iceberg-like profile of the standard elite athlete, there is no mood state profile of the elite athlete.

IV. RESEARCH RESULTS

(1) The functional indicators of the Beijing women's football team have changed a lot in the pre-match training stage, while the changes in the technical and tactical and physical training stages are small, indicating that the stability of the athletes' functional state requires an adaptation process. Some functional indicators are at a relatively suitable level, and the stimulation response of functional indicators in the competition stage is smaller than that in the training stage.

(2) The TMD score of women's football players' mood state changes was high in the whole stage, the fatigue value was large, and the energy T-score was low. There was no obvious "iceberg-like" in the mood state profiles of the Beijing women's football team before and after training and competition image.

(3) Mood state scales and functional indicators are both effective means of monitoring athletes' fatigue, and there is some negative correlation between TMD, T/C, and HB. It is necessary to combine comprehensive methods to scientifically and effectively prevent injury, Make a reasonable training plan.

V. DISCUSSION

The fluctuations of various indicators themselves have a certain range, and there are differences in the same indicator of different objects, so the same standard cannot be used for evaluation. [4]. It is recommended to establish a file of biochemical index function evaluation for each player, so as to provide a reference basis for the evaluation of athletes in future training and competition, so as to monitor the functional status of women's football players more accurately and scientifically. Pay attention to cultivating and improving the awareness of football players and coaches' psychological awareness of football. Stable psychological quality and tenacious will quality have become important factors for winning football games. Pay attention to the role of psychological factors in football games and strengthen the psychological quality of Chinese football players. The biggest opponent is often himself, so strengthening psychological training and hinting is an important supplement to improve athletes' training level and competition level, establish good psychological quality, and enhance their ability to deal with various on-the-spot emergencies [5]. Coaches and players should raise awareness and place the special factor of psychology on the same important position as football technique and tactics. Functional indicators and mood state scales monitor athletes' adaptation and adjustment to competition and training from different levels. Functional indicators contain many factors that can be monitored. It is necessary to integrate the relationship between various indicators to accurately and scientifically measure the performance of women football players. monitoring [6].

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