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Study on Chinese Medicine Shouwu Capsules on Immune Function in Athletes

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Abstract
To observe the effect of Chinese medicine health care products Shouwu capsules on immune function in athletes during training, and to explore its possible mechanism. Methods: the test group received can strengthen the immune function of Chinese medicine health Shouwu capsules, the control group did not take. CD4+CD8+ CD4+, CD8+, T lymphocyte subsets (+) and CD4+/ CD8+ ratio, serum immunoglobulin (Ig) IgA, IgG, IgM were observed before and after the experimental period, 30 days of observation, changes of immune function in athletes. Results : after the experiment, the test group CD4+ significantly increased the proportion of IgG ratio, numerical experiment, compared with before the experiment with statistical difference, $P \leq 0.05$, CD4+CD8+ group (+) ratio decreased significantly, $P \leq 0.05$. Conclusion: take Shouwu capsules can improve athletes the percentage of CD4 positive cells, can enhance the immune function of T lymphocytes, immune response in the balance of IgG, can regulate humoral immune function. Can effectively improve the athletes sleep, appetite, physical strength, improve the athlete 's body function, more conducive to the improvement of sports performance.

Key words: Medicine Shouwu capsules; Immune function; Athletes; Chinese medicine health care products

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Middle-long distance running training for a long time, large amount of exercise, physical strength overdraft consumption, often easy to cause the immune function, inhibit athletes. This study focuses on the safe, effective, convenient to take the traditional Chinese medicine health care products in the field of exercise immunology. Shouwu capsules mainly fleece-flower root, Poria, Chinese wolfberry, black sesame, walnut, Chinese medicine and food dual purpose as raw material, can enhance human immunity. Based on the experiment before and after 30 days the quiet state on T lymphocyte subsets and the ratio, serum immunoglobulin (Ig) determination of immune indexes, as well as the subjects' subjective feelings (including sleep, appetite, physical strength and so on) and sports performance interview, observation of traditional Chinese medicine health products Shouwu capsules on immune the function of long-distance runners, and to explore its possible mechanism, rich edible Chinese herbal medicine, health care products in the field of sports medicine, exercise and immunology research, laid the theoretical foundation for the development and application of scientific training and traditional Chinese medicine health care products.

1. RESEARCH OBJECTS AND METHODS

1.1 The Research Object
13 for the Provincial Games men middle-distance race athletes, aged 18-20 years old, two levels of athletes. All subjects were healthy, not sick before the experiment within 1 months, the drug did not take any other influence immune function, obtained the informed consent, and randomly divided into experimental group and control group, experimental group 7, control group 6.

1.2 Research Methods

1.2.1 Test Method

1.2.1.1 Experiment Time and Training

Choose winter interim (large amount of exercise training period), the experiment for 30 days, during the experiment by the same instructor training athletes, training plan is basically the same, before and after the experiment test on exercise performance each time.

1.2.1.2 Test Group and Chinese Medicine Health Care Regimens

13 for the Provincial Games men middle-distance race athletes, were randomly divided into experimental group and control group, experimental group 7, control group 6. During the experiment, the test group every day sooner or later each service "Shouwu Capsules" 3 grains, the control group did not take. The experimental period of 30 days, in addition to the normal diet and take Shouwu capsules, the subjects were not taking other nutritional health products and medicines, the experimental conditions were the same.

1.2.1.3 Acquisition and Processing of Blood Samples

The athletes respectively in experiment period, the first and last day of the morning fasting venous blood of all time. The 5ml blood injection of heparin sodium anticoagulation tube, 1.5ml blood injection without anticoagulant tubes, immediately shake and sent to Jinggangshan University Affiliated Hospital of each index test center detection.

1.2.1 The Main Indexes, Method and Instrument

CD4+CD8+ CD4+, CD8+, T lymphocyte subsets (double positive) and the ratio of CD4+/CD8+, using FACSCALIBUR flow cytometry; serum immunoglobulin IgA, IgG, IgM, by immune turbidimetry, detecting instrument for Hitachi 7170A automatic biochemical analyzer.

1.2.2 Interview

The test group generally reflect the athletes take Shouwu capsules, sleep easy to sleep at night, the better quality of sleep, appetite is good, full of energy, recovery is faster when a large amount of exercise after. The test group scale scores were higher than those in the control group, with statistical difference. Among them, sleep, appetite score, P = 0.05; P score ≤ 0.01 physical. The experimental results after the improvement, the test group than that in the control group, P=0.076. After the experiment, the subjects with sleep, appetite, physical strength, health, and sports performance to enhance the degree of investigation one by one, and quantitative score. Sleep, appetite, physical strength and other aspects of the "difference", "poor", "general", "good", "good" rating, at all levels were 0, 1, 2, 3, 4. For improving the performance of the extent of the use of "down", "not clear", "obvious" classification, levels were 0, 1, 2.

1.2.3 Statistical Method

The immune indexes of the experiment group and the control group were compared using independent t test, the bilateral. Experimental group or control group before and after the comparison itself, using paired t test method. Scale with two independent samples test method. The data using the mean± standard deviation (mean ±SD) expression. With P ≤0.05 is statistically different. Using SPSS10.0 statistical software.

2. THE RESULTS

At the end of the experiment, the experimental group and the control group each have one failed to complete the detection project. Therefore, the total number of statistics into 11, the test group 6, control group 5. Between the two groups (general data taking rate, age, height, weight) had no significant difference, P>0.05.

2.1 Changes of T Lymphocyte Subsets of Athletes and Their Ratio

Before and after the experiment, the experimental group and the control group of T lymphocyte subsets and the ratio in Table 1:

Table 1
Changes of T Lymphocyte Subgroup of Athletes and Their Ratio

Group	CD4+(%)	CD8+(%)	CD4+CD8+(%)	CD4+/CD8+
Control group				
Before the experiment	46.7±3.8	47.0±6.1	4.0±1.0	1.0±0.2
After the experiment	47.3±4.2	46.3±6.5	1.3±0.6*	1.0±0.2
Change the weight	0.7±1.5	-0.7±3.5	-2.7±0.6	0.0±0.1
The test group				
Before the experimen	52.8±12.3	36.0±8.3	2.8±0.5	1.6±0.8
After the experiment	58.0±10.2*	35.3±10.0	1.8±1.0	1.8±1.0
Change the volume	5.3±2.6#	-0.8±2.8	-1.0±1.2&	0.3±0.3

Compared with before the experiment, *:P ≤ 0.05, **:P ≤ 0.01. Compared with the control group, #:P ≤ 0.05, ##:P ≤ 0.01, &:P =0.059.

Can be seen from Table 1, CD4+CD8+, CD4+, CD8+, the experimental group and the control group in the experiment of T lymphocyte subsets (double positive) had no significant difference and the ratio of CD4+/CD8+, P > 0.05. After the experiment, the test group CD4+ increased obviously, compared with before the experiment with statistical difference, P ≤ 0.05. Also, the test group CD4+ ratio change was significantly higher than the control group, with statistical difference, P ≤ 0.05. After the experiment, the control group (CD4+CD8+

+) ratio decreased significantly, compared with before the experiment with statistical difference, $P \leq 0.05$. And, the change is lower than the experimental group trends, P=0.059. The two groups before and after the CD8+ ratio, CD4 ratio of +/CD8+ test showed no change, there was no statistically significant difference between groups.

2.2 Changes of Serum Immunoglobulin in Athletes

Before and after the experiment, the experimental group and the control detection data changes of serum immunoglobulin in Table 2:

Table 2
Athletes Serum Immunoglobulin

Group	IgG (g / L)	IgA (g / L)	IgM (g / L)
Control group			
Before the experiment	15.39±2.19	1.54±0.16	1.83±0.69
After the experiment	14.26±1.36	1.54±0.21	2.01±0.57
Change the amount	-1.13±1.57	0.00±0.13	0.18±0.29
The test group			
Before the experiment	14.17±2.91	1.99±0.59	2.25±0.60
After the experiment	12.62±2.00*	1.96±0.67	2.27±0.55
Change the amount	-1.55±1.20	-0.03±0.10	0.02±0.15

Compared with before the experiment, *:$P \leq 0.05$, **:$P \leq 0.01$. Compared with the control group, #:$P \leq 0.05$, ##:$P \leq 0.01$

Can be seen from Table 2, the experimental group and the control group had no significant difference in serum immunoglobulin index before the experiment, $P > 0.05$. After the experiment, the IgG numerical experiment group than in the experiment, compared with before the experiment with statistical difference, $P \leq 0.05$. But compared with the control group, there was no significant difference between groups. Values before and after IgM, IgA two groups are testing showed no change, there was no statistically significant difference between groups, $P > 0.05$. The IgG numerical analysis, numerical tests of two groups that are located in the reference value range of high-end (reference value range of 7.0-15.0), after the experiment test data to the reference interval for central, compared with baseline showed significant difference.

2.3 Athletes Physical Condition and Exercise Performance

Learned in the interview, the majority of athletes in high intensity and large amount of exercise training period in the past, sleep quality is relatively poor, loss of appetite, physical decline, compared with fatigue, easy to fall ill. In this experiment, the test group generally reflect the athletes take Shouwu capsules, sleep easy to sleep at night, the better quality of sleep, appetite is good, full of energy, recovery is faster when a large amount of exercise; while the control group most reflect sleep, appetite, physical strength, mental state and the large amount of exercise time difference. Degree to improve athletic performance before and after the experiment, the test group generally reflect than before training, while the control group did not change much. Comparison of performance before and after the experiment : after the experiment, the experimental group, 4 people are obviously improved, 2 were not obvious; control group, 1 people, 2 people are not obvious, 2 people fall.

Table 3
Athletes Interview

Group	Sleep	Appetite	Physical	Performance improvement
Control group				
Before the training	1.4±0.5	1.4±0.5	1.2±0.4	
The training	1.6±0.9	1.8±0.8	1.2±0.4	0.8±0.8
The test group				
Before the training	1.5±0.5	2.0±0.6	1.3±0.5	
The training	3.2±0.8*#	2.8±0.4*#	2.8±0.8*##	1.7±0.5&

Compared with the previous training, *:$P \leq 0.05$, **:$P \leq 0.01$. Compared with the control group, #:$P \leq 0.05$, ##:$P \leq 0.01$, &:$P = 0.076$.

From table scale score of 3, the test group training, sleep, appetite, physical strength and other aspects of the state than the previous exercise increased, with a significant difference, $P \leq 0.05$. While the control group with previous training had little difference. During the training in the past, a large amount of exercise, the experimental group and the control group with sleep, appetite, physical scale score, had no significant difference, $P>0.05$. In this experiment, the test group scale scores were higher than those in the control group, with statistical difference. Among them, sleep, appetite score, $P = 0.05$; P score≤ 0.01 physical. After the experiment results to improve the situation, the test group than that in the control group, P=0.076.

3. ANALYSIS AND DISCUSSION

3.1 Effect of Radix Capsule on T lymphocyte Subgroup of Athletes and Their Ratio

T lymphocyte is one of the most important immune cells, its main function is immune mediated cellular immunity and regulate body. CD3+ is a sign of surface antigen of mature T lymphocytes, usually in CD3+ cell levels reflect the total level of T lymphocytes. According to the T cell surface marker and immune response in different functions into CD4+ and CD8+ two subpopulations. CD4+ in the immune response plays an adjunctive and induction, CD8+ cells play antitumor effect. Relative immune balance condition in the body is mainly composed of they interact to maintain, CD4+ cells and CD8+ cells are induced, restriction, formation of T cellular networks. The ratio of CD4+/CD8+ can reflect the body immunity, normal ratio CD4+ / CD8+ for 1.5 - 2. The decrease was correlated with low immune responses against non-self antigens, increasing the ratio and high immune responses against non-self-antigen of (Xu & Kong, 2003). The experiment group took Shouwu capsules 30 days later, the percentage of CD4 positive cells increased significantly, from the experiments before 52.8± 12.3 to 58± 10.2 change quantity is 5.3± 2.6, compared with before the experiment with statistical difference, $P \leq 0.05$. Also, the percentage of CD4 positive cells in experimental group changed significantly higher than the control group, with significant difference between groups, $P \leq 0.05$. After the experiment, the ratio test group CD4+/CD8+ slightly rise is 1.8± 1, and the normal ratio of CD4+ / CD8+ was 1.5 - 2, can be seen from the data ratio test group CD4+/CD8+ in good range. From the immune index of control group before and after the visible, ratio of experimental group CD4+/CD8+ were lower than the reference value, we analysis the experiment is the large amount of exercise in the winter training period, large amount of exercise training may have on the immune function of athletes had a significant inhibitory effect. The large amount of exercise training in the control group CD4CD8 + T lymphocytes (DP T) has obvious effect, which increased from 4± 1%, dropped to 1.3± 0.6%, $P < 0.05$. Before and after the test group training changes and take Shouwu capsules are higher than that of the control group trends, $P=0.059$. The experimental group two immune index showed no significant difference, $P > 0.05$. After the experiment, the test group T cell immune function has not declined, but also relatively before the experiment significantly increased compared with the control group, with significant difference, the instructions cell immune function of athletes Shouwu capsules significantly enhanced effect, the results of this study are consistent with previous research.

3.2 Effect of Shouwu Capsules on Athletes' Serum

Immunoglobulin (Ig) is produced by B lymphocytes. In the serum, tears, saliva secrete a glycoprotein of liquid (Huang, 2001). Ig includes IgM, IgD, IgA, IgG, IgE, in addition to direct against their corresponding pathogens and toxins, can cause other functions, such as complement activation, phagocytosis, is the main effector molecule of the humoral immune response. Research on exercise immunology are IgA, IgM, IgG. About the influence of exercise on immune globulin was different on different reports. Studies have shown, swimming athletes during the 7 months of intense training, the concentration of serum IgG, IgA and saliva IgA decreased significantly, IgM increased significantly in the game (before 3). Another study is of the view that long-term high intensity training, serum IgA, IgM, IgG levels of athletes did not change significantly (4). The results of this study show the control group before and after the experiment, serum IgA, IgM, IgG levels did not change significantly in $P>0.05$. After the experiment, the IgG numerical experiment group than in the experiment, compared with before the experiment with statistical difference, $P \leq 0.05$. In-depth analysis of IgG numerical, found the numerical experiments for the first two groups are located within the reference range of high-end (reference value range of 7.0-15.0, while the experimental group was 14.17± 2.91, control group was 15.39 ±2.19), after the experiment test data to the reference interval for central, compared with before the experiment shows significant difference ($P \leq 0.05$); the control group after the experiment of IgG numerical remains in the reference value range of high-end, there was no significant change in $P>0.05$. Immune parameters in high or bottom shows immune function disorder of body. Modern medical research shows that, traditional Chinese medicine not only has a wide range of therapeutic effects in the treatment of human disease, but also regulate and enhance the immune function of the human body 's dual role. Shouwu capsules are rich in nourishing yin and Yang, Qi and blood, nourishing liver and kidney, spleen and stomach, nourishing Runfei ingredients of many biological activity and a variety of plant nutrients, such as a variety of anthraquinone compounds, polysaccharide, on the viscera balance can be nursed back to health. The test group was treated with Radix capsule 30 days later, immune index, IgG index reference value range of high-end to the reference interval central moved from before the experiment, that Shouwu capsules to play a role in the regulation of humoral immunity in IgG equilibrium.

3.3 Effect of Shouwu Capsules the Physical Conditions of the Athletes and Sports Performance

The study on subjects with sleep, appetite, physical strength, health, and sports performance to enhance the

degree of investigation one by one, and quantitative score. We learned in the interview, the majority of athletes in high intensity and large amount of exercise training period in the past, sleep quality is relatively poor, loss of appetite, physical decline, easily fatigue, easy to fall ill. In this experiment, the experimental group athletes generally reflect take Shouwu capsules, sleep easy to sleep at night, the better quality of sleep, appetite is good, full of energy, recovery is faster when a large amount of exercise; while the control group most reflect: sleep, appetite, physical strength, mental state and the large amount of exercise almost, some there is a downward trend. From the scale situation, experimental group take Shouwu capsules, the test group scale scores were higher than those in the control group, with statistical difference. Among them, sleep, appetite score, $P = 0.05$; P score≤ 0.01 physical. To improve the situation from the end of the experiment results, the test group was better than control group trends, $P=0.076$. Experimental data and interview, take Shouwu capsules can effectively improve the athletes in the training process of sleep, appetite, physical strength, and better.

CONCLUSION

Polygonum Capsule Could Enhance the Cellular Immune Function

Take Shouwu capsules for 30 days, athletes, the percentage of CD4 positive cells increased obviously, the CD4+/CD8+ ratio in the good range, results showed that Radix capsule could enhance the cellular immune function in athletes' role.

Shouwu Capsules Can Regulate the Immune Function of Body Fluid

Take Shouwu capsules for 30 days decreased IgG index, athletes, reference value range of high-end to the reference interval central moved from before the experiment, at a good range, research shows that Shouwu capsules can regulate humoral immune function in athletes' role.

Take Shouwu capsules can effectively improve the athletes' sleep, appetite, physical strength, improve the athlete's body function, more conducive to the improvement of athletic performance.

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