

SPORTS MEDICINE TREATMENT BASED ON RELIEVING CHRONIC FATIGUE AND SUB-HEALTH STATE



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TRATAMENTO DA MEDICINA DO ESPORTE RELACIONADA AO ALÍVIO DA FADIGA CRÔNICA E SAÚDE SUB-ÓTIMA

TRATAMIENTO DE LA MEDICINA DEL DEPORTE RELACIONADA AL ALIVIO DE LA FATIGA CRÓNICA Y SALUD SUBÓPTIMA

Chenwei An¹ 
(Physical Education Professional)

1. Wuhan Sports University, Wuhan, Hubei, China.

Correspondence

Chenwei An
Hubei, China, 430079.
anchenwei2021@126.com

ABSTRACT

Introduction: Chronic fatigue syndrome (CFS), also known as chronic fatigue and immune dysfunction syndrome, has become a common disease in modern medicine. **Objective:** The paper analyzes the impact of exercise training on patients' quality of life with chronic fatigue syndrome. **Methods:** We conducted fatigue investigations on college students and analyzed the exercise ability of college students with chronic fatigue syndrome. We then compared the findings with healthy college students. In the process, we recorded the physiological indicators and satisfaction scores of the two groups of patients. **Results:** Muscle endurance and cardiopulmonary function-related exercise ability of the college students with chronic fatigue syndrome are significantly different. After completing the same exercise, the scores of personal exertions were higher. **Conclusion:** Appropriate and regular exercise can achieve ideal results in the treatment of chronic fatigue syndrome. In-depth research, popularization, and application by scholars is highly suggested. **Level of evidence II; Therapeutic studies - investigation of treatment results.**

Keywords: Sports; Fatigue Syndrome, Chronic; Dyssomnias; Health Care Costs.

RESUMO

Introdução: A síndrome da fadiga crônica (SFC), também conhecida como fadiga crônica e síndrome de disfunção imunológica, tem se tornado uma doença comum para a medicina moderna. **Objetivo:** Este estudo analisa o impacto do treinamento de exercícios na qualidade de vida de pacientes com síndrome de fadiga crônica. **Métodos:** Conduzimos investigações sobre a fadiga em estudantes universitários e analisamos a habilidade para exercícios de estudantes universitários com síndrome de fadiga crônica. Durante o processo, registramos indicadores fisiológicos e escores de satisfação dos dois grupos de pacientes. **Resultados:** A resistência muscular e habilidade em praticar exercícios relacionados à função cardiopulmonar dos estudantes universitários com síndrome de fadiga crônica são significativamente diferentes. Após completar o mesmo exercício, os escores de esforço pessoal eram mais altos. **Conclusão:** Exercícios adequados e regulares podem atingir resultados ideais no tratamento da síndrome de fadiga crônica. Pesquisas aprofundadas, a popularização e a aplicação por parte de pesquisadores são altamente recomendadas. **Nível de evidência II; Estudos terapêuticos – investigação de resultados de tratamento.**

Descritores: Esportes; Síndrome de Fadiga Crônica; Dissonias; Custo de cuidados de Saúde.

RESUMEN

Introducción: La síndrome de la fatiga crónica (SFC), también conocida como fatiga crónica e inmunodeficiencia, se ha tornado una enfermedad común para la medicina moderna. **Objetivo:** Este estudio analiza el impacto del entrenamiento de ejercicios en la calidad de vida de pacientes con síndrome de fatiga crónica. **Métodos:** Conducimos investigaciones sobre la fatiga en estudiantes universitarios y analizamos la habilidad para ejercicios de estudiantes universitarios con síndrome de fatiga crónica. Durante el proceso, registramos indicadores fisiológicos y puntajes de satisfacción de los dos grupos de pacientes. **Resultados:** La resistencia muscular y habilidad en practicar ejercicios relacionados a la función cardiopulmonar de los estudiantes universitarios con síndrome de fatiga crónica son significativamente diferentes. Tras completar el mismo ejercicio, los puntajes de esfuerzo personal eran más altos. **Conclusión:** Ejercicios adecuados y regulares pueden atingir resultados ideales en el tratamiento de la síndrome de fatiga crónica. Investigaciones profundizadas, la popularización y la aplicación por los investigadores son altamente recomendadas. **Nivel de evidencia II; Estudios terapéuticos – investigación de resultados de tratamiento.**

Descriptorios: Deportes; Síndrome de Fatiga Crónica; Disomnias; Costos de la Atención en Salud.



INTRODUCTION

Chronic fatigue syndrome (CFS) is a group of long-term conscious fatigue, which is difficult to relieve after rest and is accompanied by corresponding physical dysfunction and psychological and mental symptoms. Since the United States Centers for Disease Control (CDC) formally proposed the diagnostic criteria for chronic fatigue syndrome in 1988, people have gradually discovered that the disease is widespread in the entire population.¹ Although many studies suggest that the rate of chronic fatigue syndrome in adolescents is lower than that in adults, the incidence of chronic fatigue syndrome tends to increase year by year. In 2002, the Ministry of Education, Culture, Sports, Science, and Technology reported that the school rejected about 2.8% of junior high school students because of chronic fatigue syndrome. Some scholars surveyed 1,324 middle school students in Harbin and found that 14.6% of middle school students were diagnosed with chronic fatigue syndrome. A disease of learning. Therefore, to understand the current situation of chronic fatigue syndrome in college students and explore the influencing factors of its illness, we launched this investigation.² This study provides a basis for formulating intervention measures for chronic fatigue syndrome in college students.

METHODS

Research object

We used stratified cluster random sampling to select 336 college students as the survey subjects. It is excluded that they are participating in other research, and the research may affect the results of this research. All the subjects of the survey had informed consent.³ We distributed 336 questionnaires in total. Among them, 98 were in the first grade, 131 were in the second grade, and 107 were in the third grade. We recovered 336 copies, with a recovery rate of 100%; 10 invalid questionnaires were eliminated. There are 326 valid questionnaires. The effective rate of the questionnaire was 97.02%.

Questionnaire

We refer to the CFS diagnostic criteria established by the CDC in the United States, and self-designed the questionnaire of the "Investigation on the Health Status of College Students." The questionnaire consists of three modules. The available content is gender, grade, and significance. CFS-related influencing factors include eight issues in three aspects: lifestyle, learning, and social support. The Fatigue Scale (FS-14) uses a closed-ended and two-point system to count scores and contains 14 items. The scores of the 1st to 8th items are added together to get the physical fatigue score. The highest is 8 points.⁴ The total score of fatigue is obtained by adding physical strength and mental fatigue scores, with a maximum of 14 points. The higher the score, the heavier the fatigue. CFS screening criteria: Anyone with significant symptoms and more than or equal to 4 minor symptoms or signs can be judged as a suspected case of CFS. To control the quality of the survey, the research group members first used the research tools to select 30 research subjects for the first measurement randomly. After a lapse of three months, the ratio will be greater than or equal to 10% of the pre-sampling cost. We use the stratified cluster random sampling method to select the research subjects for research, and the result of the research survey results agreement rate Kappa coefficient is 0.89.

Investigation method

We use on-site questionnaire surveys to issue "Investigation on the Health Status of College Students" questionnaires to college students. To ensure the reliability of the information collected, the

investigator, before filling out, explained the survey purpose and filling requirements to the subjects in detail and supervised and solved doubts on the spot.⁵ After the survey is completed, the investigator will conduct a unified preliminary check on the questionnaire and eliminate invalid questionnaires.

Student motion image tracking

If a pixel $f(x, y)$ on a moving image, the imaging brightness at the time t is $E(x, y, t)$. At the same time, we use $u(x, y)$ and $v(x, y)$ to represent the moving components of the optical flow at this point in the horizontal and vertical directions: $u = dx/dt, v = dy/dt$. After some time, interval Δt , the corresponding brightness of the point becomes $E(x + \Delta x, y + \Delta y, t + \Delta t)$. When the brightness of the point changes, expand the brightness of the changed point according to the *Taylor* formula, and we can get:

$$E(x + \Delta x, y + \Delta y, t + \Delta t) = E(x, y, t) + \frac{\partial E}{\partial x} \Delta x + \frac{\partial E}{\partial y} \Delta y + \frac{\partial E}{\partial t} \Delta t + \varepsilon \quad (1)$$

ε is a higher-order expansion of $\Delta x, \Delta y, \Delta t$. Since the fundamental equation of optical flow is established based on the assumption that the brightness of two adjacent frames of the video sequence is constant, there are:

$$E(x + \Delta x, y + \Delta y, t + \Delta t) = E(x, y, t) \quad (2)$$

Therefore, combining equation (2) and dividing both sides of equation (1) by Δt at the same time, we can get:

$$\frac{\partial E}{\partial x} \frac{dx}{dt} + \frac{\partial E}{\partial y} \frac{dy}{dt} + \frac{\partial E}{\partial t} = 0 \quad (3)$$

Let $E_x = \frac{\partial E}{\partial x}, E_y = \frac{\partial E}{\partial y}, E_t = \frac{\partial E}{\partial t}$ be the basic constraint equation of optical flow after simplification and deformation:

$$E_x u + E_y v + E_t = 0 \quad (4)$$

E_x, E_y, E_t respectively represents the gradient of the pixel gray in the moving image along the x, y, t direction.⁶ They can be calculated directly from moving images. The two unknowns of the optical flow value u, v must be solved by adding various optical flow constraints, thus forming different optical flow calculation methods.

Statistical processing

We used the x2 test and one-way analysis of variance in the SPSS11.0 statistical software to analyze the data statistically. At $\alpha=0.05$ level, we use $P<0.05$ as the difference is statistically significant.

RESULTS

The detection rate of chronic fatigue syndrome

We detected 66 CFS patients among 326 college students, with a detection rate of 20.2%. The detection rate of CFS is statistically different among different genders, grades, and majors.⁷ Among them, the detection rate of girls is higher than that of boys, and the detection rate of students in third grade is higher than that of students in other grades. The detection rate of Chinese students was higher than that of students from other colleges ($P<0.05$). See Table 1 for specific data.

Comparison of individual factors related to chronic fatigue syndrome

We use CFS detection as the dependent variable and use 8 questions in three aspects: lifestyle, learning status, and social support status of college students as independent variables to compare individual factors.⁸ The results showed that the daily sleep time, drinking, whether to participate in physical exercise, whether the diet is regular, the degree of satisfaction with the current learning environment, and the frequency of recreational activities are related to CFS ($P < 0.05$). It was considered irrelevant whether they would ask others for help under work pressure and troubles ($P > 0.05$). See Table 2 for specific data.

Table 1. Comparison of general conditions of CFS patients.

Variable	CFS	Non-CFS	CFS detection rate%	p
Gender				<0.05
Male	26	123	17.45	
Female	40	137	22.6	
Grade				<0.05
Freshman	21	77	21.43	
Sophomore	20	101	16.53	
Junior	25	82	23.36	
profession				<0.05
Medical school	19	79	19.39	
Dane IT Academy	3	26	10.34	
Mechanical and Electrical Engineering	23	78	22.77	
Department of Economic Management	13	54	19.4	
Department of Chinese	8	23	25.81	

Table 2. Comparison of individual factors related to CFS among college students.

Variable	CFS	Non-CFS	CFS detection rate	p
Sleep time per day (t/h)				<0.05
>8	12	71	14.46%	
6~8	47	175	21.17%	
<6	6	14	30.00%	
Drinking				<0.05
Yes	11	35	23.91%	
No	55	225	19.64%	
Physical exercise				<0.05
Not participating	14	35	28.57%	
Participate occasionally	45	186	19.48%	
Often attend	7	39	15.22%	
Diet				<0.05
Law	18	67	21.18%	
Basic law	40	175	18.60%	
Irregular	8	18	30.77%	
Study-induced stress				>0.05
Small or none	17	43	28.33%	
General	35	176	16.59%	
Big	13	40	24.53%	
Satisfaction with the current learning environment				<0.05
Like	8	33	19.51%	
General	42	189	18.18%	
Dislike	16	38	29.63%	
Frequency of recreational activities				<0.05
Often	18	49	26.87%	
Occasionally	42	198	17.50%	
Never	6	12	33.33%	
Help others when you encounter troubles				>0.05
Little or no	37	176	17.37%	
Often	29	84	25.66%	

DISCUSSION

This study showed that the detection rate of chronic fatigue syndrome among college students was 20.2%. This shows that there are not a few patients with chronic fatigue syndrome among college students, like the results of related studies. The high detection rate of CFS among college students may be related to some college students staying up late, drinking alcohol, taking less physical exercise, eating irregularly, dissatisfied with the learning environment, and less recreational activities. As a result, the symptoms gradually developed into chronic fatigue syndrome. The results show that the detection rate of CFS is different for students of different genders, grades, and majors. Among them, the detection rate of girls is higher than that of boys, the detection rate of third-year students is higher than that of other grades, and the detection rate of Chinese students is higher than that of students in other colleges. First, consider the physiological differences between males and females. Girls' physical strength and energy are lower than boys.⁹ In addition, juniors face the choice of finding a job. His school time is long, and his after-school activities are more significant than those in his first year and sophomore year. Reduced physical activity leads to muscle stiffness and decreased physical fitness. Especially the students of the Chinese Department. During school, he will choose to participate in more extracurricular training. Long-term response to studies and training has led to changes in his lifestyle. The students have insufficient sleep time, insufficient nutrition, and poor living habits. Some students often drink alcohol, which causes a burden on gastrointestinal digestion. So many factors cause fatigue to exist for a long time, which is also a big challenge to his physical and spiritual.

There is still controversy about the relevance of CFS and lifestyle. The competitive pressure faced by college students is increasing daily, often staying up late leads to poor long-term sleep quality, and they rarely have free time to participate in physical exercises and recreational activities. Sketching cannot be relieved through sports or entertainment, and it is easy to produce negative emotions and mental fatigue. Such as mental anxiety, depression, and lack of energy.¹⁰ At the same time, continuous lack of sleep can quickly turn the central nervous system from an excited state to an inhibited state, which in turn causes mental retardation, inattention, and memory decline. This leads to physical fatigue, which can cause cognitive dysfunction and even behavioral disorders in severe cases.

This study shows that college students have problems and confusions in life and study, and asking others for help when encountering troubles can be considered as having nothing to do with fatigue syndrome ($P > 0.05$). Fatigue is affected by many factors. Talking to others about your troubles may reduce mental stress. However, the pathogenic factors leading to chronic fatigue syndrome still exist for a long time and are manifested through a series of symptoms and signs.

Therefore, college students should pay attention to their health, develop good living habits, eat regularly, ensure adequate sleep, and exercise rationally and scientifically. In addition to lifestyle, the learning environment also affects the degree of fatigue of college students. Students are dissatisfied with the environment, and the external conditions are not satisfied, which may lead to low learning enthusiasm, decreased mental excitement, and fatigue. To improve learning enthusiasm and work more efficiently, students should choose a learning environment that makes them feel comfortable and comfortable to reduce fatigue and the impact of the learning environment on fatigue.

CONCLUSION

Exercise enhances physical strength, improves psychology, stimulates nerve factors, and regulates the body's immune function. It has a good function in adjusting circadian rhythm and so on. In addition, exercise is easy, safe, and reliable, so it has become the first choice for the treatment

of chronic fatigue syndrome. Due to the low tolerance of chronic fatigue syndrome, students' fatigue and poor muscle endurance will aggravate fatigue symptoms after high-intensity exercise. Therefore, exercise intensity should be mainly at medium and low levels, according to the individual's

specific situation, dynamic adjustment, and gradual progress. Students can use the British "step exercise therapy" for therapeutic exercises.

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