

Evaluation and Monitoring System for Exercise Rehabilitation Based on Combined Chinese and Western Medicine Technology

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Abstract

INTRODUCTION: Developing exercise rehabilitation assessment and monitoring systems is essential in rehabilitation medicine. Introduces a sports rehabilitation assessment and monitoring system based on combining Chinese and Western medicine technology, aiming to integrate traditional Chinese and Western medicine theory and modern Western medicine technology to provide more comprehensive and personalized rehabilitation services. Through the systematic integration of technologies, the author is committed to building an efficient and precise rehabilitation system to provide patients with more scientific and practical rehabilitation programs.

OBJECTIVE: The research system employs various sensor technologies, including motion capture devices, biosensors, and pulse recognition technology, by combining Chinese and Western medicine. The motion capture device enables real-time monitoring of the patient's movement trajectory, joint mobility, and other physiological indicators; the biosensor collects the patient's physiological data, such as heart rate and blood pressure. Meanwhile, Chinese and Western medicine pulse recognition technology was introduced to obtain pulse information specific to Chinese and Western medicine to provide more comprehensive data support for rehabilitation assessment. Integrating these technologies, a multi-level and multi-dimensional rehabilitation assessment system was established.

METHODS: This study aims to improve the accuracy and personalization of the rehabilitation assessment and to tailor a rehabilitation plan more in line with the patient's actual situation. Through the combination of Chinese and Western medicine techniques, it aims to break the single perspective of traditional rehabilitation assessment and make the rehabilitation plan closer to the physiological characteristics and pathological state of the patients as well as the needs of the combination of Chinese and Western medicine in the identification and treatment.

RESULTS: The system has achieved remarkable results in practical application. The accurate monitoring of the motion capture device provides a more comprehensive understanding of the patient's motor status and accurately analyzes the rehabilitation progress. At the same time, the data collection of biosensors provides doctors with more detailed physiological information, enabling them to formulate rehabilitation plans more comprehensively. The introduction of combined Chinese and Western medicine pulse recognition technology adds a unique auxiliary diagnostic tool of collaborative Chinese and Western medicine to the rehabilitation assessment and improves the personalized level of the rehabilitation plan.

CONCLUSION: The sports rehabilitation assessment and monitoring system combining Chinese and Western medicine technology brings new ideas and methods for developing rehabilitation medicine. By fully utilizing the advantages of modern technology and traditional medical knowledge, a comprehensive and in-depth rehabilitation assessment system was constructed to provide patients with more scientific and caring rehabilitation services. Future research will optimize the system's performance and promote the broad application of integrated Chinese and Western medicine technology in rehabilitation.

Keywords: integrating Chinese and Western medicine; sports medicine; exercise rehabilitation; assessment and monitoring

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1. Introduction

Life is considerably better now than it was in earlier generations, especially in the Internet of Things era. The speedy and sustainable development of data collecting, processing, transmission, and storage is the cause of this rapid progress[1]. This incident may significantly impact numerous health monitoring gadgets. By 2021, it is predicted that the market for secondhand medical equipment paired with both Chinese and Western medications will have saved 1.3 million lives annually[2]. Even though sensor device integration into sports medicine has advanced significantly in China and the West, most of these systems still rely on batteries[3].

Given that batteries must frequently be changed or recharged, this is a clear disadvantage for the healthcare industry. Using a ferroelectric generator, which uses the direct piezoelectric effect to transform mechanical energy into electrical energy, one way to attain energy independence is to take mechanical energy out of the human body and turn it into electricity[4]. Because piezoelectric materials can gather and harvest energy, there is rising interest in using them to create flexible wearable devices that combine Western and oriental medicine in sports medicine[5].

The sensor properties of piezoelectric materials are directly related to the piezoelectric coefficients d_{ij} (power units) and g_{ij} (voltage field units). In addition, low dielectric losses in power generation help to maximize the efficiency of converting mechanical energy into electrical energy. Thermoelectric materials are a subset of piezoelectric materials characterized by spontaneous polarization during temperature changes, and they change bond charge during heating or cooling. Some thermoelectric materials are ferroelectric because they are spontaneously polarized and can indicate natural hysteresis behavior (voltage and polarization) through electrical or mechanical voltage circuits[6]. Thus, all ferroelectric materials are thermoelectric and piezoelectric because their polarization depends on temperature or temperature—voltage changes. The inherent versatility of ferroelectric materials provides unique mechanical flexibility and functional advantages for devices used in conjunction with TCM and sports medicine, from production to end use to automatic vibration energy recovery and recycling (piezoelectric properties). As well as thermal vibration (thermoelectric parameters) and their ability to use polymers or composites.

In general, portable sports medicine electronic devices with herbal and Western medicine capabilities consist of six main components: (i) substrate, (ii) sensors, (iii) actuators,

(iv) interfaces, (v) wireless transmission, and (vi) power supply. Therefore, a step-by-step approach is often used to integrate the various components into the final architecture of the device[7]. Multi-component devices must have sufficient mechanical strength and electrical properties, and each element must be designed for high loads during operation[8]. Indeed, the interactions must be flexible to ensure continuous movement of the electrons, and the piezoelectric material of the active sensors must be able to measure stimuli in certain parts of the body and convert them into signals. In this paper, the author combines Chinese and Western medicine to study MV devices in sports medicine and analyze their potential applications in medical monitoring. Sports medicine is combined with Chinese and Western medicine.

2. Relevant studies

As stress increases during exercise, the body may become fatigued after exercise, which can lead to short-term decreases in athletic performance or psychological and emotional anxiety, which can lead to variability in the athlete or sports participant. Exercise-related fatigue can lead to metabolic disorders and medical problems. After exercise, the body undergoes various metabolic reactions to remove toxins and harmful substances and create a dynamic balance in the body's environment[9]. Exercise fatigue has become a hot topic in physical activity[10]. One of the tremendous tangible riches of Chinese culture is the fusion of Chinese and Western medicine. Its extensive oriental comprehensive care system, capable of treating sports injuries, exhaustion, and other ailments, has a strong cultural and social basis. In sports, using Chinese and Western medicine together has enormous promise. Researchers have been addressing the impacts of human weariness with herbs since the 1970s, and they have seen encouraging results in some areas.

During exercise or competition, people may experience fatigue and sports injuries[11]. It is recommended that Chinese and Western medicine be combined and closely integrated with exercise to treat fatigue and recover from it with herbs to ensure uninterrupted scientific exercise training and continuous athletic performance improvement[12]. Astragalus, ginseng, and *Rhodiola rosea* are herbs used to regenerate the body after fatigue, repair injuries, and improve body functions[13]. This paper systematically discusses the progress of herbal medicine in sports research.

Testing the most suitable piezoelectric materials focuses on their ability to detect a wide range of physical stimuli and their versatility to be combined with other

sensors or collection mechanisms, such as friction selectivity and pressure resistance[14]. An in-depth understanding of the characteristics and functionality of flexible motion medical devices combining Western and Eastern medicine can contribute to innovation and future development of medical applications[15]. If Young's Module blocks are sufficiently small over a wide range of stresses, the mechanical and electrical properties required for the device will not directly affect contact with skin dynamics and complex body structures. These devices can work if flexible multifunctional devices can be integrated or at a higher level[16]. However, these devices must be fully compatible with the skin surface[17]. For example, if the devices are mounted on curved and wavy surfaces, the skin should be small, thin, soft, dry, and intact. Exercise equipment combined with Western and Western medicines must be aesthetically pleasing and invisible in everyday life, as they are mounted directly on human skin. Therefore, glossy transparent materials are also recommended for medical portable devices[18]. Good adhesion between the device's layers permits the correct transfer of any loads, and good adhesion between human skin and the device's surface is also necessary[19]. Reducing the temperature coefficient of resistance is required to limit the effect of temperature on pressure and voltage sensors, as body temperature (Bt) can negatively affect these sensors. High scalability and cost efficiency are essential in researching the transition to affordable technologies[20]. Progress has been made in addressing these issues at the processing stage, particularly in converting conventional production processes (micro-production processes) to large-scale printing technologies. In addition, using materials in synthetic solutions is

recommended to reduce the cost of the final traditional device.

3. Research methodology

3.1 Definition of the relationship between Chinese and Western medicine and sports medicine

TCM can be applied to any sport and is a multidisciplinary field. It is vital for recovery from fatigue and injury after training. It also positively affects the central nervous, cardiovascular, and musculoskeletal systems, helping athletes perform better by reducing pre-game anxiety and nervousness. Using herbs in sports can help athletes achieve better in competition by reducing pre-competition anxiety and excitement. Two thousand years ago, Shen Nong used herbs to improve health. Athletes often use herbs to enhance their endurance and recreational sports performance. Sports and medicine are inseparable. Exercise promotes the development of methamphetamine in plants and provides medicine for post-traumatic diseases. Sport and medicine are interdependent and complementary. Chinese medicine also promotes sport and fosters innovation and improvement in Chinese medicine. The measurement mechanism of the wearable device of Chinese and Western medicine and the materials of the wearable medical device of Chinese and Western medicine are shown in Figures 1 and 2.

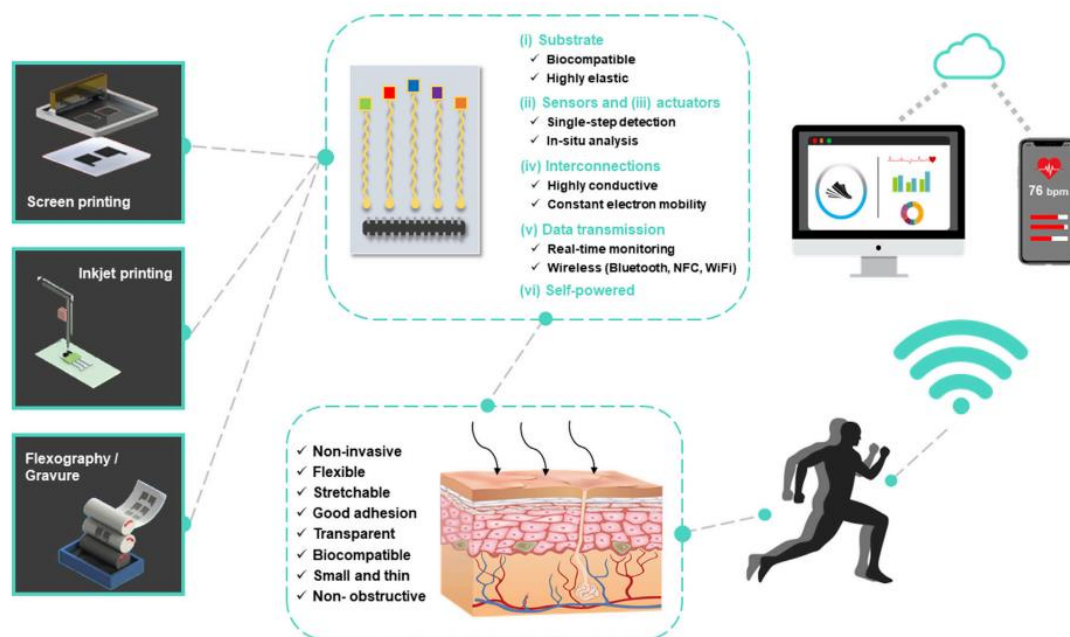


Figure 1. Mechanisms of wearable device measurement in Chinese and Western medicine^[21]

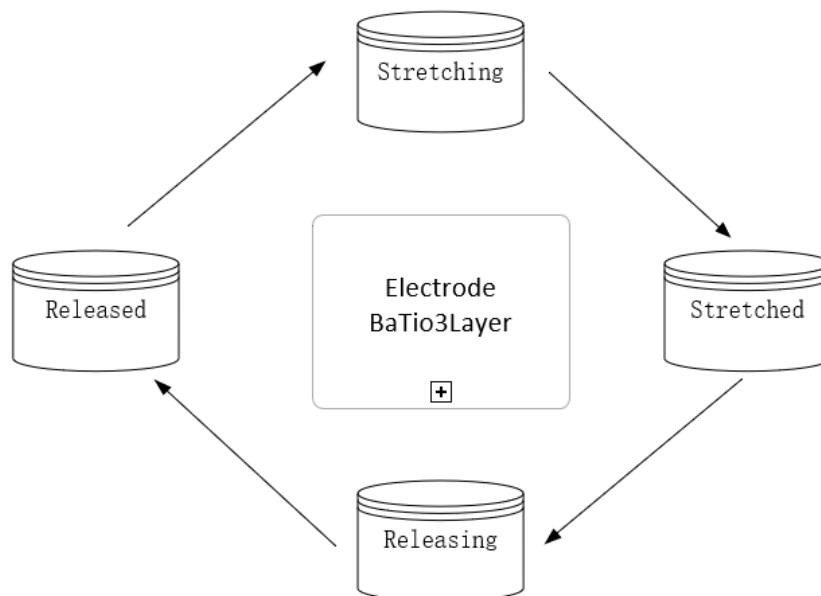


Figure 2. Materials for wearable medical devices combining Chinese and Western medicine

The direct application of traditional and Chinese medicine is a unique approach to therapeutic medicine. With the modernization of TCM, more and more active ingredients are being used in the medical field, making modern TCM more complex and advanced. This development has made TCM a vital area of research in reducing exercise-related fatigue. Active substances in TCM, such as ginsenosides and polysaccharides, have significantly reduced exercise fatigue. In recent years, there has been a dynamic trend in the study of TCM for treating exercise-related fatigue. The results showed that fungal polysaccharides significantly reduced post-exercise fatigue at the optimal dose of 20 mg/(kg-d), but higher doses of fungal polysaccharides did not provide significant benefits.

Furthermore, the anti-fatigue effect of inosine has been demonstrated in modern pharmacology, although its active

substance remains to be explained. On the other hand, turmeric showed a significant inhibitory effect on exercise-induced fatigue in mice, significantly increasing the body's resistance to exercise intensity and promoting rapid recovery from fatigue. Herbs have a crucial therapeutic role in treating sports injuries and promoting fatigue recurrence, especially for people who practice for long periods. These individuals need herbal preparations to regulate their internal organs, keep working quickly and recovering efficiently, and provide prolonged high-intensity training without undue fatigue. Chinese medicine shows great potential in the treatment of exercise fatigue and provides useful research recommendations for sports medicine. Sports medicine aids that combine Chinese and Western medicine are shown in Figure 3.

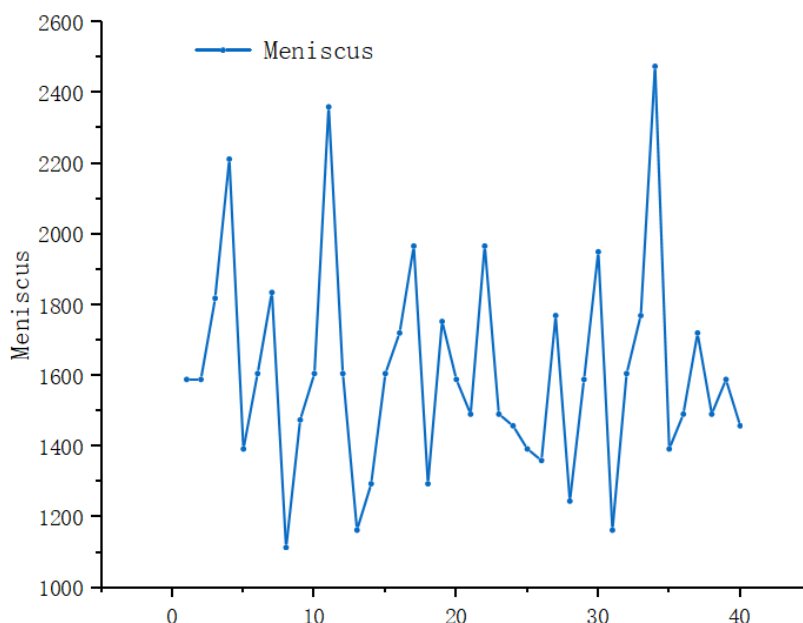


Figure 3. Sports medicine assistive devices combining Chinese and Western medicine

3.2 Sports Medicine Applications of Traditional Chinese Medicine

Chinese medicine has a deep foundation in the medical field. It treats sports injuries with herbs and has excellent burns, acupuncture, and massage applications. It also helps to improve the treatment of sports injuries and the recurrence of fatigue in athletes. Acupuncture, as a traditional Chinese medicine method, employs superficial acupuncture points and deep-rooted traditional medical theories for treatment. Modern scientific research has shown that acupuncture and moxibustion can effectively relieve muscle fatigue and discomfort after high-intensity training and competition through the transfer mechanism of the southern system. Prolonged burning activates essential enzymes in the body that are necessary metabolic mechanisms to improve natural immunity and general health. In a study of athletes, university researchers investigated the effects of moxib on serum creatine kinase (CK) during exercise and observed changes in serum lactate levels after moxib treatment to assess muscle fatigue and physiologic recovery. The results showed that inhalation of the spray significantly increased blood lactate concentration, promoted physiological regeneration, and indirectly improved athletic performance. Acupuncture and moxibustion provide athletes with a natural, non-invasive regeneration method to sustain prolonged high-intensity training and reduce the risk of overload injuries. At the same time, reducing fatigue and muscle tension at high loads can help people recover quickly. This can positively impact an athlete's success, long-term health, and career.

Acupuncture has a unique and practical value in modern sports medicine and integrative health management. Acupuncture is a unique method of treating sports-related illnesses and injuries with appropriate needle stimulation. Acupuncture is a technique that uses metal needles. Specialized Acupuncture and Moxibustion techniques spin, rotate, lift, and supply energy and blood to the body. Acupuncture and Moxibustion are excellent for treating joint and muscle injuries in athletes and can reduce pain after an injury. Many researchers have also conducted extensive clinical trials. The control group used conventional therapy, and the 35-point trial group used acupuncture and moxibustion, with an overall effective rate of 88.6%, significantly higher than that of the control group (54.3%). The most important effect of massage on human health is to improve circulation and pain through meridians, bruising, breathing, and circulation. It has an excellent regenerative impact on people after sports injuries.

$$Loss = mse(R_{f_{pred}}, R_{f_{true}}) + \lambda ReLU(-\frac{dR_f}{dc}) \quad (1)$$

$$\sum_{\{v:(v,u) \in E\}} f_{vu} - \sum_{\{v:(v,u) \in E\}} f_{uv} = 0, \forall_u \in V \setminus [s, y] \quad (2)$$

In Equation (1), the Loss function, which is the missing value function, is counted by the least squares of the absolute value, and $\sum_{\{v:(v,u) \in E\}} f_{vu} - \sum_{\{v:(v,u) \in E\}} f_{uv} = 0$ in

Equation (2) is also an approximation, which is the value to find the limit.

$$\sum_{\{u:(u,t) \in E\}} f_{ut} = |f| \quad (3)$$

Equation (3) is an absolute value qualification of Equation (2) variables.

$$c[V_1, V_n] = \sum_{(u,v) \in (V_1, V_n)} c_{uv} \quad (4)$$

$$Md = \frac{1}{d} \sum_{i=1}^k \min i = jd(ci, cj) \quad (5)$$

Equation (4) further defines the number of consecutively summed items; Equation (5) is a weighted determination of the minimum value of the function Md.

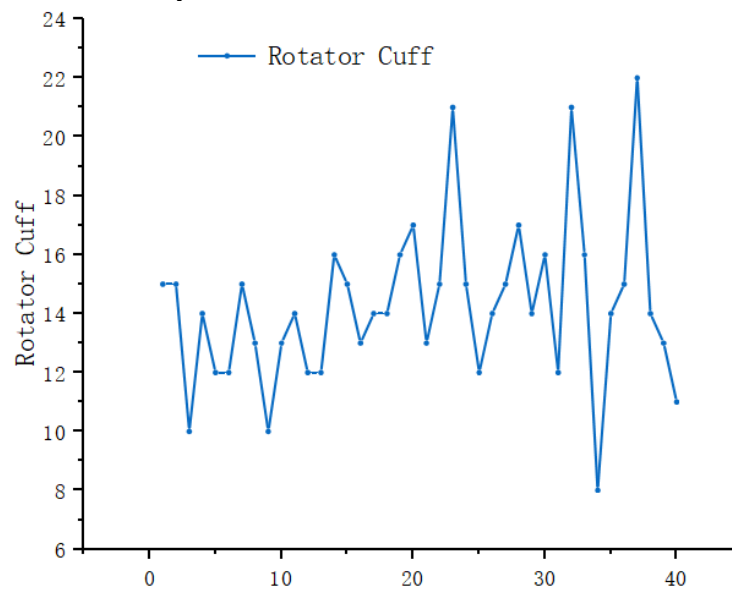
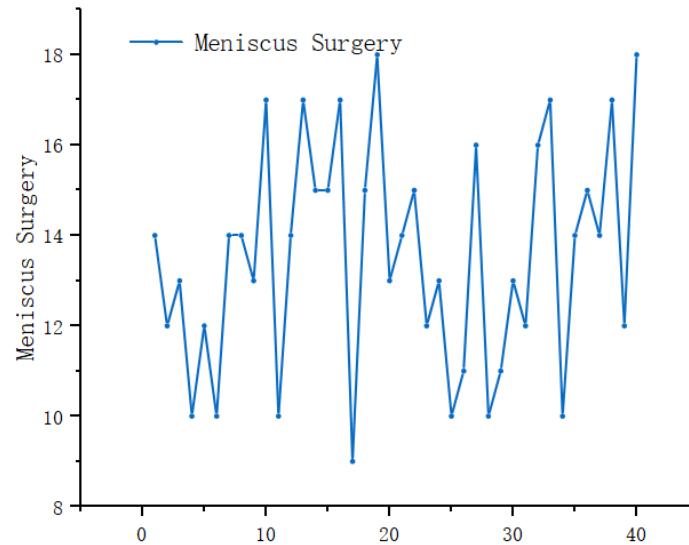
4. Experimental results and discussion

4.1 Measurement of the impact of TCM technology on the development of sports medicine

Herbs play an essential role in skeletal muscle formation. For example, in some middle-distance running events, herbs can aid in the recovery of skeletal muscle fatigue, rapidly restore muscle inflammation, and mobilize more muscle fibers for exercise. Herbal interventions enable athletes to train for strength during the growing season. Many Chinese scientists have also made many discoveries. A 2013 study investigated the pharmacological effects of Baxiang Tang. It showed that the equation not only significantly prolonged exercise fatigue and reduced malondialdehyde (MDA) accumulation in skeletal muscle but also significantly increased peroxidase isomerase (SOD) activity at the molecular level. The study's results suggest that taking platinum broth during exercise helps eliminate free radicals, improves the body's antioxidant capacity, effectively reduces physical fatigue, and promotes significant progress during training.

Prolonged high-intensity training can lead to physical phenomena such as energy and substance depletion, accumulation of metabolites, and excessive accumulation of free radicals and peroxidized fats. Prolonged fatigue can also lead to certain types of skeletal muscle damage. In this case, using Chinese herbs is particularly important as they have many rehabilitative and healing properties that provide a complete solution to post-exercise injuries and fatigue. Chinese researchers have also shown that TCM rehabilitation can significantly slow exercise-induced structural changes in muscle fibers and improve substantial

In conclusion, it can be concluded that Chinese herbs can effectively repair damaged skeletal muscles, especially



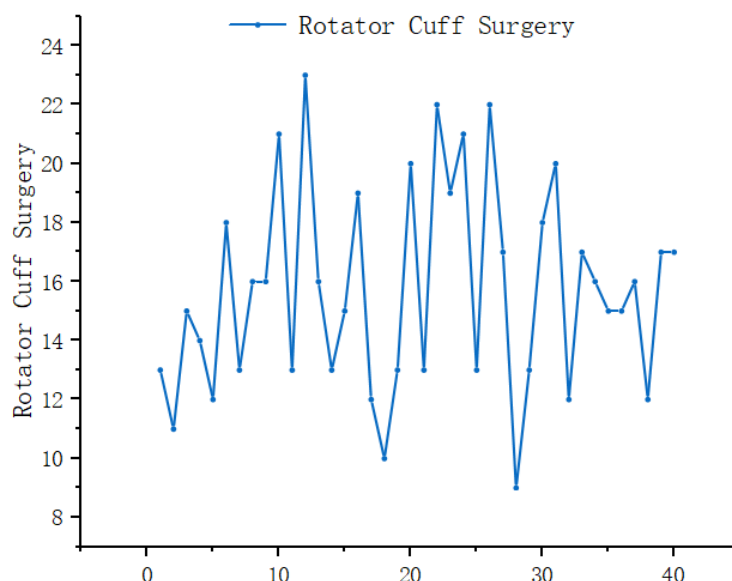


Figure 6. Cuff for Sports Rehabilitation Assessment

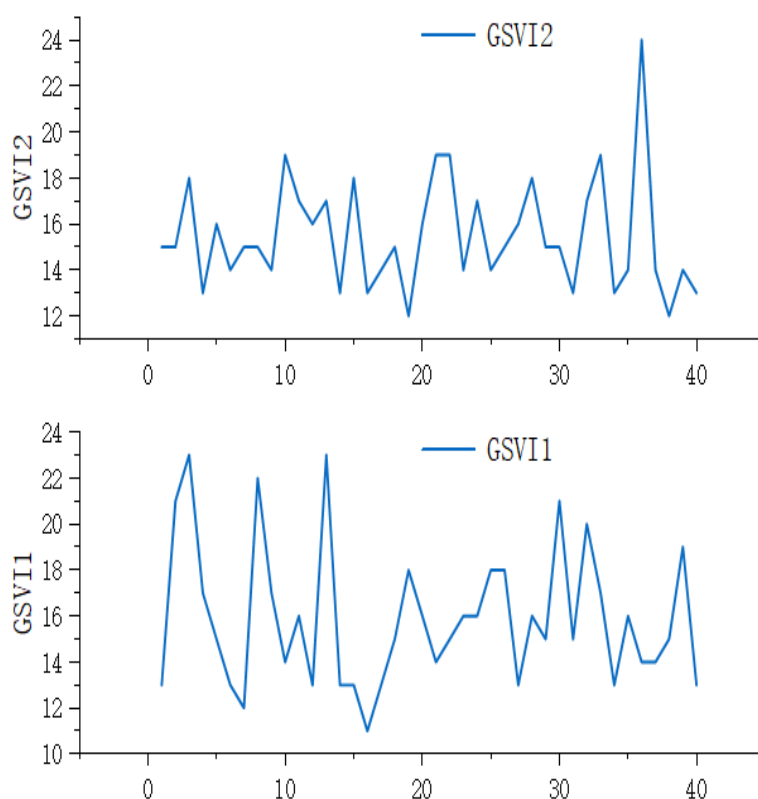


Figure 7. Rotator for sports rehabilitation testing system

Herbal medicines have significant effects on the cardiovascular system during exercise. In the 3000-meter sports obstacle course, herbal equations can effectively improve the immune system of athletes, improve cardiovascular function, increase blood circulation, provide more oxygen to athletes, and play an essential role in regulating their cardiovascular system. Researchers studying the therapeutic effects of herbal medicine combinations on patients with swimming difficulties found significant results. After four weeks of continuous use, there

were substantial changes in crucial blood parameters. There was a significant increase in hemoglobin, IgG immunoglobulin, IgM, and T cells and a significant decrease in cortisol levels. This series of biochemical changes not only underscores the positive impact of the herbal and Spleen combination on blood composition but also suggests that it works through a variety of mechanisms, including activation of the immune system, promotion of metabolism, lowering of metabolism, and increasing the body's resistance to fatigue. Notably, other studies on the

effects of patchouli, dodecane, and carnosine on fatigue after high-intensity endurance training in rats have also yielded encouraging results. These herbs significantly increased hemoglobin concentration and glycogen reserves and reduced amino acid and protein metabolism by accelerating protein synthesis, thereby improving tolerance to fatigue in many areas. These results provide useful information for athletes and coaches and suggest the possible use of these herbs, which may enhance anorexia, physical fitness, and tolerance to fatigue. Finally, these studies open new avenues for using TCM in exercise and provide a basis for further clinical practice. TCM is an active stimulant in treating cardiovascular disease after exercise, improving cardiovascular disease, cardiovascular and astringent functions, and reducing the accumulation of blood clots after fatigue. It is also an effective way to recover from post-exercise fatigue as it allows regular exercisers to regulate, recover from, and heal from cardiovascular disease, reduce thrombosis and clotting, and heal from cardiovascular disease. The central nervous system plays an essential role in the learning process. For example, athletes need to focus on lifting weights and running 100 meters, and extensive, high-intensity exercises stimulate the central nervous system, leading to rapid fatigue.

In summary, it can be concluded that the active ingredients of this herbal preparation can significantly improve the recurrence of central nervous system fatigue in athletes. In animal studies, the herbal combination was very effective in recovering nerve fatigue and nerve fatigue in rats. However, it is not clear whether long-term use would have any adverse effects on athletes.

4.2 Combination of Chinese and Western medicine for sports medicine rehabilitation assessment and monitoring

Athletes in sports like diving and gymnastics must keep their mental states stable to perform consistently on the field. The Spleen controls movement, while the Heart controls the Heart. Anxiety is brought on by heart and splenic malfunction, which can lead to deficient sperm secretion, inadequate sources of biochemical gasses, weaker blood, heart failure, and loss of cerebral ligaments. Utilizes blood evidence to deal with heart qi of the Spleen—effective treatment for palpitations, forgetfulness, and insomnia. Psychotherapy is also an effective treatment for

anxiety, irritability, and negative emotions and is best combined with TCM. Gui Quan Tang, with rehabilitation and psychotherapy, has a significant impact on anxiety. It improves the balance of the nerve management glove, calms the patient, and is widely used in clinical practice. Chinese medicine can improve the emotional and psychological state of athletes and is an effective way to eliminate anxiety or depression in adolescents. Studies have shown that these herbs can improve the body, eliminate fatigue, restore strength, relieve mental tension and anxiety, and positively affect the performance of athletes.

In daily exercise, strenuous exercise can lead to symptoms such as coronary artery disease. For example, long-distance runners may fatigue after long, intense training and sometimes suffer from arrhythmia or tachycardia. Research indicates that the application of traditional Chinese medicine may impact the control of pertinent apoptotic variables, thereby mitigating cardiac apoptosis, reducing inflammation, safeguarding cardiac tissues, and delaying the advancement of heart failure. In addition to being the primary determinants of the warm-yang intervention in apoptosis, the Bcl-2 family, the bladder protein family, and the cardiac anchoring proteins (CRAPs) are critical components in the control of apoptosis. Furthermore, heat variables that influence cardiac apoptosis have them as major targets. Chrysanthemum, Bok Choy, Shih Wei Tang, Ginseng Soup, and Heart Repair Soup are examples of natural soups that can lower the amount of apoptotic cells by controlling the expression of genes related to cystatinase-3 and cytosolic in cardiac cells. Various dosages of embryonic ginseng boosted the activity of cardiac cells, reduced cell death, blocked the expression of apoptosis-related genes and proteins, and elevated the Bcl-2 gene. However, there was no significant change in the activity of cysteine protease-8, suggesting that its mode of action is related to the disruption of the mitochondrial apoptotic pathway.

Experimental studies have shown that herbs can significantly improve and affect cardiac cells and are widely used in medicine. This has an effect on the regeneration of the body in some patients. However, the therapeutic effects of the above drugs in athletes are unknown, as are the long-term side effects of oral medications in humans. Improving cardiac function in athletes with herbal medicine is a hot topic for future research—the level of GSVI changes in sports medicine, as shown in Figure 8.

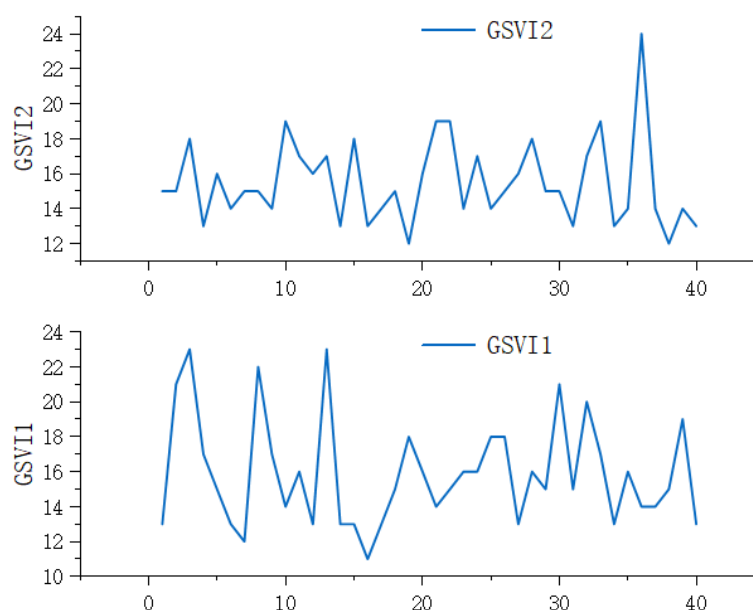


Figure 8. Levels of change in GSVI for sports medicine

The number and structure of mitochondria are critical for ATP production. Mistletoe-containing herbs increase the number of mitochondria in the skeletal and cardiac muscles of diabetic rats, while increased regulation of mitochondrial biosynthesis improves mitochondrial function in the muscles of diabetic rats. Chrysanthemum extract increased ATPase activity after training in high-endurance rats. Many studies have also shown that herbal medicines positively affect the ultrastructure of myocardial mitochondria. Studies have shown that lanolin increases the activity of the mitochondrial enzymes Na⁺-K⁺-ATP, Mg²⁺-ATP, and Ca²⁺-ATP. Studies have demonstrated that valuable herbs are essential in treating cardiovascular diseases, mainly by altering mitochondrial microstructural damage. Studies that increase the number of mitochondria or promote structural changes in mitochondria are relatively limited, and further research in this area is needed.

Participation in the tricarboxylic acid cycle helps to optimize mitochondrial bioenergetic synthesis processes. In particular, pyridinone IV acts by inhibiting the activity of the mitochondrial transporter protein Ca²⁺, activating cellular metabolic enzymes, synthesizing ATP, generating more energy for the cell, and decreasing mitochondrial Ca²⁺ capacity. Its effects are not limited to the cellular level but also to organ function and disease progression. MPTP, a non-specific channel consisting of a synthetic ATP dimer, is regulated by calcium and reactive oxygen species (ROS) concentrations in the mitochondrial matrix, which tends to increase progressively in acute and chronic heart disease. The results showed that ginseng RG5 had a significant inhibitory effect on the detection of MPTP, rendering it insensitive to external stimuli and improving the ability of cardiac cells to resist hypoxia/peroxide damage. In addition, mistletoe inhibited aldosterone MPTP by suppressing Ca²⁺-induced cardiac MPTP activation or interfering with cardiac cells through interactions with targeting molecules in mitochondria. On the other hand,

capsaicin increased the expression of attenuator one and Bcl-2, inhibited the detection of MPTP, and effectively suppressed mitochondrial disorders induced by hypoxia/peroxidation, thereby preventing cardiac injury. These results provide insight into the possible mechanisms by which herbal preparations modulate cardiovascular health and treat related diseases.

In conclusion, herbal medicines play an essential role in treating cardiovascular diseases, modulating mitochondrial structure and function, and influencing the process of cellular energy synthesis. However, studies on mitochondrial growth and conformational changes remain relatively limited, and further research is needed. In addition, the effects of herbal preparations on organ system function and disease progression are required to understand better. Many studies have been conducted on the effects of herbal medicines on mitochondrial function, but few reports have been made on mitochondria's morphological and structural changes.

5. Conclusion

The Sports Rehabilitation Evaluation and Monitoring System with Integrative Chinese and Western Medicine Technology represents an essential advancement in rehabilitation medicine. This study aims to integrate the traditional theory of combining Chinese and Western medicine with modern Western medical technology to provide more comprehensive and personalized rehabilitation services. The following conclusions were drawn through the study and application of this system: first, the exercise rehabilitation assessment and monitoring system based on the integration of Chinese and Western medicine techniques improves the accuracy of rehabilitation assessment. Traditional rehabilitation assessment usually focuses on physiological and anatomical parameters while ignoring the diagnostic methods of combining Chinese and

Western medicine. By introducing the integrated Chinese and Western medicine pulse recognition technology, more physiological information can be obtained to understand further the patient's overall health status, which leads to a more accurate rehabilitation program. Second, this system promotes the individualization of rehabilitation plans. Each patient's rehabilitation needs are unique, and traditional rehabilitation plans are usually standardized treatment plans that do not consider individual differences. By integrating motion capture devices, biosensors, and pulse recognition technology from Chinese and Western medicine, it is possible to better understand the patient's unique characteristics and tailor the rehabilitation plan to improve the personalization of treatment. Third, this system improves the efficiency of rehabilitation monitoring. Traditional rehabilitation monitoring usually requires patients to go to medical institutions for regular checkups, which wastes time and increases the burden on patients.

In contrast, the exercise rehabilitation evaluation and monitoring system based on the integration of Chinese and Western medicine technology can collect data in real-time, and doctors can remotely monitor the patient's rehabilitation progress and make timely adjustments, which improves the efficiency and convenience of rehabilitation treatment. Finally, this system brings new ideas and methods to rehabilitation medicine. Traditional rehabilitation treatment often focuses on symptom relief and ignores the overall health of the patient. Through the integrated use of Chinese and Western medicine techniques, it is possible to pay more comprehensive attention to patient's physiological, psychological, and social factors and provide them with more comprehensive rehabilitation services to recover their health faster. In conclusion, the sports rehabilitation assessment and monitoring system based on combining Chinese and Western medicine technology has many application prospects in rehabilitation medicine. By improving the accuracy, degree of individualization, and monitoring efficiency of rehabilitation assessment, this system provides patients with more scientific and comprehensive rehabilitation services. It is expected to play an essential role in the future practice of rehabilitation medicine and improve patients' quality of life. With the continuous advancement of technology and in-depth clinical practice, it is confident that this system will continue to improve and expand and make more significant contributions to the development of rehabilitation medicine.

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References

- [1] XI Chaojun, LI Fengri, CHENG Wuzhong, et al. Application of traditional Chinese and Western medicine combined with chronic disease management in pulmonary rehabilitation and efficacy evaluation [J]. American journal of translational research, 2021, 13(6): 6372-6381.
- [2] WANG Guangjun, ZHU Bangguo, FAN Yi, et al. Design and evaluation of an exergame system to assist knee disorders patients' rehabilitation based on gesture interaction[J/OL]. Health Information Science and Systems, 2022, 10(1): 20. DOI:10.1007/s13755-022-00189-5.
- [3] QIU R J, LI M, HU J Y, et al. Methods for the development of a core outcome set for clinical trials integrating traditional Chinese medicine and Western medicine[J]. Journal of Integrative Medicine, 2021(2): 56-77.
- [4] NABACWA L. Nursing and medical students' perceptions of the rehabilitation medicine course unit: A case study of Mbarara University of Science and Technology.[J]. 2021(3): 101-127.
- [5] WEI W, YONGCHANG D, QIAN Y, et al. Systematic evaluation of the efficacy of integrated traditional Chinese and Western medicine in treating mild cognitive impairment[J]. Francis Academic Press, 2021(1): 20-36.
- [6] DING B, TIAN F, ZHAO L. Digital evaluation algorithm for upper limb motor function rehabilitation based on micro sensor[J/OL]. Journal of Medical Imaging and Health Informatics, 2021, 11(2): 391-401. DOI:10.1166/jmihi.2021.3278.
- [7] KOHAR A, TRAN D, PERRET D, et al. Physical medicine and rehabilitation milestone evaluation project: Development of standardized rotation-specific milestone-incorporated faculty-of-resident evaluation tools[J]. American Journal of Physical Medicine & Rehabilitation, 2021, published ahead of print: 56-77.
- [8] WRIGHT M L, COLADONATO C, CICCOTTI M, et al. Combined anterior cruciate ligament and medial collateral ligament reconstruction show high rates of return to activity and low rates of recurrent valgus instability: An updated systematic review[J/OL]. Arthroscopy, Sports Medicine, and Rehabilitation, 2023, 5: e867-e879. DOI:10.1016/j.asmr.2023.03.006.
- [9] TIAN X, HE J. Research on informatization monitoring and evaluation index system of sports and medical integration demonstration community based on analytic hierarchy process (AHP)[J]. IEEE, 2021: 1-13.
- [10] KANADE A, SHARMA M, MANIVANNAN M. Tele-evaluate: A low-cost, teleconsultation system for home-based stroke survivor rehabilitation using multiscale CNN-LSTM architecture[J]. 2021, 56(56): 44-62.
- [11] ZHU L. Computer vision-driven evaluation system for assisted decision-making in sports training[J]. Wireless Communications and Mobile Computing, 2021, 2021(7): 1-7.
- [12] WANG C, LIANG J, SI Y, et al. The effectiveness of traditional Chinese medicine-based exercise on physical performance, balance, and muscle strength among older adults: a systematic review with meta-analysis[J/OL]. Aging Clinical and Experimental Research, 2022, 34(4): 725-740. DOI:10.1007/s40520-021-01964-2.
- [13] JOANNA KVIST P, ATC, KARIN GRVARE SILBERNAGEL P. Fear of movement and reinjury in sports medicine: Relevance for rehabilitation and return to sport[J]. Physical Therapy, 2021: 56-78.
- [14] XIANG Y Z. Integrating traditional Chinese and Western medicine for cardiovascular disease[J/OL]. SCIENTIA SINICA Vitae, 2022, 52(6): 832-839. DOI:10.1360/SSV-2021-0388.
- [15] CHEN J. Research on qi gong reform of medical colleges and universities under the background of "Integration of Sports and Medicine" based on big data[J/OL]. Journal of

- Physics Conference Series, 2021, 1744(3): 032125. DOI:10.1088/1742-6596/1744/3/032125.
- [16] WANG B, MA Y. Research status of evaluation and nutrition interventions on frailty in the elderly by Traditional Chinese Medicine and Western medicine[J/OL]. Chinese Journal of Integrative Nursing, 2022: 59-67. DOI:10.55111/j.issn2709-1961.202206129.
- [17] ROTH E J, HORNBY T G. The value of rehabilitation interventions –Integrating evidence, clinical expertise, critical assessment, and patient needs A conference report[J]—Archives of Physical Medicine and Rehabilitation, 2021: 11489.
- [18] RAMAN R, UTTS J, COHEN A I, et al. Integrating ethics into the guidelines for assessment and instruction in statistics education (GAISE)[J/OL]. The American Statistician, 2023: 45-78. DOI:10.1080/00031305.2022.2156612.
- [19] KO V M Chi, LAU N Nam, QIU J Hong, et al. Cross-cultural adaptation of Chinese Victorian Institute of Sports Assessment–Achilles (VISA-A) questionnaire for Achilles tendinopathy[J/OL]. Foot & ankle Orthopaedics, 2022(1): 1-11. DOI:10.1177/24730114221081535.
- [20] POURAHMADI M, DELAVARI S, KOES B, et al. How do you formulate appropriate review questions for systematic sports medicine and rehabilitation reviews?[J/OL]. British journal of sports medicine, 2021, 55(22): 1246-1247. DOI:10.1136/bjsports-2021-104315.
- [21] TSIKRITEAS Z M, JAMES I. ROSCOW C R B, KHANBAREH H. Flexible ferroelectric wearable devices for medical applications[J]. iScience, 2020, 336(29): 1-7.