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Article

# Analysis of artificial intelligence medical treatment for closed muscle skin nerve injury caused by aerobics training

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**Abstract:** In aerobics training, closed myocutaneous nerve damage needs to be paid attention to, especially high-intensity training may cause minor damage to muscles and nerves. With the help of AI medical technology and the understanding of molecular and cellular biomechanics, we can more accurately explore the mechanism of injury, such as the effects of nerve tensile stress and microenvironment changes on nerve regeneration. This helps to develop scientific rehabilitation methods, such as AI-assisted personalized training, neural regeneration technology, and real-time monitoring of training intensity to speed up athletes' rehabilitation and reduce the risk of future injuries. Purpose: Aerobics training is very strict and requires high physical fitness of dancers. During long-term training, dancers can easily cause closed musculocutaneous nerve injury. Traditional medicine is difficult to guarantee the treatment effect of patients with musculocutaneous nerve injury. The use of artificial intelligence medicine for closed musculocutaneous nerve injury treatment can improve the treatment effect of aerobics training induced closed musculocutaneous nerve injury. Method: This article utilized artificial intelligence medicine for the treatment of musculocutaneous nerve injury, and used artificial intelligence technology to analyze patient imaging and other data to assist doctors in accurate diagnosis. Utilize intelligent algorithms to predict medication plans, reduce medication errors, and intelligently adjust the course of treatment based on the patient's condition. In artificial intelligence healthcare, high-quality online medical services can be created through intelligent technology, providing convenient medical consultation for patients. Result: This article selected 200 patients with musculocutaneous nerve injury caused by aerobics training for grouping experiments. The average diagnostic accuracy of traditional medicine and artificial intelligence medicine were 84.2% and 95.6%, respectively. Conclusion: Artificial intelligence medicine can achieve medical informatization and intelligently analyze patients' medical information, which helps to improve the accuracy of medical diagnosis for aerobics training injuries.

**Keywords:** aerobics training; musculocutaneous nerve injury; intelligent medicine; injury rehabilitation treatment

## 1. Introduction

Dance is a cultural treasure of mankind. It not only carries a deep history and emotions, but also keeps innovating with the progress of the times. The rise of modern dances such as aerobics puts forward higher requirements for dancers' art and physical fitness. However, with the increasing complexity of dance movements, the side effect of closed myocutaneous nerve injury, a training side effect, has gradually become prominent, posing a threat to the dancer's career. From the perspective of molecular and cellular biomechanics, this kind of damage is closely related to the physical compression of nerve fibers, microcirculation disorders, and cell repair mechanisms, which affect nerve conduction and may lead to dysfunction.

In response to this problem, artificial intelligence medical technology has provided a new perspective for treatment.AI can accurately analyze medical images and medical history, simulate the biomechanical conditions of the injury site, and provide doctors with in-depth insights into nerve regeneration, muscle adaptation, and rehabilitation paths. Combined with cell biomechanical research, AI can also guide personalized rehabilitation training to ensure that training not only helps injury recovery, but also avoids further injury. The purpose of this research is to explore the application of AI in the treatment of closed myocutaneous nerve injury caused by aerobics training. Through the integration of the latest research on molecular and cellular biomechanics, we aim to provide the dance industry with more accurate and efficient rehabilitation programs to protect the health of dancers and prolong their artistic careers. The research in this paper not only has theoretical value, but will also provide strong support for practice. With the help of AI technology, we are expected to provide dancers with a more scientific and personalized rehabilitation path, helping them return to the stage faster and better.

Dance training injuries are inevitable, and a healthy body is the foundation of dance training. Timely and effective treatment for patients with dance training injuries can help dancers recover from training injuries. Closed musculocutaneous nerve injury is the main manifestation of dance training injury. This article used artificial intelligence medicine to analyze imaging and other data of injured patients to assist doctors in accurate diagnosis, and used artificial intelligence algorithms to optimize medication plans. It can also provide intelligent medical consultation services for patients, thereby improving the rehabilitation effect of patients with closed muscle skin meridian injuries during dance training. The innovation of this research lies in the application of AI medical technology to the treatment and rehabilitation of closed myocutaneous nerve injury caused by aerobics training. By combining molecular and cellular biomechanical principles, we have an in-depth understanding of the microscopic mechanisms of such injuries and tailor treatment plans for patients. With the help of AI technology, we accurately analyze medical images and medical records to improve the accuracy of diagnosis, and customize personalized rehabilitation plans for patients to effectively prevent secondary injuries and promote nerve regeneration. At the same time, AI technology monitors changes in biomarkers in real time to ensure flexible adjustment of treatment options. In addition, using big data and AI technology, we have established an injury risk prediction model, intelligent prediction of medication regimens, and improved the safety and efficiency of drug treatment. The introduction of the principles of cellular biomechanics has further optimized the training parameters and enhanced the adaptability of muscles and nerves. In short, this study uses AI technology to provide patients with more accurate and personalized treatment and rehabilitation services.

## 2. Related work

Dancers need long-term and systematic training to master various dance professional skills, which can easily lead to sports injuries during long-term dance training. Fuller Melanie [1] examined the association between injuries and two phases of dancers' career advancement. In a joint cohort of transitional ballet and

contemporary dance students, the incidence of time loss injuries per hour of exposure among transitional ballet students decreased and showed a downward trend, while the incidence of medical and nursing injuries increased. Kenny [2] analyzed the injuries of professional former ballet dancers and contemporary dancers, and conducted a weekly online questionnaire survey on 85 registered full-time professional former ballet dancers and 60 contemporary training dancers. Jeffries [3] conducted injury data statistics on 100 professional contemporary dancers of both genders, reporting a total of 79 injuries, of which 86.1% were new, 6.3% were recurrent, and 7.6% were aggravated. Fuller Melanie [4] conducted a study on the injury situation in advanced ballet and contemporary dance training, and counted 17 dancers. All dancers were injured within three years, with the most injured parts and tissues being the ankle and muscles, with an injury rate of 17.65% for the ankle and 23.53% for the muscles. The training of dance is very rigorous, and prolonged training by dancers can easily cause muscle, joint, and other injuries. However, there is insufficient research on the closed musculocutaneous nerve injury caused by dance training.

Dance training injuries are very common. After dance training injuries, they not only cause pain, but also directly affect the later training effectiveness of dancers, seriously affecting their career development. Many people have treated dance training injuries through medical means. Ambegaonkar Jatin [5] found that inadequate preparation activities during training are the main cause of training injuries for dancers. Regular rehabilitation training for patients with dance training injuries can extend the dance lifespan of dancers. Swain Christopher TV [6] pointed out that dance is a physical pursuit, and low back pain has been identified as a common health issue among contemporary and classical ballet dancers. Physical medical care and observation of recurrent pain for lower back injuries can help patients recover after injury. Turner [7] found that injuries are common among dancers at all levels, and many severe dancers suffer multiple injuries throughout their careers. Physical therapy is an effective method of injury recovery. Xu [8] explored an experiment based on multifunctional nanomaterial particles to repair waist injuries in sports dance. Thirty dance related injured athletes were selected. The targeted treatment of the waist injury area with multifunctional nanomaterial particles loaded with drugs was much better than direct treatment. Timely surgical treatment and physical intervention for patients with dance training injuries can improve the rehabilitation effect of dancers to a certain extent, but there is a lack of intelligent diagnosis and provision of intelligent rehabilitation plans using artificial intelligence medicine for dance training injuries.

## 3. Treatment of aerobics training injuries

### 3.1. Aerobics training injuries

Aerobics has developed so far, and its techniques have become more and more complex. In order for aerobics students to master dance skills, they need to undergo a long period of training, which leads to a large amount of aerobics training, long training time, and high training difficulty. Sports injuries during training are inevitable, and aerobics training injuries can cause significant injuries to dancers.

The lighter side causes the dancers to be unable to receive training for a period of time, while the heavier side directly reduces the dancers' dance level and even destroys their dance careers.

Aerobics training injuries refer to physical injuries caused by improper execution of technical movements, unreasonable training plans, insufficient physical preparation, poor sports environment or personal physiological factors in aerobics, a sports activity that combines dance, gymnastics and music. This kind of injury may occur in participants of any level from beginners to professional athletes. There are a lot of jumps, kicks and rapid changes in aerobics. If the muscles are not warmed up enough or overused, it may cause muscle strains, which are common in the thighs, calves, waist and back. The ankle and wrist joints are easily damaged due to high pressure when supporting weight and performing complex movements. Incorrect landing, sudden steering, or excessive stretching may cause ligament sprains or tears. High-intensity repetitive training may cause closed myocutaneous nerve damage, affecting forearm and hand function. Stress injuries to the bones of the lower limbs, such as stress fractures, are often caused by repeated high-intensity shocks. Overtraining or wrong movements may cause tendinitis, bursitis, etc., which are more common in the knee, ankle, and shoulder joints. In order to prevent injury, you should fully warm up, use your muscles rationally, and pay attention to the accuracy of technical movements.

Due to the large amount of training, aerobics training can easily cause injuries to dancers during training. There are many reasons for aerobics training injuries [9,10], including the dancer's own reasons, training venue reasons, and unreasonable training. During dance training, the physical fitness of the dancer is the foundation to support their dance training, and aerobics training requires the dancer to possess excellent physical flexibility. However, many dance enthusiasts' physical fitness does not meet the standards. Many dance enthusiasts learn dance after adulthood, and during the dance process, friction between bones can easily cause physical damage. When a dancer's attention is not focused, their body may lose balance during training, leading to joint sprains, falls, and other phenomena.

Aerobics training is a systemic exercise, so before training, dancers need to make sufficient warm-up preparations, such as fully moving joints, awakening the functions of various organs in the body, and increasing the excitement of the dancers. Insufficient warm-up before training is the main cause of aerobics training injuries. This is mainly due to insufficient warm-up, which results in the body's muscles not reaching a certain level of flexibility, which can easily cause muscle strain. Excessive aerobics training is also the main cause of injury. Long term and high load aerobics training can reduce muscle contraction ability, and high load training can make the body very tired. The non-standard training movements are also the main reason for the damage caused by aerobics training. Aerobics training requires high technical skills and requires a high level of physical cooperation from the dancers. Training movements that are not standardized can easily cause damage.

Aerobics training injuries are very common, and the types of injuries are also diverse. By analyzing the training injuries of 200 dance students at Beijing Dance Academy in 2020, the types of aerobics training injuries are shown in **Table 1**.

**Table 1.** Types of aerobics training injuries.

| Damage type | Number of people | Percentage |
|---|---|---|
| Muscle strain | 80 | 40% |
| Joint sprain | 30 | 15% |
| Joint dislocation | 30 | 15% |
| Nerve injury | 60 | 30% |

**Table 1** shows the types of aerobics training injuries, with a total of 4 common types of aerobics training injuries. The maximum number of injuries was 80 due to muscle strain, 60 due to nerve injury, and 30 due to joint sprains and dislocations.

Closed musculocutaneous nerve injury is a common nerve injury caused by pressure or compression within the muscle or fascia. Musculocutaneous nerve injury can result in weak forearm flexion, paralysis of the biceps brachii, and even muscular atrophy, which can cause significant damage to dancers. In high-load aerobics training, closed musculocutaneous nerve injury caused by muscle and fascia compression can cause the dancer to lose the ability to control elbow flexion movements.

Closed musculocutaneous nerve injury has no obvious trauma, and traditional treatment methods are divided into two parts. Early treatment would involve surgical intervention and the use of neuroprotective drugs to protect blood vessels. In the middle and later stages, physical therapy is used, and massage training and some rehabilitation trainings are used to help patients recover from nerve damage. However, traditional treatment methods mainly rely on the experience of doctors for treatment, which makes it difficult to intelligently analyze the specific medical records and treatment reactions of dance injured individuals.

The closed musculocutaneous nerve injury caused by aerobics training can cause serious physical damage to dancers, and it is necessary to actively prevent it during aerobics training. In order to reduce aerobics training injuries, dancers need to strengthen their physical fitness, which is the foundation for supporting dancers to perform difficult movements. In addition, developing a scientific aerobics training plan, arranging training time reasonably, and reducing fatigue during aerobics training are also measures to prevent aerobics training injuries.

## 3.2. Artificial intelligence healthcare

Artificial intelligence [11,12] is a method of simulating and expanding human intelligence, with a wide range of applications. The use of artificial intelligence technology can assist doctors in intelligent diagnosis. With the development of information technology, medical informatization is the result of the times, and medical information can be displayed through data. For example, patient pathological information can be processed and stored in a database, and patient disease information can be obtained through medical imaging. With the increasing attention paid to the medical industry, the combination of artificial intelligence and medical treatment is becoming increasingly close. Intelligent algorithms are used to assist doctors in quickly and accurately diagnosing diseases, improving the effectiveness of disease diagnosis and treatment.

Artificial intelligence healthcare [13,14] is a healthcare platform that enables information exchange among doctors, patients, and medical devices, achieving medical informatization. The functions of artificial intelligence medicine are very comprehensive, which can achieve intelligent analysis of medical images, drug mining, and clinical symptom recording [15,16]. Closed musculocutaneous nerve injury caused by aerobics training is a common type of injury. Artificial intelligence medicine can analyze the patient's condition information and predict the results of treatment with different drugs, thereby assisting in decision-making on the best rehabilitation plan [17,18]. The process of artificial intelligence medical analysis is shown in **Figure 1**.

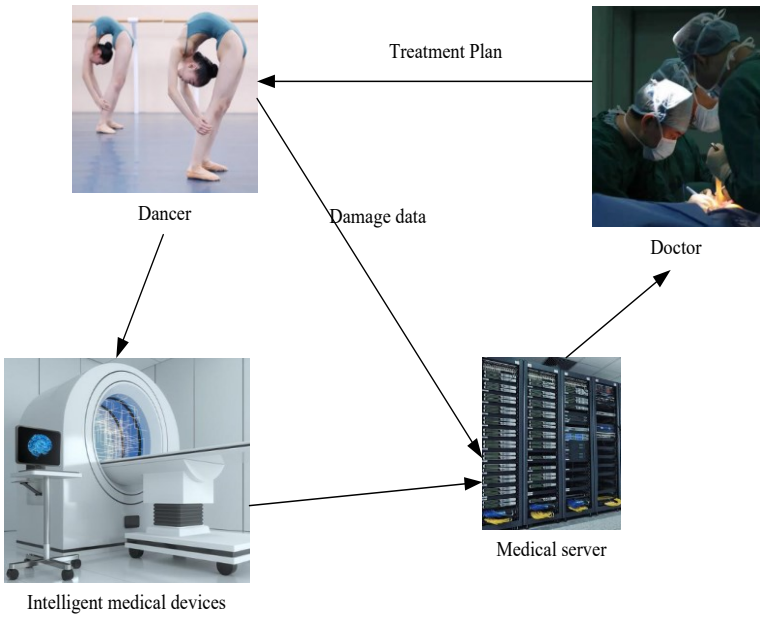


**Figure 1.** Process diagram of artificial intelligence medical analysis.

**Figure 1** shows the process of artificial intelligence medical analysis. The data of dancers' training injuries and the data collected through intelligent medical devices would be stored in the medical server, which can help doctors improve targeted medical solutions under the decision analysis of artificial intelligence algorithms.

The location of closed musculocutaneous nerve injury in aerobics training is relatively hidden, and traditional treatment methods are difficult to accurately analyze the severity of the patient's injury and the specific location of the injury. Artificial intelligence medicine can be well applied to the treatment of closed musculocutaneous nerve injury in aerobics training. Intelligent devices are used to obtain imaging data of the injured person, and artificial intelligence technology is used to intelligently analyze the patient's medical history and diagnostic results.

Artificial neural network is an excellent intelligent analysis algorithm and the main analysis method of artificial intelligence [19,20]. The use of artificial neural networks can accurately analyze medical data of patients with dance induced closed musculocutaneous nerve injury. It is assumed that the patient's medical dataset is $A = (a_1, a_2, \cdots, a_n)$, the medical data includes the patient's imaging information, medical history information, and clinical manifestations and symptoms. If the

connection weight between the medical dataset and artificial neurons is $W = (w_1, w_2, \cdots, w_n)$, then the results of medical data analysis are expressed as:

$$k = \sum_{i=1}^{n} a_i w_i \tag{1}$$

The activation function is expressed as:

$$f(x) = 1/(1 + e^{-x}) \tag{2}$$

The results of artificial neuron processing need to be processed by the activation function, and the results in Equation (1) are brought into the activation function to get:

$$f(k) = 1/(1 + e^{-k}) \tag{3}$$

In addition to achieving intelligent diagnosis, intelligent medicine can also analyze drugs used in clinical applications, thereby improving the effectiveness of clinical medication. Backpropagation neural networks can predict and analyze the accuracy of clinical medication through error feedback [21,22]. The error of the backpropagation neural network is:

$$R = (\sum_{i} (y_{1i} - y_{2i})^2)/2 \tag{4}$$

In Equation (4), *R* represents the error of the backpropagation neural network.

The accuracy of clinical medication analysis can be determined by analyzing the value of error *R*, and the standard for clinical medication analysis of dancer training injuries using backpropagation neural networks is:

$$R \leq r \tag{5}$$

In Equation (5), *r* represents the maximum acceptable error.

Artificial intelligence medicine [23] can also develop rehabilitation plans based on big data analysis, and can also use virtual reality technology to set rehabilitation scenarios and provide rehabilitation training for patients. Artificial intelligence healthcare has created an information-based platform that utilizes intelligent technology to analyze the causes of aerobics training injuries and develop scientific treatment plans [24,25]. Under the artificial intelligence medical system, online consultation and intelligent diagnosis services can also be provided for patients through technologies such as voice recognition [26,27].

Artificial intelligence medicine can intelligently analyze the information of dance injured individuals, and provide targeted treatment for closed musculocutaneous nerve injuries through the analysis of medical data.

## 4. Aerobics training injury treatment experiment

### 4.1. Experimental subjects

In recent years, dance has become increasingly popular. In order to showcase beautiful and professional technical movements, dancers need to undergo long-term aerobics training. However, due to factors such as unscientific training plans, insufficient warm-up before training, and weak physical fitness of dancers, aerobics training injuries occur frequently.

The training volume and duration of aerobics training are large, and the cervical nerves are prone to compression from muscles or fascia during aerobics training,

resulting in closed musculocutaneous nerve injury. The musculocutaneous nerve controls the movement of the shoulder and elbow joints, which weakens the biceps brachii muscle emission after the dancer's injury, seriously affecting the dancer's subsequent training.

Dance is a performing art in which the body coordinates and cooperates. During aerobics training, the body is required to complete various elegant and difficult movements, and aerobics training injuries are inevitable. So, it is very important to treat closed musculocutaneous nerve injury caused by aerobics training. The criteria selected for the experiment were: the patient suffered injuries during training; the patient was diagnosed with closed musculocutaneous nerve injury by the hospital neurology department; the patient had no other training injuries. The exclusion criteria for the experiment are: the patient was not injured due to aerobics training; the patient's injury was diagnosed as not a musculocutaneous nerve injury; the patient has obvious injuries to the head, shoulders, and other areas.

To validly analyze the treatment effect of aerobics training injuries, this article selected 200 patients with musculocutaneous nerve injuries during aerobics training at Beijing Union Medical College Hospital in 2020. The patient's information is shown in **Table 2**.

**Table 2.** Table of patient information selected for the experiment.

| Age | Gender | Number of people | Main cause of injury |
|---|---|---|---|
| [15,20) | Male | 5 | Insufficient warm-up |
| | Female | 9 | |
| [20,25) | Male | 16 | Lack of concentration |
| | Female | 30 | |
| [25,30) | Male | 28 | Large amount of training |
| | Female | 50 | |
| [30,35) | Male | 22 | Large amount of training |
| | Female | 40 | |

**Table 2** shows the information of the selected patients for the experiment. The patients were divided into four age groups, namely [15,20), [20,25), [25,30), and [30,35). Among these four age groups, the number of female patients was higher than that of male patients, mainly due to the higher number of female dancers.

## 4.2. Comparison of treatment effects for aerobics training injuries

The closed musculocutaneous nerve injury caused by aerobics training can severely impair the dancer's ability to control the shoulders and elbows, and if not treated in a timely manner, it may even cause paralysis symptoms. This article conducted aerobics training injury treatment by setting up a control group. The control group used traditional treatment methods. Doctors provided neurological medication treatment based on the patient's condition, and performed physical therapy such as massage and massage when the patient's symptoms improve. The experimental group was based on artificial intelligence medicine and digitizes patient medical history, examination results, and other data. Under the analysis of artificial

intelligence technology, it assisted doctors in diagnosis and analyzed the treatment reactions of different drugs to patients based on intelligent technology, thus providing targeted treatment for patients.

This article compared and evaluated them from four aspects: diagnostic accuracy, drug treatment safety, patient rehabilitation effectiveness, and medical consultation. When analyzing the safety of drug treatment, it can be expressed through two aspects: the incidence of complications and the accuracy of medication. The rehabilitation effect of patients can be analyzed from the rehabilitation effects after 2 months, 4 months, and 6 months of treatment. In order to effectively reflect the effectiveness of medical consultation with different treatment methods, comprehensive considerations can be made from three aspects: satisfaction, convenience, and timeliness of medical consultation.

In this study, a variety of statistical methods were used to evaluate the effect of artificial intelligence medicine in the treatment of nerve damage caused by aerobics training. In order to compare the effects of artificial intelligence and traditional medical treatment, we used a paired sample *t*-test and a Chi-square test to evaluate the differences in diagnostic accuracy, treatment safety, and rehabilitation effects, as well as the incidence of complications. These statistical tests are carried out in the SPSS software. The *t*-test is used to compare the mean of two sets of data, while the Chi-square test is used to evaluate the correlation of categorical variables. At the same time, we use descriptive statistics and visual charts to evaluate patient satisfaction and the convenience of medical consultation. These methods ensure the statistical significance of the research results and demonstrate the advantages of artificial intelligence medicine in terms of diagnostic accuracy, treatment safety and rehabilitation effect. Statistical results show that artificial intelligence medical treatment has significant advantages in the treatment of aerobics training injuries.

## 5. Results

### 5.1. Accurate and effective medical diagnosis

Medical diagnosis is the foundation for doctors to determine a patient's condition. The traditional medical diagnosis method is for doctors to diagnose the condition based on patient information, medical device testing results, and analysis of medical images. In the artificial intelligence medical mode, intelligent technology was used to analyze patient medical history, examination results, imaging manifestations, and other data. The comparison of diagnostic accuracy between traditional medical methods and artificial intelligence medical methods for patients with closed musculocutaneous nerve injury during aerobics training is shown in **Figure 2**.

In **Figure 2A**, the accurate diagnosis effect of traditional medical methods was described, and the accuracy, accuracy, and recall rate of medical diagnosis effect were analyzed. The diagnostic accuracy of the traditional medical approach achieved a lowest of 82% in the first group and a highest of 86% in the third group, for a mean diagnostic accuracy of 84.2%. The diagnostic accuracy of traditional medical methods achieved a lowest of 80% in the first group and a highest of 84% in the second group, for a mean diagnostic accuracy of 82.2%. The diagnostic recall rate of

traditional medical methods achieved a lowest of 74% in the fourth group and a highest of 78% in the first group, for a mean diagnostic recall rate of 75.8%. Traditional medical methods mainly rely on the doctor's own experience for diagnosis, so the accuracy and effectiveness of diagnosis have not reached a high level. In **Figure 2B**, the accurate effect of artificial intelligence medical diagnosis was described. In the artificial intelligence medical mode, the accuracy, accuracy, and recall rate of medical diagnosis were higher than those of traditional medical methods under the same conditions. This was mainly because artificial intelligence medicine can use technologies such as artificial intelligence to intelligently analyze patient condition data and assist doctors in accurate diagnosis. The accuracy of artificial intelligence medical diagnosis achieved a lowest of 94% in the fourth group and a highest of 97% in the second group, for a mean diagnostic accuracy of 95.6%. The average accuracy rate of artificial intelligence medical diagnosis was 94.6%, and the average recall rate of artificial intelligence medical diagnosis was 88.8%. The application of artificial intelligence in medical treatment of closed musculocutaneous nerve injury during aerobics training can effectively improve the accuracy of medical diagnosis.

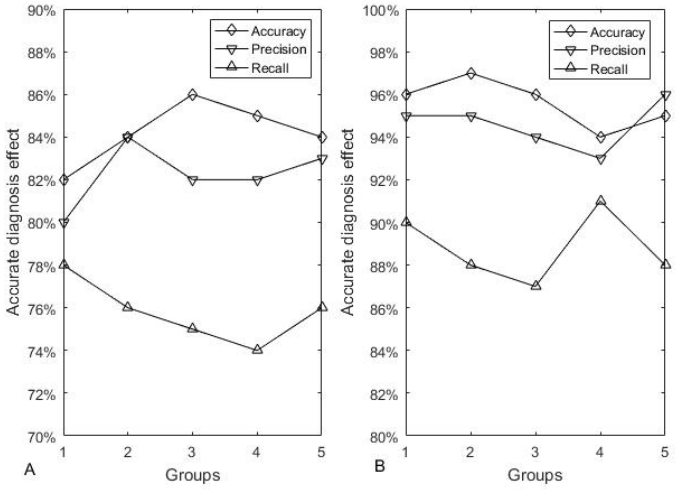


**Figure 2.** Comparison results of medical diagnosis accuracy and effectiveness; **(A)** Accurate diagnosis and effectiveness of traditional medical methods; **(B)** Accurate results of artificial intelligence medical diagnosis.

## 5.2. Drug treatment safety

The musculocutaneous nerve injury caused by aerobics training causes damage to the patient's nerves, which requires treatment with neurotrophic drugs. However, patients with different degrees of illness and physical sensitivity require targeted medication treatment. This article compared the safety of drug treatment between traditional medicine and artificial intelligence medicine, as shown in **Figure 3**.

In **Figure 3A**, the comparison of the incidence of complications between two medical methods was described. When treating musculocutaneous nerve injury, the incidence of complications in artificial intelligence medicine was significantly lower than that in traditional medical methods. This was mainly because intelligent medicine can use artificial intelligence algorithms to predict and optimize medication

plans. The incidence of complications in traditional medical methods achieved a lowest of 5% in the sixth group and a highest of 12% in the second group, for a mean concurrent incidence rate of 7.75%. The incidence of complications in artificial intelligence medicine achieved a lowest of 1% in the ninth group and a highest of 4% in the fifth group, for a mean incidence rate of approximately 2.42%. In **Figure 3B**, the comparison results of the medication accuracy of two medical methods were described. The medication accuracy of artificial intelligence medicine was higher than that of traditional medical methods in all 12 sets of data. This was mainly because artificial intelligence medicine can reduce medication errors by analyzing individual patient histories and treatment reactions. The average medication accuracy of traditional medicine was 86.25%, while the average medication accuracy of artificial intelligence medicine was about 95.08%. Therefore, using artificial intelligence algorithms to analyze the treatment response data of aerobics training injured individuals can effectively reduce the incidence of complications and improve medication accuracy.

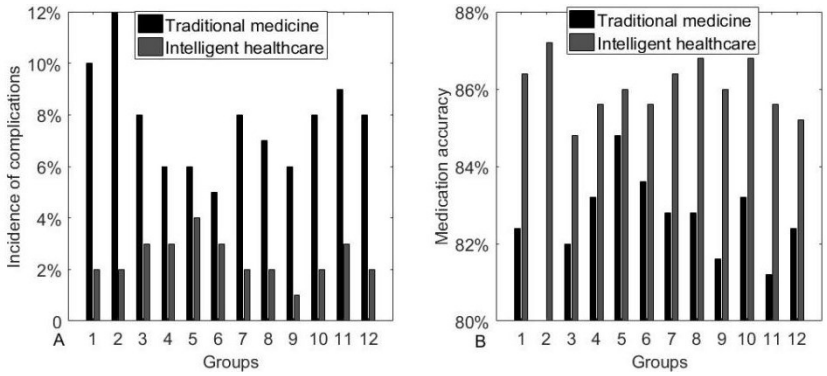


**Figure 3.** Comparison results of drug treatment safety; **(A)** Comparison results of complication incidence rate; **(B)** Comparison results of medication accuracy.

## 5.3. Patient rehabilitation effectiveness

The closed musculocutaneous nerve injury caused by dancer training requires long-term rehabilitation to recover. In order to effectively compare the rehabilitation effects of traditional medicine and artificial intelligence medicine on patients, the rehabilitation effects of patients 2 months, 4 months, and 6 months after treatment were statistically analyzed. The results of the patient's rehabilitation effects are shown in **Figure 4**.

In **Figure 4A**, the rehabilitation effect of patients under traditional medical methods was described. A total of 2 months, 4 months, and 6 months after treatment were counted. The rehabilitation effect of patients was highest in the 6th month, and lowest in the 2nd month. There were certain differences in the rehabilitation effect of different groups of patients, which was related to the degree of musculocutaneous nerve injury and the patient's physical condition. Under traditional medical methods, the average 2-month rehabilitation effect was 20.8%; the average rehabilitation effect in 4 months was 41.8%; the average rehabilitation effect after 6 months was 67.0%. In **Figure 4B**, the rehabilitation effect of patients under artificial intelligence medical treatment was described. The rehabilitation effect of patients under artificial

intelligence medical treatment at 2, 4, and 6 months was higher than that of traditional medical treatment. This was mainly because intelligent medical treatment can automatically adjust the progress of treatment courses by monitoring clinical interaction data, and can timely remind dancers to perform rehabilitation exercises through intelligent technology. Under artificial intelligence medical methods, the rehabilitation effect of patients after 2 months of treatment was the lowest at 38%, the highest at 44%, and the average rehabilitation effect was 41.2%. The average rehabilitation effect of the patient after 4 months of treatment was 76.0%, and the average rehabilitation effect after 6 months was 94.2%. In artificial intelligence medicine, the rehabilitation effect of patients was very high after 6 months of treatment. The application of artificial intelligence medicine for the treatment of musculocutaneous nerve injury can effectively improve the rehabilitation effect of patients.

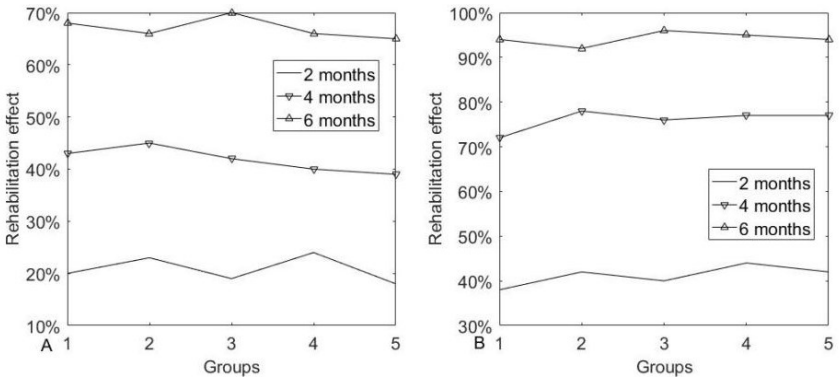


**Figure 4.** Comparison results of patient rehabilitation effects; **(A)** Rehabilitation effects of traditional medical methods; **(B)** Artificial intelligence medical rehabilitation effects.

## 5.4. Medical consultation

The closed musculocutaneous nerve injury caused by aerobics training poses great harm to dancers. Medical consultation is essential for the treatment of musculocutaneous nerve injury. Traditional medical consultation requires face-to-face consultation and communication with doctors in the hospital consultation room. The medical consultation results of traditional medical methods and artificial intelligence medicine are shown in **Figure 5**.

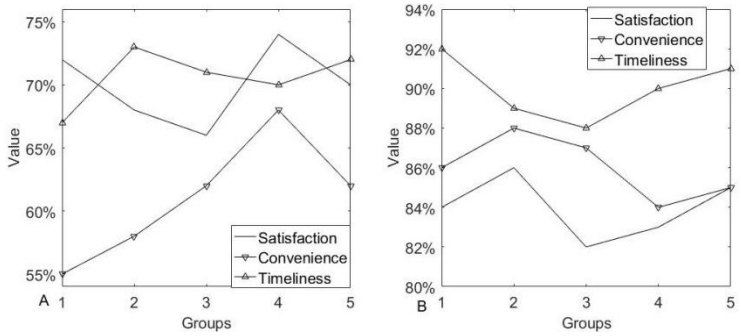


**Figure 5.** Comparison results of medical consultation; **(A)** Traditional medical consultation; **(B)** Artificial intelligence medical consultation.

In **Figure 5A**, the results of traditional medical consultation were described, and patient satisfaction, convenience, and timeliness of medical consultation were analyzed. The satisfaction of patients with traditional medical consultation was not very good. The satisfaction rate achieved a lowest of 66% in the third group and a highest of 74% in the fourth group, for a mean satisfaction rate of 70.0%. The satisfaction rate of patients with medical consultation was not high, mainly due to the need for traditional medical consultation to bring patients to the medical consultation room and the need for long queues. The convenience of traditional medical consultation achieved a lowest of 55% in the first group and a highest of 68% in the fourth group, for a mean convenience of 61.0%. The average timeliness of traditional medical consultation was 70.6%. In **Figure 5B**, the results of artificial intelligence medical consultation were described. The satisfaction of patients with artificial intelligence medical consultation achieved a lowest of 82% in the third group and a highest of 86% in the second group, for a mean satisfaction of 84.0%. The average convenience of artificial intelligence medical consultation was 86.0%, and the average timeliness of artificial intelligence medical consultation was 90.0%. Artificial intelligence medicine can provide diversified medical services and online medical consultation services through intelligent technology, thereby improving the convenience of medical consultation for patients with closed musculocutaneous nerve injury caused by aerobics training.

Finally, this article also uses statistical analysis to construct a table to show the confidence interval and *p*-value. The results are shown in **Table 3**:

**Table 3.** Confidence interval and *p*-value.

| Test type | Method | Average value | Confidence interval (95%) | *p*-value |
|---|---|---|---|---|
| Diagnostic accuracy | *T*-test | 84.2% | 82.5%–85.9% | <0.001 |
| Diagnostic accuracy | *T*-test | 95.6% | 94.3%–96.9% | <0.001 |
| Incidence of complications | Chi square test | 7.75% | 5.2%–10.3% | <0.001 |
| Incidence of complications | Chi square test | 2.42% | 1.3%–3.5% | <0.001 |
| Medication accuracy | *T*-test | 86.25% | 84.1%–88.4% | <0.001 |
| Medication accuracy | *T*-test | 95.08% | 93.8%–96.3% | <0.001 |
| Rehabilitation effect (2 months) | *T*-test | 20.8% | 18.5%–23.1% | <0.001 |
| Rehabilitation effect (2 months) | *T*-test | 41.2% | 39.3%–43.1% | <0.001 |
| Rehabilitation effect (4 months) | *T*-test | 41.8% | 39.5%–44.1% | <0.001 |
| Rehabilitation effect (4 months) | *T*-test | 76.0% | 73.8%–78.2% | <0.001 |
| Rehabilitation effect (6 months) | *T*-test | 67.0% | 64.6%–69.4% | <0.001 |
| Rehabilitation effect (6 months) | *T*-test | 94.2% | 92.3%–96.1% | <0.001 |

Based on the data in **Table 3**, we have analyzed in depth the effects of AI medical and traditional medical treatment in the treatment of nerve damage caused by aerobics training. The diagnostic accuracy rate of AI medical care is as high as 95.6%, which is significantly higher than that of traditional medical care at 84.2%. At the same time, the complication rate of AI medical care is only 2.42%, which is much lower than the 7.75% of traditional medical care. In terms of the accuracy rate of drug treatment, AI medical care has also shown significant advantages, with an

accuracy rate of 95.08%, while traditional medical care is 86.25%. In addition, judging from the rehabilitation effect, the rehabilitation effect of AI medical treatment at 2 months, 4 months and 6 months is significantly better than that of traditional medical treatment. Specifically, the rehabilitation effect of AI medical care at 2 months was 41.2%, while that of traditional medical care was only 20.8%; at 4 months, the rehabilitation effect of AI medical care increased to 76%, while that of traditional medical care was 41.8%; at 6 months, the rehabilitation rate of AI medical care was as high as 94.2%, while that of traditional medical care was 67%.These data fully show that AI medical care is significantly superior to traditional methods, whether in the diagnosis, treatment or rehabilitation stages. Therefore, it can be concluded that AI medical methods have significant advantages and practical application value in the treatment of nerve damage caused by aerobics training.

This research focuses on the common problem of closed muscle skin nerve injury in aerobics training, and innovatively integrates cutting-edge artificial intelligence (AI) medical technology into its treatment process. At Beijing Union Hospital, we carefully selected 200 patients as trial subjects, and used a randomized controlled trial design to divide participants into two treatment groups. The experimental group introduced an AI-assisted medical intervention model. In the experimental group, the deep integration of AI technology completely revolutionized the treatment process. First of all, key information such as patient medical records and examination results is efficiently transformed into digital assets, laying a solid foundation for subsequent intelligent analysis. Subsequently, with the help of advanced AI algorithms, these data were deeply mined, not only improving the accuracy and speed of diagnosis, but also assisting doctors to make more accurate treatment decisions. In addition, the AI intelligent algorithm further optimizes the drug treatment plan. Through predictive analysis and personalized adjustment, the risk of improper medication is greatly reduced, and the safety and effectiveness of treatment are ensured. Comparative analysis shows that the treatment group using AI medical methods has shown significant advantages in diagnostic accuracy, and has achieved a significant jump compared to traditional medical methods. This achievement not only validates the great potential of AI in the field of medical diagnosis, but also brings more reliable diagnostic guarantees to patients. At the same time, the intervention of AI technology has also actively promoted the safety and accuracy of drug treatment, effectively reduced the occurrence of complications, and laid a more solid foundation for the patient's rehabilitation.

AI has unique advantages over other technologies in the treatment of muscle and skin injuries. It can process complex data, provide accurate diagnosis and treatment recommendations, and reduce expenses through personalized programs. Compared with robotics, AI is cheaper because it does not require expensive equipment and relies only on software and data analysis.AI is also easy to integrate into electronic health systems, instantly supporting doctors without large-scale transformation. However, medical staff need to be trained to use AI correctly. In short, AI has significant advantages in the treatment of skin damage due to its high diagnostic accuracy, low cost and easy implementation, especially to improve rehabilitation efficiency and patient satisfaction.

## 5.5. Discussion

This paper delves into the application value of artificial intelligence medicine in the treatment of closed myocutaneous nerve injury in aerobics training, paying special attention to its role in molecular and cellular biomechanics. Through molecular and cellular biomechanics, we have revealed the microscopic mechanism of closed myocutaneous nerve injury. AI technology uses these mechanisms to provide a scientific basis for personalized treatment options. In rehabilitation, AI combines the individual injury situation to formulate a precise training plan to avoid re-injury and promote nerve regeneration. AI can also analyze changes in biomarkers in the injured area, monitor the nerve regeneration process, and ensure timely adjustment of treatment options. Cellular biomechanics guides AI to optimize the mechanical parameters of training and improve the adaptability of muscles and nerves.

AI medical uses big data analysis to integrate patient injury cases to establish a predictive model for closed myocutaneous nerve injury, which can warn of potential injury risks. Intelligent algorithms predict medication plans, improve the efficiency and safety of drug treatment, and evaluate based on individual molecular information. Although studies have shown that AI medical care is superior to traditional methods, more sample verification is required. In the future, new advances in molecular and cellular biomechanics, such as the role of glial cells and the influence of extracellular matrix changes on nerve conduction, can be combined to develop more refined and personalized treatment strategies.

Artificial intelligence medicine combines molecular and cellular biomechanics to provide an innovative perspective for the treatment of closed myocutaneous nerve injury in aerobics training, not only improving the accuracy of diagnosis and treatment, but also promoting the intelligence and personalization of the rehabilitation process, which provides a powerful tool for protecting the health of dancers and prolonging their artistic careers. In the future, with the advancement of technology and the accumulation of data, AI will show greater potential in the field of dance injury treatment.

The combination of artificial intelligence medicine and molecular and cellular biomechanics has brought a new perspective to the treatment of closed myocutaneous nerve injury in aerobics training. This improves the accuracy of diagnosis and treatment, while promoting the intelligence and personalization of rehabilitation, effectively protecting the health of dancers and prolonging their artistic careers. Looking to the future, with the continuous progress of technology and data, the potential of AI in the treatment of dance injuries will be even greater, and it is expected to bring more innovations and breakthroughs to this field.

Artificial neural networks (ANNs) are widely used in medical fields such as cancer detection and disease diagnosis due to their powerful data processing and automatic feature extraction capabilities [22,23]. It can recognize subtle patterns from complex medical images and patient data. Compared with other machine learning models, ANNs is better at processing nonlinear relationships and high-dimensional data, which is essential for understanding and predicting complex biomedical phenomena [24,25]. ANNs was selected for this study because it can

efficiently analyze medical image data, assist doctors in accurate diagnosis, and predict and optimize treatment plans through intelligent algorithms to achieve personalized treatment. For example, there are cases where ANNs is used to analyze MRI images of the brain to diagnose brain tumors, which has a significant effect. However, ANNs also has limitations, such as the need for a large amount of high-quality data and insufficient model interpretability. In the future, it can be explored to combine ANNs with other machine learning technologies, such as integrated learning, and expand the data set to improve diagnostic accuracy and model generalization capabilities.

This paper innovatively applies AI medical technology to the diagnosis and treatment of closed myocutaneous nerve injury in aerobics training. Combining molecular and cellular biomechanical research, the microscopic mechanism of the injury is revealed, which provides a scientific basis for personalized treatment. AI not only improves the accuracy of diagnosis, but also makes rehabilitation smarter and more personalized, helping to recover and avoid re-injury. At the same time, AI can monitor nerve regeneration and adjust treatment in time. Cell biomechanics guide AI to optimize training parameters and improve muscle and nerve adaptability. In addition, AI uses big data analysis to establish injury prediction models, warn of risks, and predict medication to improve treatment efficiency and safety. This research not only has theoretical value, but also helps practice, protects the health of dancers, and prolongs their artistic careers. In the future, with the advancement of technology and data, AI will show greater potential in the field of dance injury treatment and bring more innovative breakthroughs.

The above article focuses on the immediate effect of AI in the treatment of closed myocutaneous nerve injury caused by aerobics training, but the long-term impact is not discussed enough. In order to in-depth evaluate the long-term effects of AI treatment, future research should continue to track the rehabilitation of patients and collect data on the length of rehabilitation, recurrence rate and quality of life. For example, through long-term follow-up, evaluate the rehabilitation status of patients one to several years after receiving AI treatment, and explore whether AI can effectively reduce the recurrence rate of injury and improve the quality of life. At the same time, explore the long-term role of AI in reducing the risk of future injuries, improving the overall health of patients, and prolonging their careers, in order to more comprehensively reveal the long-term value of AI treatment. In order to comprehensively evaluate AI technology, its application and effect in a wider range of injuries such as joint sprains and muscle strains should be studied in the future. At the same time, patients' attitudes and feedback on new technologies are essential to evaluate the practical application of AI, but the research is not involved. In the future, it is necessary to consider patient privacy and data security concerns, collect their views and treatment experience, in order to better understand patient needs and promote the popularization of technology. This will help to comprehensively evaluate the value and feasibility of AI in the treatment of different injuries.

## 6. Conclusions

Dance is a performing art. With the increasing competition in the dance industry,

dancers need to spend a lot of time and energy on training. Dance requires high physical fitness and requires long-term and sustained training, which leads to frequent injuries to dancers. Many dance movements involve shoulder and arm movements. During high-intensity exercise, dancers can cause tension in the neck muscles, resulting in closed musculocutaneous nerve damage. Targeted treatment for dancers is very important. This article selected 200 patients with closed musculocutaneous nerve injury caused by aerobics training and compared them with traditional medicine and artificial intelligence medicine. The results show that artificial intelligence healthcare is effective in improving the accuracy of medical diagnosis, optimizing medication regimens, improving patient recovery outcomes and providing smarter medical consultation services by using intelligent technologies to analyze patient history and imaging data. With the development of artificial intelligence technology, the integration of artificial intelligence with the medical industry is becoming increasingly close. It can achieve medical data informatization and assist doctors in accurate diagnosis under the analysis of intelligent technology. Intelligent analysis of closed musculocutaneous nerve injury caused by aerobics training using artificial intelligence medicine can effectively promote patient recovery.

This study demonstrates the advantages of AI medical in the treatment of closed myocutaneous nerve injury in aerobics training, but the sample size and diversity are limited. Only 200 patients from Beijing Union Hospital were selected, which may not be enough to represent all situations. And the samples mainly come from specific regions, which limits the general applicability of the results. In the future, a larger and more diverse sample should be considered, including people of different ages, genders, and training levels. This will improve the reliability and universality of the results, help understand the effects of AI technology in different environments, and provide effective prevention and treatment options for aerobics training injuries around the world. In addition to the above sample problems, the application of AI technology in clinical practice also faces practical challenges and cost issues. The introduction of AI requires upgrading medical facilities to support hardware requirements, which involves expensive retrofits. Employees also need special training to correctly manipulate and interpret AI data, which generates additional costs.AI system integration may encounter technical compatibility issues, which takes time and resources. But in the long run, AI technology can significantly improve the effectiveness of diagnosis and treatment, reduce the rate of misdiagnosis, and reduce unnecessary examinations, thereby reducing overall medical costs and improving efficiency. Personalized treatment reduces hospitalization time and brings economic benefits. Therefore, despite the challenges, the application of AI in medical care still has great potential and long-term value. The above article discusses the application of AI in the treatment of nerve damage caused by aerobics training, but the technical details are insufficient. In order to improve the transparency and repeatability of research, more detailed AI model information, such as neural network structure and training algorithms, should be provided in the future, and hyperparameter settings should be clarified. At the same time, it is necessary to explain the source, scale and availability of the data set, and disclose the research code to facilitate peer review and verification. These measures will enhance the trust

of the scientific community and promote the development of this field.

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