# Real Time Monitoring Method of Exercise Load in Dance Training Course Based on Intelligent Device

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**Abstract.** Because of the heavy exercise load in dance training class, students' bearing capacity is different. In order to better scientifically guide the movement of dance training classes, a real-time monitoring method of exercise load in dance training classes based on smart devices is proposed. Combined with smart devices, it collects and manages a large number of physical fitness indicators of dance training, and uses heart rate changes as load evaluation indicators. Real-time acquisition of the movement status of dance training courses and real-time monitoring. Finally, it is confirmed by experiments that the real-time monitoring method of exercise load in dance training courses based on intelligent equipment has high practicability in practical application, so as to meet the research requirements.

**Keywords:** Intelligent equipment · Dance training · Exercise load · Exercise monitoring

## 1 Introduction

Dance teaching is an indispensable part of physical education reform and basic education. It is not only an important way to enhance students' physique, but also an important part of current quality education. Since the reform and opening up, China's dance teaching has developed continuously and experienced an all-round evolution process. The effect of dance teaching greatly affects the physical development of students [1]. The exercise load of dance training is monitored and analyzed in real time. Exercise load is an important factor affecting the process of body metabolism and energy consumption and recovery. Making effective use of training time and reasonably arranging exercise load is an important aspect to measure teaching quality and improve teaching effect [2]. In club teaching and daily teaching, we should comprehensively analyze the physiological characteristics of objective groups participating in sports, and study the effective physiological load value, threshold and suitable exercise intensity, which is not only conducive to the use of specific quantitative standards to guide dancers in training. Moreover, it is conducive to students' practice, provide reference for reasonable curriculum arrangement, and guide dance lovers to reasonably select dance content with appropriate load for training [3].


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Literature [4] obtains the health status of community residents and analyzes the influencing factors based on the intelligent health monitoring system. According to the analysis results, the health status of community residents is good, and psychological problems such as anxiety and depression are widespread, which reminds community residents to pay attention to mental health. For the elderly, irregular meals, salty diet, regular drinking and no vigorous exercise, the intelligent health monitoring system detects that they are prone to chronic diseases, and suggests that community residents formulate health improvement measures by referring to the influencing factors of chronic diseases. By analyzing the physiological and psychological changes of the elderly, literature [5] uses 3D software to build a digital model of the health detection integrated machine, analyzes the human-computer interaction behavior under different functions, improves the design of key parts in combination with the force analysis results, and verifies the comfort of the elderly using the improved detection integrated machine through simulation tests.

In order to better achieve the purpose of exercising and strengthening physique, this paper studies the real-time monitoring method of exercise load in dance training classes, collects the load data of dance training through intelligent devices, takes the change of heart rate as the load evaluation index, obtains the exercise state of dance training classes, and realizes real-time monitoring. The experiment verifies that the intelligent device gives a reasonable training scheme according to the formulation of the best load monitoring index. Using intelligent equipment to carry out real-time quantitative monitoring and analysis of key physical indicators has positive significance in practical applications.

## 2 Real Time Monitoring Method of Exercise Load in Dance Training Class

### 2.1 Exercise Load Data Management of Dance Training Course

The purpose of dance training is to provide a kind of stimulation, which can effectively improve the competitive performance of dancers, so as to obtain better sports performance. The competitive performance of dancers is the embodiment of their competitive ability level in training and competition, which reflects the harmonious accumulation of the functions of intelligent devices inside the body after training, and shows the sports quality and technical level of dancers [6]. In order to actively meet the requirements of real-time monitoring of exercise load in dance training class, it is necessary to manage the exercise load data of dance training class, and coaches should establish a delicate balance between arranging training load and recovery. Dancers receive intelligent devices and repetitive exercise loads in order to induce adaptability matching the required functions, such as delaying the occurrence of fatigue, increasing power output, improving exercise coordination or reducing the risk of injury. This paper holds that the quality of training results depends on the type and quantity of stimuli, so understanding the causal relationship between training load dose and response is very important for dance training [7]. Taking the heart rate data during dance training as an example, during exercise load monitoring, it is mainly divided into quiet heart rate and exercise heart rate according to different exercise states. The quiet heart rate can be detected with the teacher about

10 min before class and entered into the intelligent device. Since the quiet heart rate is relatively stable, you can also follow the recent normal quiet heart rate. The real-time collection process of exercise load monitoring data is mainly based on the sensors of intelligent devices such as heart rate meters. In order to reuse the equipment, the equipment information needs to be tied with students before class [8]. In order to avoid human error and improve binding efficiency, this paper uses intelligent device RFID tag to simplify the operation. That is, two RFID tags containing student information and heart rate meter information will be distributed before class. Students will stick them on the heart rate meter and bind the equipment through RFID scanning. The heart rate meter is bound with the smart device Bluetooth in advance. The student starts to receive data after wearing the heart rate meter until the student removes and returns the heart rate meter. The data transmission of exercise heart rate meter is completed through the Internet of things. The main transmission process is shown in Fig. 1. The basic data of dance training load data collection and management is that after collecting the state data of dance training, heart rate and other sports data collected by each student, the current age is calculated according to the student's birth date, and the student's age and gender are called from the database to match the parameter values to the core parameters such as the target rate, and then the current load intensity is calculated.

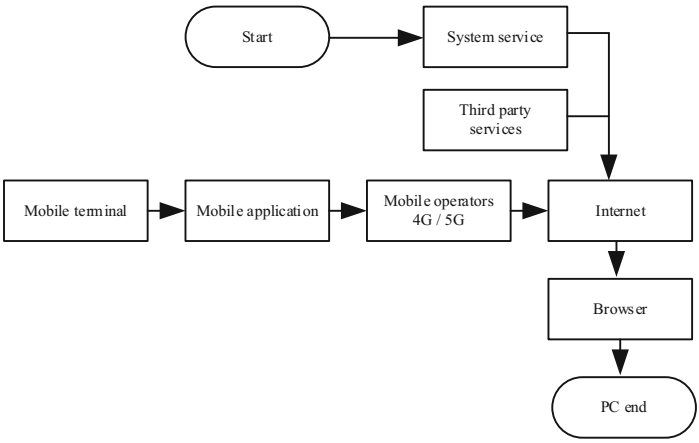


**Fig. 1.** Data acquisition process of dance training load based on intelligent device

The concept of exercise load based on intelligent devices is based on the mutual adaptation of exercise forms and physical function changes. The fundamental purpose of monitoring and adjusting exercise load is to scientifically and effectively organize and adjust the factors related to the mutual adaptation of physical function and exercise behavior, so as to improve the effectiveness, pertinence and safety of training. The focus of dance training load is the change of body state caused by sports behavior and the stress response of the body to the process of dance training. The stimulation of sports to the body has both physiological and psychological aspects. The stimulation to the body in the process of dance training is higher than that in the state of daily life. The relationship between external stimulation and physiological load is shown in Fig. 2.

External stimulation is divided into physical stimulation and psychological stimulation, exercise load is divided into physiological load and psychological load, and the arrow in Fig. 2 indicates causality.

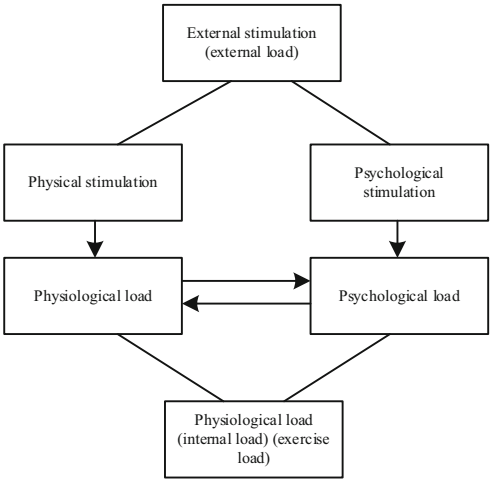


**Fig. 2.** Relationship between external stimulation and physiological load of dance training

The smart device sensing layer is composed of various sensors and sensor gateway architectures, as shown in Fig. 2. Including carbon dioxide concentration sensor, temperature sensor, humidity sensor, QR code label, smart device label, reader, camera, GPS and other sensing terminals; It also includes vital sign acquisition terminals such as heart rate meter, sphygmomanometer and blood glucose meter. The function of the intelligent device perception layer is equivalent to the nerve endings of human eyes, ears, nose, throat and skin. It is the source of the Internet of things to identify objects and collect information. Its main function is to identify objects. The intelligent device information collection network layer is composed of various private networks, the Internet, wired and wireless communication networks, network management intelligent devices and intelligent device platforms, which is equivalent to human nerve center and brain, Responsible for transmitting and processing the information obtained by the perception layer. The intelligent device application layer is the interface between the Internet of things and users. It combines the needs of the industry to realize the intelligent application of the Internet of things. The application of exercise heart rate monitoring intelligent device belongs to the vital sign monitoring part of intelligent health, which can be divided into nursing (Fig. 3).

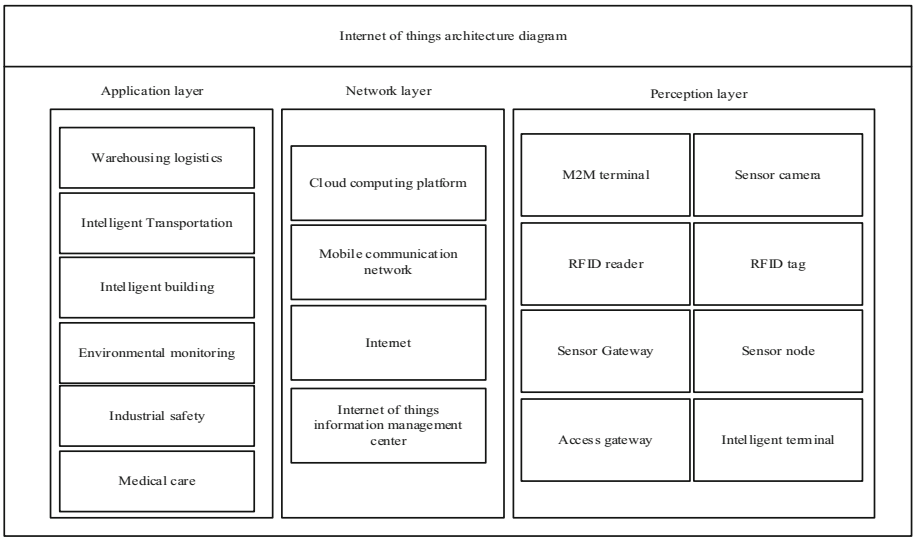


**Fig. 3.** Intelligent monitoring and management architecture of dance training load

According to the requirements of intelligent devices, flexibly select the appropriate intelligent device architecture. Use intelligent equipment to monitor the exercise load of heart rate. The speed of heart rate can well reflect the intensity of exercise. Next, it shows the rationality of using heart rate index to monitor exercise load. This paper studies the exercise load from the two aspects of "load" and "load intensity", and the load intensity is the most important content of studying the exercise load, and explains the rationality of the phenomenon that the utilization index is widely used to monitor the exercise load according to the research results of predecessors.

## 2.2 Evaluation Index of Exercise Load in Dance Training Course

As far as China is concerned, professional dancers have no other work and income except participating in competitions and training, but professional dancers are not employed by professional dance clubs, do not participate in professional competitions, and do not obtain additional income through participation. Therefore, the remarkable feature of professional dancers is that they belong to a group, with special intelligent equipment training, special guidance, strong knowledge and professionalism, and a large amount of training. Amateur dancers refer to those who use their spare time outside their own work for the purpose of fitness or leisure hobbies. Their remarkable feature is that they generally do not have the guidance of professional coaches and are purely for personal hobbies. Most of the training funds, equipment and competition fees are obtained by raising or soliciting sponsorship or even donations. They often have their own formal jobs and have to go to work to make a living after the competition, After achieving good results, of course, you can also get some sponsorship or participate in other image endorsement activities. Professional is result oriented, amateur is interest oriented, so

professional dancers can earn income through training and competition without considering other work pressure; For amateur dancers, dance is only a way to obtain physical and mental health benefits, not a career or a means of making a living. Figure 4 shows the factors that affect the load of dance training and lead to overtraining, disease and injury.

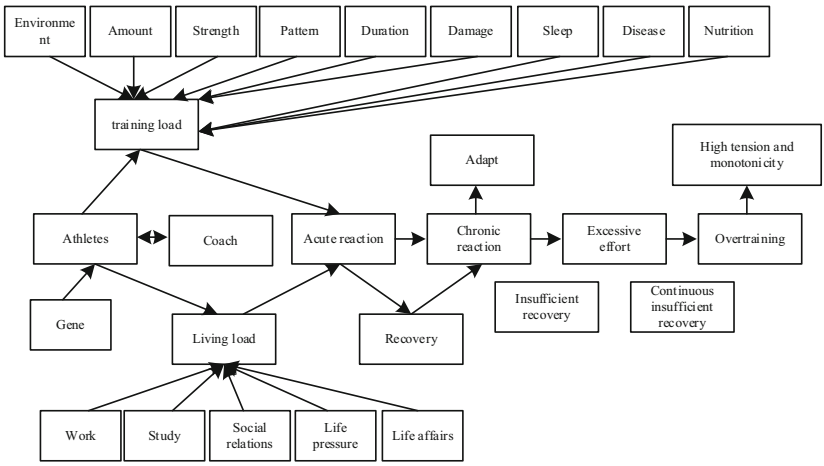


**Fig. 4.** Factors affecting dance training load and leading to overtraining, disease and injury

Although it is pointed out that load is "the impact of exercise and non exercise stimulation on human biological intelligent devices at different times" until 2020, load monitoring has a history of nearly a century: by the 1980s, indicators such as blood lactic acid, creatine kinase and maximum oxygen uptake can be easily measured by portable devices, which further enriched the means of load monitoring. With the rapid development of science and technology, advanced wearable devices came into being. A series of more convenient physiological and biochemical monitoring technologies have been continuously developed, and the means of load monitoring have been greatly expanded. In training, exercise load refers to the accumulated pressure that individuals bear in competition or training over a period of time. According to the source of monitoring indicators, exercise load can be classified into external load and internal load; According to the attributes of monitoring methods, exercise load is divided into objective evaluation and subjective evaluation; According to the statistical processing method of monitoring, sports load can also be divided into absolute load and relative load. See Table 1.

Taking the heart rate as the load evaluation index for research, in the actual dance training process, the physiological condition *YR* and psychological condition *AR* of the human body will affect the exercise load intensity *AGE*. The exercise load monitoring model needs to establish a self-learning mechanism. The self-learning target rate measurement method of maximum heart rate index *MR* is:

$$FQ = \frac{YR - AR}{MR - AGE} \tag{1}$$

**Table 1.** Classification of dance training load and common indicators

| Classification basis | Load category | Definition | Common indicators |
|---|---|---|---|
| Indicator source | External load | Individual work | Duration, times, speed, acceleration, distance, times of throwing or changing direction, jump height, weight, etc. |
| | Internal load | The body's response to certain stimuli | Heart rate, blood lactic acid, testosterone, cortisol, RPE, self recovery scale, emotional state scale, etc. |
| Method properties | Objective evaluation | Evaluation not based on individual subjective will | Heart rate, blood lactic acid, testosterone, cortisol, speed, acceleration, distance, etc. |
| | Subjective assessment | The evaluation is mainly based on individual psychological activities and influenced by psychology | RPE, self recovery scale, emotional state scale, etc. |
| Statistical analysis | Absolute load | Load accumulation over a period of time | Daily load, weekly load, monthly load, season load, etc. |
| | Relative load | Relative change of load over a period of time | Weekly load change rate, weekly load change amount, acute and chronic load ratio, etc. |

The maximum heart rate monitoring identification index is converted to:

$$R = \frac{YR - AR}{MFQ + PFQ} + AGE \tag{2}$$

Among them, exercise heart rate $MFQ$ and quiet heart rate $PFQ$ are the collected data, age is the objective data, and the maximum heart rate index is the reference index. By default, "maximum heart rate index - age" is used. That is, the maximum heart rate calculated in general. Using intelligent devices to calculate the maximum heart rate is an international customary method, which is applied to people of all ages. When applied to students, there may be some deviation. The exercise heart rate monitoring intelligent

device involves embedded, Android, web application and other related technologies, and it is necessary to organically combine all parts into a coordinated intelligent device to jointly complete the exercise heart rate monitoring service. On the whole, the intelligent device is divided into three parts: heart rate acquisition module, Android application and web service. Next, the overall operation process of the intelligent device is described from the perspective of the overall data flow. Part of the data flow is shown in Fig. 5.

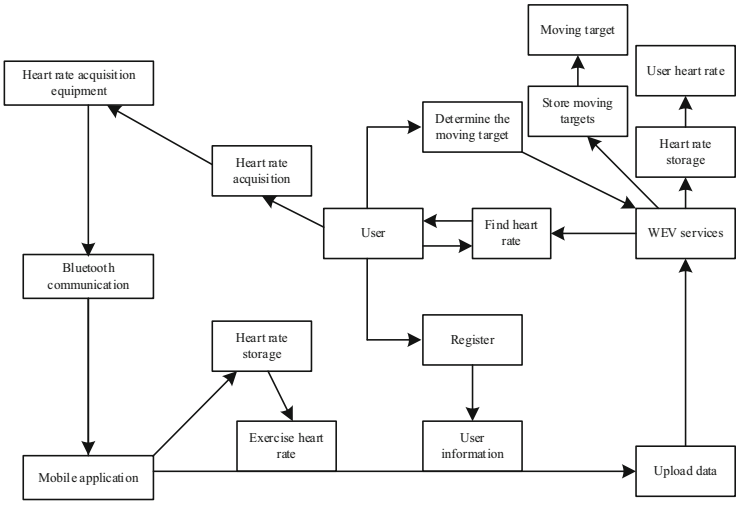


**Fig. 5.** Data processing flow chart of exercise heart rate monitoring intelligent device

The heart rate acquisition equipment should complete real-time heart rate acquisition. First collect the pulse information, and then obtain the time t for each pulse from the pulse information. The heart rate HR = 60t. The heart rate filtering algorithm is used to filter the collected heart rate information numerically. Finally, the filtered data is sent to the mobile phone heart rate acquisition module through Bluetooth and smartphone communication. The hardware framework design is shown in Fig. 6.

According to the formula converted to calculate the maximum heart rate, it can be seen that the exercise heart rate and quiet heart rate can be directly collected, and the load intensity is obtained through RPE. The maximum heart rate index $a_{u1}$ is calculated through this formula. The data of students of different gender and age are grouped. When the data conforms to the normal distribution $a_{zel}$, the expected value (mean) is the maximum heart rate index of students of that gender and age, Finally, the maximum heart rate index corresponding to different gender and age is obtained, and a more objective and practical maximum heart rate index is used in practical application. The purpose of this paper is to explore the research progress of sports load monitoring in training from the perspective of external load $a_{y-1}$ and internal load $a_{y1}$, combined with the differences of method attributes and statistical analysis:

$$HRV = \sqrt{\frac{\left(a_{y1} - a_{y-1}\right)^2 + \left(a_{u1} - a_{zel}\right)^2 + RPE}{100R}} \tag{3}$$

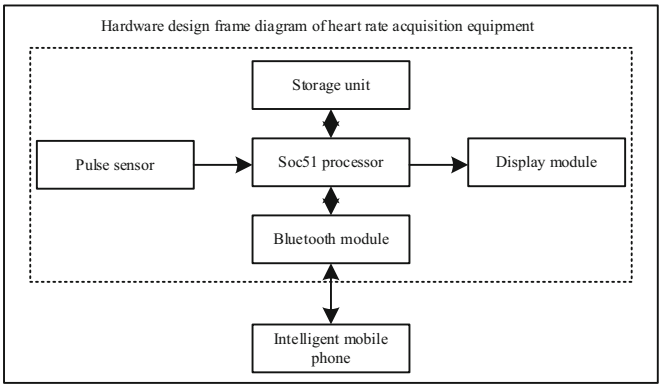


**Fig. 6.** Heart rate acquisition equipment

When the training load decreases, *HRV* will accelerate; When *HRV* decreases, it is usually related to the increase of training load, especially when the load increases rapidly (5% ± 2%), *HRV* decreases, which indicates excessive load. However, some studies have found that when the training load increases, *HRV* also increases. When the subjects are in acute fatigue, *HRV* will increase, while when the subjects are in chronic fatigue, *HRV* will decrease.

### 2.3 Realization of Load Monitoring of Dance Training Course

The purpose of studying the load monitoring intelligent device of dance training course is to help athletes monitor their exercise status in real time and for a long time, and adjust the exercise load in time according to the exercise heart rate, so as to avoid poor exercise effect due to insufficient exercise intensity or sports injury caused by excessive exercise, so as to achieve good exercise effect. Interpreting the research goal of intelligent device, this paper can get its basic needs: monitoring real-time heart rate, This is the requirement of intelligent device sensor sensitivity and heart rate acquisition algorithm; It can monitor heart rate for a long time, which is the demand for data storage and analysis of intelligent acquisition equipment and dancers' adherence to heart rate monitoring; It can detect the exercise heart rate, which requires the portability or wearability of the exercise heart rate acquisition device; It can view the exercise heart rate in real time, which is the demand for the real-time display of the exercise heart rate monitoring intelligent device. It is the core demand to adjust the exercise load in time according to the exercise heart rate. This demand requires the intelligent device to give a reasonable theoretical model and operable scheme of using the exercise heart rate to monitor the exercise load. The functional module of the intelligent device is designed according to the demand analysis of the intelligent device, as shown in Fig. 7:

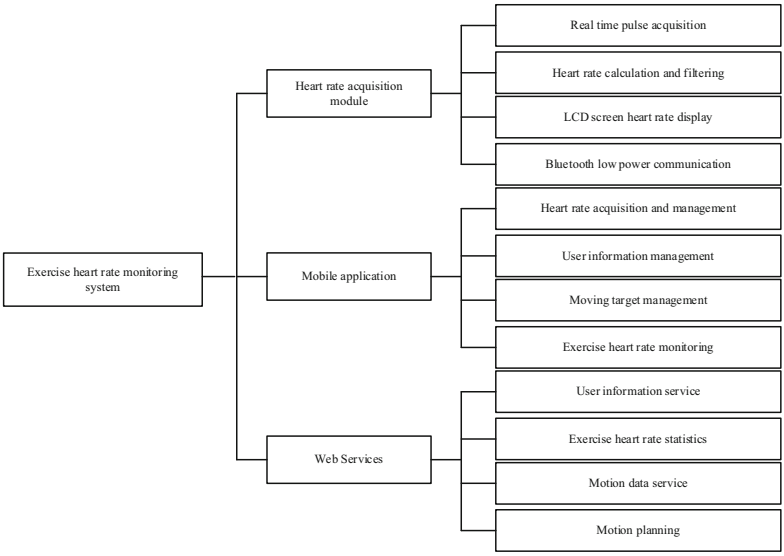


**Fig. 7.** Functional structure of exercise heart rate monitoring intelligent device

Many experts in the field of dance training in China conduct important research on load. Whether the scientific evaluation of training load, competition load or fitness load should include qualitative and quantitative parts, which are interdependent and inseparable. Quantitative evaluation is meaningful only on the basis of qualitative evaluation. Qualitative evaluation can only have correct evaluation on the basis of quantitative evaluation. The "qualitative" without "quantitative" basis is inaccurate and "qualitative", which may make the training deviate from the correct direction due to the accuracy of evaluation, while the "quantitative" without "qualitative" is also incomplete and lacks the description of key information. Figure 8 shows the selected exercise load evaluation system.

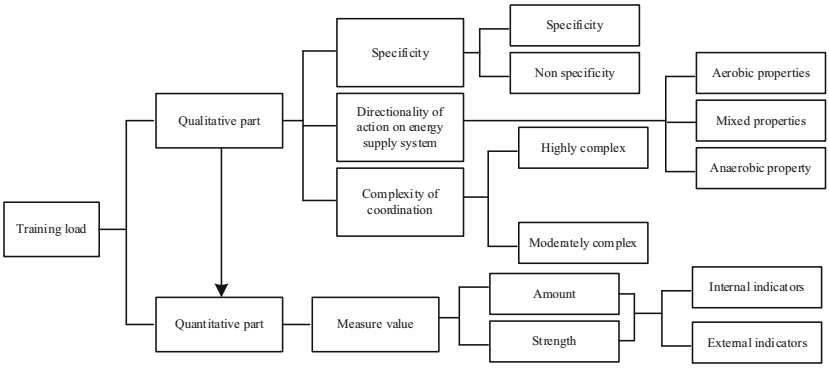


**Fig. 8.** Evaluation of exercise load

The essence of dance training is to apply appropriate exercise load stimulation to the dancer's organism artificially, purposefully and according to the plan, so as to make it produce the expected adaptive changes. The exercise intensity, exercise duration and exercise frequency are the three factors affecting the load. A full grasp and understanding of them and reasonable arrangement can achieve the best effect of dance training. The duration and frequency of exercise are easy to control, but the intensity of exercise is difficult to grasp. Exercise intensity is not only the external load imposed by the coach in the training class, but also the real reaction of these external loads on the dancer's organism, which is also called internal load. Therefore, the trainer can regard the training load as all the impulse borne by the dancer. According to the historical records of students in all aspects, give early warning of various possible accidents, make relevant suggestions on the intensity of current load, and guide the rationality of curriculum arrangement. Figure 9 shows the flow of sports load monitoring model.

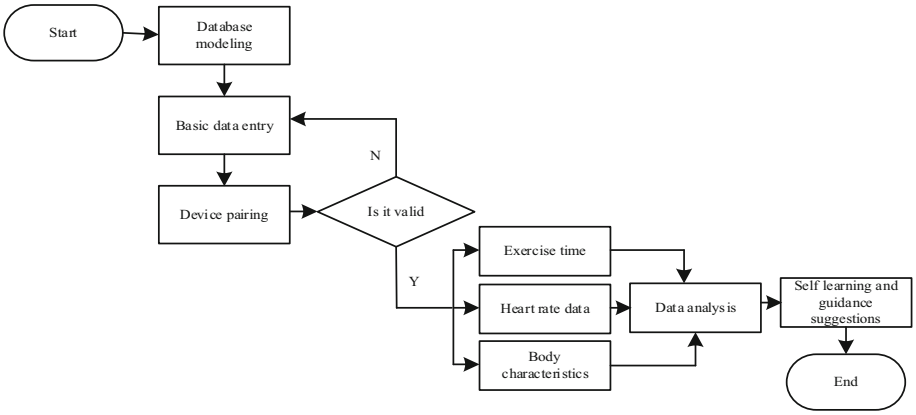


**Fig. 9.** Flow chart of sports load monitoring model

The model takes the dancer as an intelligent device, which inputs training and outputs exercise ability. The product of exercise duration and intensity is called training impulse (a). Coaches can effectively predict sports performance through this model, so as to design the best training plan according to sports performance. Expected sports performance = body adaptation $k_1$ - body fatigue $k_2$, the formula is:

$$a(t) = k_1 w(t) e^{-t/\tau_1} - k_2 w(t) e^{-t/\tau_2} \tag{4}$$

Where $w(t)$ is adaptive impulse and $e$ is fatigue impulse. During training, load stimulation is applied to organisms, and adaptive impulse and fatigue impulse work together to affect the training process. Adaptive impulse plays a positive role in promoting sports performance, and fatigue impulse plays a negative role in promoting sports ability. After training, the body adaptation and fatigue decreased exponentially, but the rate of decline was not consistent. The body adaptive impulse maintained for a long time and the attenuation rate was slow. On the contrary, the attenuation rate was fast. By comparing the expected results with the real results to adjust the attenuation constant and weight factor,

so as to produce a more accurate prediction of sports results. It further describes that the changes of dancers' physical functions will be reflected in the intelligent devices of various organs of the body, including cardiovascular intelligent devices, respiratory intelligent devices, immune intelligent devices, endocrine intelligent devices, neuromuscular intelligent devices, etc., as well as the observation of coaches and the self feeling of dancers. Through the comprehensive analysis of multiple indicators, the fatigue degree and recovery of the body are diagnosed, as shown in Table 2.

**Table 2.** List of commonly used indexes and functions for athletes' physical function evaluation

| Organizational system | Index | Effect |
|---|---|---|
| Blood system | Blood lactic acid, hemoglobin, creatine kinase, etc. | Evaluate load intensity and functional state |
| Cardiopulmonary system | Maximum oxygen uptake, anaerobic threshold, heart rate, etc. | Evaluate the load intensity and long-term training effect |
| Immune system | Leukocytes, immunoglobulins, etc. | Functional state evaluation |
| Endocrine system | Cortisol, testosterone | Evaluation of training load and functional status |
| Muscular system | Muscle strength, torque, muscle pain, etc. | Strength training effect, evaluation of muscle load |
| Coach observation system | Athletes plan to complete quality, etc. | Comprehensive evaluation of sports training status |
| Athlete's self feeling | RPE et al. | Evaluate the local reaction and overall state of athletes |

By integrating the monitoring practice and technology of training load and the literature evaluating the fatigue degree of training and competition in recent years, it is found that 91% of the 55 teams engaged in high-level sports said they had used or had been using some type of monitoring means to monitor them, which proves the value of sports monitoring, as shown in Table 3.

Therefore, the accurate measurement of the training load of organisms can help to more accurately evaluate the adaptability of dancers to the training plan arrangement, and can help coaches adjust the adjustment rate of personalized training plan. Previously, it was considered to be the most appropriate and practical method to quantify the internal load of dance training and other items. Nevertheless, when using training impulse to calculate training load, some technical problems related to weighted heart rate may increase the risk of accuracy error of objective methods. When the number of devices is insufficient, the monitoring of training load becomes the main problem. Therefore, when monitoring training needs to be more simple and effective, the practical application of this method in measuring training load should be paid more attention. However, this suggestion needs to be considered because there are many factors that affect the dancer's

**Table 3.** Monitoring practice of dance training

| Monitoring type | Degree of use | Degree of confirmation | Practical degree |
|---|---|---|---|
| GPS and accelerator | High | Secondary | High |
| RPE scale | High | High | High |
| Health Questionnaire | High | High | Low |
| Biochemical index | Low | Secondary | High |
| Heart rate measurement | High | High | High |
| Sports performance test | Secondary | Secondary | Secondary |
| Motion screening | High | Low | Secondary |
| Neuromuscular assessment (example: CMJ) | Secondary | Secondary | Secondary |

personal perception of physical strength, and these factors need to be considered when using.

## 3 Analysis of Experimental Results

The intelligent polar S400 telemetry heart rate meter was used to record the immediate heart rate every 5 min, and the heart rate change during exercise was measured in the flow chart of the subject's exercise load monitoring model. The measurement of exercise and exercise center rate starts from the subject standing quietly, and the exercise time is 60 min. In addition, a student majoring in dance monitors the course content and records the course content of each period. Stop the polar S400 telemetry heart rate meter immediately after the exercise. After exercise, the subjects were asked to fill in the rating of subjective fatigue immediately. RPE used relevant analysis software to analyze and statistically process the data. First, use the power load increasing test to select the appropriate subjects, then carry out the power load increasing test on the qualified subjects according to the test plan to obtain HRmax, and carry out the load increasing test of dance training class to obtain another HRmax. Through a large number of experimental comparison, it is found that there are obvious differences between the results measured by the two methods. The results measured by the dance patrol test are significantly higher than the power test. The experimental results are shown in Table 4.

According to the maximum heart rate calculation formula, an initial maximum heart rate is obtained. The athlete starts training according to the exercise load level divided by the maximum heart rate, and adjusts the maximum heart rate according to the subjective physical feeling. Each adjustment can add or subtract 5. Before using this method to feedback and adjust the maximum heart rate, the athlete should first be familiar with the use of the sensory table in this method. The corresponding relationship of each index of exercise intensity is shown in Table 5.

**Table 4.** Statistics of real-time monitoring results of maximum heart rate

| Power car test (people participating in the treadmill) | | Fort experiment | |
|---|---|---|---|
| Number of people | Maximum heart rate | Number of people | Maximum heart rate |
| 8 | 167.35 ± 12.69 | 8 | 171.65 ± 11.09 |
| 12 | 164.01 ± 12.36 | 12 | 173.11 ± 8.75 |
| 21 | 165.76 ± 13.06 | 21 | 172.36 ± 9.76 |

**Table 5.** Various indexes of exercise intensity

| Correlation strength | | | |
|---|---|---|---|
| Classification of exercise intensity | Maximum heart rate | Maximal oxygen uptake or maximal heart rate reserve | Supervisor physical feeling scale |
| Lower strength | <34% | <29% | <9 |
| Low strength | 34%–59% | 34%–49% | 10–11 |
| Medium strength | 60%–79% | 50%–75% | 12–13 |
| High strength | 80%–89% | 76%–84% | 14–16 |
| Super strength | ≥90% | ≥85% | >16 |

The exercise heart rate reflects the exercise load intensity of the athlete. The maximum heart rate can reflect the physiological maximum stress level of the athlete. The heart rate reserve obtained by subtracting the resting heart rate from the maximum heart rate reflects the variation range of the athlete's heart rate. The maximum heart rate will not change in a short time, but after long-term training or long-term stop training, the athlete's maximum heart rate will change accordingly. The real-time monitoring method of dance training load of intelligent equipment is proposed, which can well reflect the physical function level of athletes on the basis of ensuring the movement effect and safety of athletes. The content of aerobic dance class belongs to the combination of power routines, which includes warm-up stretching and review. The completion time of the combined action is about 60 min. During the training process, record the immediate heart rate every 5 s, calculate the 60 heart rate values of each member for 60 min in a class in the form of the average heart rate value per minute, and then conduct real-time monitoring, sorting and Analysis on a total of 960 heart rate values of 16 research objects. The variance and standard deviation can represent the dispersion and stability of a group of data and its average value, and the skewness represents the characteristic number of the asymmetry of the probability distribution density curve relative to the average value (as shown in Table 6).

**Table 6.** Average value of real-time monitoring of intelligent devices

| | N | Minimum | Maximum value | Mean value | Standard deviation |
|---|---|---|---|---|---|
| Overall data | 970 | 65.00 | 195.00 | 142.6529 | 26.8542 |
| Male heart rate | 490 | 65.00 | 186.00 | 139.6628 | 26.6523 |
| Female heart rate | 490 | 68.00 | 195.00 | 143.9858 | 27.0658 |

At the same time, frequency analysis shall be carried out for the falling point of heart rate value (as shown in Table 7).

**Table 7.** Exercise load monitoring frequency of intelligent equipment

| Project frequency | | Frequency | | | Percentage | | |
|---|---|---|---|---|---|---|---|
| | | Total (970) | Male (490) | Female (490) | Total (970) | Male (490) | Female (490) |
| Heart rate range | Below 90 | 55 | 31 | 24 | 5.6 | 6.5 | 4.9 |
| | 90–110 | 63 | 27 | 36 | 6.6 | 5.5 | 7.6 |
| | 110–130 | 195 | 107 | 88 | 20.2 | 22.2 | 18.2 |
| | 130–150 | 208 | 116 | 93 | 21.7 | 24.2 | 19.3 |
| | 150–170 | 321 | 158 | 161 | 33.5 | 33.2 | 33.6 |
| | 170–190 | 123 | 45 | 79 | 12.8 | 9.3 | 16.5 |
| | Above 190 | 4 | 0 | 4 | 0.4 | 0 | 0.7 |

The results show that the heart rate monitoring value is mainly concentrated in the range of 131–170 times min, which basically meets the actual value, so it can better give the best training scheme according to the dance training state and athlete system.

## 4 Conclusion

For the best exercise load of dance course, the step experiment method and its exercise center rate data are used as the exercise load monitoring index, combined with the exercise load index as the subjective self feeling evaluation index, this paper analyzes the exercise load index in the process of dance exercise, finally formulates the best load monitoring index, and gives a reasonable training scheme to truly realize the expected goal of strengthening students' physique. At present, intelligent devices can only realize the functions of monitoring and formulating training plans, and cannot give early warning of sports overload. It is hoped that in the follow-up research, the early warning function of overload movement of the research object can be realized.

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