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LETTER TO THE EDITOR

Evaluating the Therapeutic Effect of Massage Thrapy on Tibialisis Anterior Muscle Fatigue of Sport Dancer Using Atmospheric Environmental Monitoring

Shan Zhang[1#], Junhua Li[2#], Yang Wang[3#], Zhenglin Gu[4], Jun Tong[2], Yuhua Wang[5*]

[1]Department of Sports Arts, Xi'an Physical Education University, Xi'an 710000, China

[2]Sports Department, Kunming Medical University, Kunming 650500, China

[3]School of Rehabilitation, Kunming Medical University, Kunming 650500, China

[4]School of Tourism and Geographical Sciences, Yunnan Normal University, Kunming 650500, China

[5]Sports Department, Hubei University of Medicine, Shiyan 442000, China

[*]Email: wy671369@126.com

#The first three authors contributed equally to this work.

Method: the objects of this study were 200 professional sport dancers with tibialisis anterior muscle fatigue after exercise. They all enjoyed the right to know and were randomly divided into two groups, i.e., research group containing 100 cases and control group containing 100 cases. The patients in research group, also called observation group, were treated with massage therapy; while those in control group just took a rest. Isokinetic test and training mode were used to model the left tibialisis anterior muscle fatigue. During the modeling period, the Monitoring and Evaluation of Atmospheric Environment was performed to determine the indicators of passive activity of ankle joints in both groups. Results: after the research objects took a 5-minute break, another test showed that the maximum amplitude and gain rate, integral electromyography and gain rate, median frequency and gain rate, slope and gain rate were significantly reduced, $P < 0.05$. After accepting the massage therapy, the index of patients in the research group increased significantly, which was higher than that of the control group, $P < 0.05$. Conclusion: The massage therapy can significantly reduce the degree of muscle fatigue. Meanwhile, it is scientific and reasonable to surface EMG and isokinetic test to evaluate the effect of massage therapy on the tibialisis anterior muscle fatigue of sport dancers.

I Introduction

Yue Shang, Wei Wang published "The Analysis of Aesthetic and Aesthetic Value of Dance Movement" on Issue: 107, Pages: 2957-2960, Article No: e107331, Year: 2019, in the article, For dance such sports event research, muscle selection in performance and dance compilation perfect fused event, it mainly tests sportsman aesthetic ability, and therefore the paper makes research according to aesthetic ability. The paper carries out weight analysis of dance from spirit of cooperation, fitness, aesthetic values and innovation capacity four aspects, and gets dance aesthetic value weight, aesthetic education value occupies 44.5%, while physical value occupies 40.0%.

For sport dancers, the daily training activities are various and intense, so tibialisis anterior muscle fatigue is relatively common in this group. After the occurrence of this disease, the failure to obtain timely rest and targeted effective treatment will lead to stress injuries, tibiofibular fatigue periostitis, periosteum relaxation and subperiosteal hemorrhage, and various inflammatory reactions (Gu and Fang 2016.), including swelling and pain, which greatly improve the probability of tibialis osteitis in the lower leg (Chen et al. 2017). Tibialisis anterior muscle fatigue can occur in any age group, and is common in the group between the ages of 20 and 40, which has a serious impact on patients' normal life, work and exercise. With the further development of the research, the application of massage therapy in the treatment of tibialisis anterior muscle fatigue has been well promoted (Muro et al. 2016).

II Perspective

A total of 200 patients who had been clearly diagnosed as tibialisis anterior muscle fatigue in our hospital from January 2015 to August 2018 were selected as research objects. The imaging picture of 1 patient is shown in figure 1 below. All the patients were sports dancers. The content of this study was approved by the hospital ethics committee, and patients and their family members enjoyed the right to know and signed the formal informed consent issued by the hospital.

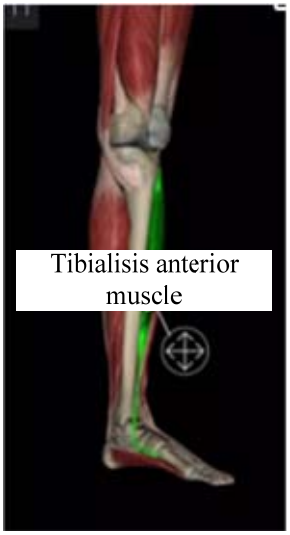

Fig 1. Tibialisis anterior muscle fatigue after exercise

The patients were divided into research group (i.e. observation group accepting massage therapy) and a control group (i.e. the rest group), each containing 100 patients. In the research group, there were 60 males and 40 females, aged between 20 and 30 (27.9±3.1). In the control group, there were 52 males and 48 females, aged between 22 and 32 (28.6±3.9). There was no significant different difference in general data between two groups, $P > 0.05$.

First, scientific modeling was conducted. Based on the left lower limb of the patient, Biodex system-3 multi-joint isokinetic muscle force tester was applied to make the model of tibialisis anterior muscle fatigue. At the same time, the archives of the tested subjects were developed. After the information such as name was input in the isokinetic muscle strength evaluation/training system, the scientific test program was selected, with uniform movement speed set to 60 and the time interval set to 5 minutes (Rettedal et al. 2016). Then, the subject was fixed and the corresponding test was carried out. The ankle's range of motion was set and the left lower limb was weighed. Press the start button, the subjects were told to use the power arm of the dorsal body to bend and tread the joint to

the original position when the maximum range of motion of the joint was generated, and the ankle joint was expanded and extended for 50 times in this form. In addition, Environmental Monitoring and Assessment of muscle strength was adopted to collect and record the muscle contraction mechanical signals during exercise. For patients in the control group, they were asked to lie down for 5 minutes after completion of the modeling (Liu et al. 2017). For the patients in the observation group, 5 minutes of massage treatment was conducted after the modeling by experienced and highly qualified massage experts.

The electromyographic signal is a muscle action potential recorded by electrodes. The four indicators closely related to the degree of fatigue include integral electromyography, maximum amplitude, slope and median frequency (Liu et al. 2017).

SPSS21.0 statistical analysis software was adopted to process data. The measurement data were expressed by means of mean ±average （$\bar{x}$±s）, while enumeration data were expressed in terms of natural number (n) and percentage (%). The intergroup difference was compared by t test and chi-square, respectively. The intergroup difference was considered of statistical value when $p<0.05$.

III Personal View

The electromyographic signal is a muscle action potential recorded by electrodes. The four indicators closely related to the degree of fatigue include integral electromyography, maximum amplitude, slope and median frequency. First, the files of the subjects were constructed, the left anterior tibialis muscle to be tested was selected, the reference electrode was placed at the bone mark, namely the tibialis tuberosity. Then, the test was performed according to the selected test protocol, twice in total, and this test was carried out simultaneously with the modeling test. As shown in table 1, under the isokinetic mode, there was no significant difference in indicators before treatment for the two groups, $P > 0.05$.

Table 1. Observation of the patient's surface EMG before treatment in good atmospheric environment ($\bar{x}$±s)

Indicator	Group	Value
IEMG	Control group (n=100)	211.55±150.90
maximum amplitude	Control group (n=100)	55.69±11.24
median frequency	Control group (n=100)	31.34±20.83
slope	Control group (n=100)	65.10±111.28
IEMG	Research group (n=100)	185.93±145.15
maximum amplitude	Research group (n=100)	50.89±9.85
median frequency	Research group (n=100)	87.93±32.11
slope	Research group (n=100)	56.77±11.90

As shown in Fig. 2, subjects were asked to take a five-minute break before being tested again. The results showed that there were significant decreases in indicators including maximum amplitude and gain rate, integral electromyography and gain rate, median frequency and gain rate, slope and gain rate. After the massage therapy, all indicators of the patients in the research group showed a significant increase, $P < 0.05$, with statistical significance.

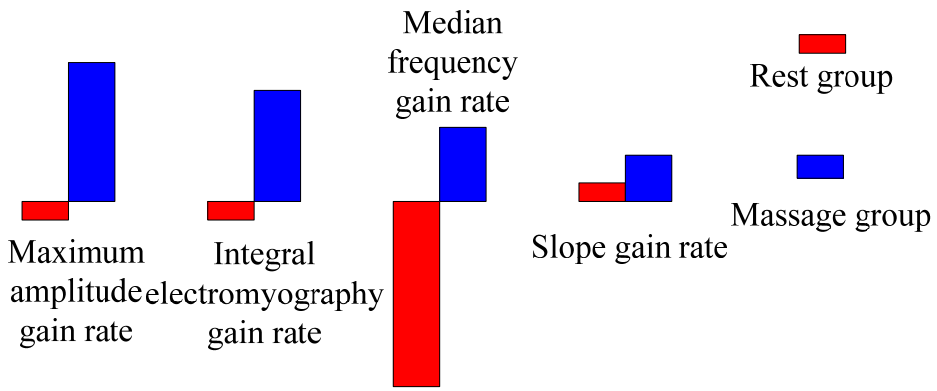

Fig 2. The influence of massage therapy on the EMG and gain rate of tibialisis anterior muscle

During the operation of this study, scientific and reasonable modeling must be ensured. The left lower limb of the patient was selected, and the Biodex system-3 multi-joint isokinetic muscle force tester was applied to make the model of tibialis anterior muscle fatigue. First, the subjects were introduced to the basic methods and essentials of isokinetic muscle strength test. Three times of sublevel ankle flexion and extension were carried out before the test as preparation activities. Next, build the profiles of the subjects. Information such as name of subject were input into the isokinetic muscle strength assessment/training system, and the scientific test scheme was selected, with uniform movement speed set to 60 and test time interval set to 5 minutes. After that, the subjects will be fixed, with the left ankle joint attachments fixed on the power axis of the isokinetic muscle force tester, the torso and the left thigh fixed on the test chair, and the upper part of the left ankle joint tied on the head end of the dynamometer arm. Finally, test was carried out. The ankle's range of motion was set and the left lower limb was weighed. Press the start button, the subjects were told to use the power arm of the dorsal body to bend and tread the joint to the original position when the maximum range of motion of the joint was generated, and the ankle joint was expanded and extended for 50 times in this form. In addition, isokinetic evaluation system of muscle strength was adopted to collect and record the muscle contraction mechanical signals during exercise, and the model of tibialis anterior muscle fatigue was constructed (Badal et al. 2016, Tug et al. 2018). In all stages of the test, the electromyographic signals of the tibialisis anterior muscle were measured using a wireless telemetry instrument. For the patients in the observation group, 5 minutes of massage treatment was conducted after the modeling by experienced and highly qualified massage experts. Repeatedly press the position of tibialis anterior muscle of the left leg in the upper and lower order, and at the same time, rub the following acupoints emphatically, such as stomach meridian of foot-yangming, foot Shaoyang gallbladder meridian-Yangling Spring, Foot Three Li ,Shangjuxu and Fenglong. Pay attention to asking patients' feelings during massage, and the pressing strength should be comfortable and tolerable.

IV Conclusion

After the massage treatment, the maximum amplitude and gain rate, the integral electromyography and gain rate, the median frequency and gain rate, the slope and gain rate increase were higher than those in the rest group, indicating that the application of massage can improve the tibialisis anterior electromyographic signal. This may be due to that the compensation factor of fast muscle fiber effectively compensated during the reduction of slow muscle fiber discharge. However, under isometric mode of , the slow muscle fiber and fast muscle fiber can be well recruited to form a larger torque and enhance the muscle force, so as to enhance the strength of the tibialis anterior muscle and significantly reduce the degree of muscle fatigue. In conclusion, the message therapy can significantly

reduce the degree of muscle fatigue. Meanwhile, it is scientific and reasonable to use EMG and isokinetic test to evaluate the effect of massage therapy on the tibialis anterior muscle fatigue of sport dancers. In addition, in view of the limited sample size in this study, a large sample size study should be carried out in the future to fully support the result.

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