
Development of an intelligent light moxibustion ring device based on LED infrared technology

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Abstract: Based on LED infrared technology and the methods and application characteristics of moxibustion, a new intelligent light moxibustion ring device is developed. Using computer technology to achieve precise and intelligent temperature control processing of the light moxibustion ring. The light moxibustion ring designed with new materials is simple, flexible, environmentally friendly, and easy to carry. The light moxibustion ring equipment has the advantages of temperature control, preventing burns, eliminating smoke, and being reusable, greatly leveraging the thermal effect of LED infrared technology, which is beneficial for clinical application and social promotion.

Keywords: Light moxibustion ring; LED infrared technology; Intelligent and precise; Acupuncture and moxibustion instruments; Automatic temperature control; Infrared radiation; portable

1.Introduction

Moxibustion therapy is one of the traditional Chinese medicine therapies. It involves burning moxa sticks or moxa velvet, fumigating and burning acupoints on the body surface, stimulating meridians and regulating the organs, thereby preventing, maintaining health, and treating diseases. With the development of the economy and society, health issues are becoming increasingly prominent, and the aging population is becoming increasingly severe. Delaying aging and solving sub-health problems have attracted much attention. Research has confirmed that moxibustion has unique clinical efficacy and health benefits for the body, and the development of moxibustion devices has broad application value. The integration of multiple disciplines provides new ideas for promoting the research and development of moxibustion health products, which will promote the development of human health. At present, there are few types of moxibustion devices, and there are many shortcomings, such as complex operation, difficulty in temperature control, and inconvenience in carrying, which limit the operation of medical personnel and the effectiveness of moxibustion on subjects. Moreover, traditional moxibustion has obvious drawbacks such as smoke irritation and even burns. We have developed a new type of intelligent and precise moxibustion device in the early stage, which can partially control temperature and reduce pollution to a certain extent. However, there are still design flaws, the equipment occupies a large space, and the applicability is still insufficient. Based on this, we are exploring to achieve breakthroughs in the use of moxibustion technology.

The light radiation of moxibustion is mainly infrared light, which is consistent with the principle of semiconductor light-emitting tubes. Therefore, to some extent, semiconductors (such as LED lights) can be used to simulate moxibustion. In the future, utilizing the technological achievements and production processes of LED zoom lights to develop expanded products from health lighting to medical applications will be beneficial for fully transforming patented technology into effective economic and social benefits. We utilize the infrared characteristics of LED and simulate the moxibustion effect to design a new wearable intelligent light moxibustion ring, highlighting the advantages of liberating manpower, precise temperature control, zero

pollution, etc. On the basis of promoting the connotation of traditional moxibustion therapy and combining modern science and technology, we achieve new breakthroughs in moxibustion.

2 Design Principles

2.1 The spectral effect of moxibustion shares similarities with LED

The therapeutic mechanism of moxibustion, in addition to drug stimulation and warm thermal stimulation, plays an important role in treatment through its spectral effects. Currently, attention to moxibustion is gradually shifting towards its radiation spectrum research. Hong Wenxue et al. found in their experiments measuring the thermal radiation spectrum characteristics of moxa sticks that the spectrum of moxibustion is mainly near near-infrared and far infrared, containing a small amount of visible light, with a peak of about 3.5 μm . Zhang Hongliang et al. found through spectral analysis that the luminescence spectrum during the combustion process of medicinal moxibustion strips ranges from infrared light at around 600 nm to mid infrared light at 2500 nm, and even to the far-infrared region. The spectral shape, intensity, and peak value continuously change throughout the entire moxibustion process. Shen Xueyong et al. used a self-made spectral detection device to observe the infrared radiation spectra of human acupoints and moxibustion, and found that there were two radiation peaks of 2-2.5 μm and 15 μm on the infrared radiation spectra of acupoints. Research on the mechanism of moxibustion has found that although the wavelengths of infrared spectra are not the same, it is clear that infrared spectra play an important role in moxibustion treatment. With the gradual deepening of spectral research on moxibustion, theoretical basis is provided for the development of simulated moxibustion instruments for selecting light stimulation sources of different wavelengths and simulating the biological effects of moxibustion.

With the development of semiconductor technology, LED infrared technology is widely used in the medical field. The application of LED infrared technology in the field of light health has attracted much attention. Research has found that infrared spectroscopy has good application prospects in soft tissue injury, chronic inflammation and joint related diseases, wound healing, and skin disease treatment. Compared with traditional biomedical light sources, LED light sources have greatly improved parameters such as luminous efficiency, color stability, and chromaticity, laying the foundation for the application of LED light sources in the biomedical field. Shi Guiju et al. used the principle that LED irradiation of human skin will raise the skin surface temperature, designed an LED array simulating acupuncture and moxibustion irradiation pen, and organically combined LED technology with acupuncture and moxibustion, which can play a similar role to acupuncture and moxibustion. Fan Xiaohong et al. treated peri-arthritis of shoulder with a self-developed infrared light acupuncture and moxibustion instrument with a wavelength of 0.6~1.5 μm , and found that the treatment effect of the high-power infrared light acupuncture and moxibustion instrument was the most prominent, and the treatment time was relatively short. It can be seen that with the recognition of acupuncture and moxibustion therapy, the continuous improvement of LED technology and its application in biomedicine, the organic combination of LED infrared technology and acupuncture and moxibustion can play a better role in clinical efficacy. Therefore, we believe that if a segment of the infrared wavelength of moxibustion is selected and simulated with LED infrared for treatment, the same efficacy as moxibustion treatment can be achieved.