

Research progress and key scientific problems of traditional Chinese moxibustion

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Moxibustion

Moxibustion (written as “jiū (灸)” in Chinese), also known as “jiū ruò (灸炷)” in ancient Chinese, was described in the ancient Chinese book *Shuo Wen Jie Zi* as having the meaning of burning and possessing the properties of fire, while sharing the same pronunciation as “jiǔ (久).” “Moxibustion is a method of curing diseases that uses lighted moxa to press and cauterize acupoints.” Moxibustion is a traditional external treatment method that involves the application of moxa wool or other materials, either directly or indirectly (such as through burning or fumigation), to stimulate specific points or areas on body surface. It is used for purposes such as prevention, treatment, rehabilitation, and health care. Moxibustion originated in ancient times, prevailed during the Qin and Han dynasties (221 B.C.E.–220 C.E.), experienced a period of decline during the Ming and Qing dynasties (1368–1912 C.E.), and was revitalized in the contemporary era.

Throughout the centuries, doctors have continuously explored and enriched the types of moxibustion, adapting them to different diseases, and achieving positive outcomes in clinical applications. Commonly used moxibustion methods in clinical practice include suspended moxibustion, indirect moxibustion (such as herb/ginger partitioned moxibustion), wheat grain-sized cone moxibustion, and warm needling moxibustion.

Clinical application of moxibustion

In recent years, the disease spectrum of moxibustion has expanded, and its efficacy has been confirmed in an increasing number of clinical studies. According to quantitative analysis and evaluation of modern literatures^[1], moxibustion has a wide range of clinical indications, with the ability to treat 197 diseases independently. When the disease has a long course,

affects deep-seated areas, or presents with complexity, acupuncture and moxibustion can be combined to treat the disease. For example, irritable bowel syndrome, characterized by intestinal dysfunction without major morphological changes, is primarily attributed to spleen and stomach weakness in traditional Chinese medicine. Therefore, herb-partitioned moxibustion is recommended to warm and nourish the spleen and stomach, effectively improving clinical symptoms in patients^[2]. Crohn disease, characterized by a transmural inflammation extending from the intestinal mucosa to the muscle layer, often presents extensive pathological involvement. Its pathogenesis includes spleen and kidney deficiencies, intestinal *qi*, and blood stasis. Simple moxibustion may have limited efficacy; however, moxibustion combined with acupuncture is more effective in improving intestinal lesions^[3].

Based on the National Program on Key Basic Research Project (973 Program), the team of Shanghai University carried out a series of clinical randomized controlled trials (RCTs) on ulcerative colitis, irritable bowel syndrome, hyperlipidemia, rheumatoid arthritis, knee osteoarthritis, lumbar disc herniation, and other diseases. These trials included the clinical observation of 3,400 patients, resulting in multiple evidence-based data supporting the clinical effectiveness of moxibustion. High-quality clinical evidence has been obtained for warm moxibustion in the treatment of diarrheal irritable bowel syndrome^[4] and for moxibustion combined with acupuncture in the treatment of Crohn disease^[5].

Mechanism of the moxibustion effect

The moxibustion project of the “973 Program” comprehensively used modern multidisciplinary technologies and methods; in-depth researches were conducted from three aspects: “Key factors of moxibustion effect”

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“moxibustion mechanism,” and “moxibustion core effect” to explain the biological mechanism of the moxibustion effect at multiple levels. (1) Warm and heat stimulation initiates moxibustion through local sensing mechanisms and signal transduction at acupoints. Local acupoint receptors, host immunity, and microcirculation play a role in creating a local sensory link between warm moxibustion and hot stimulation^[6]. (2) The analgesic and anti-inflammatory effects of moxibustion may be closely related to local thermal effects, infrared radiation effects, central integration, and modulation^[6]. (3) The warm and heat stimulation produced by moxibustion led to warming, unblocking, and tonifying^[7]. A study on the separation of heat, light, and smoke proved that warm and heat stimulations caused by moxibustion were the main factors in the moxibustion effect^[8].

The key scientific research areas in moxibustion

Strengthen standardized research on moxibustion

Moxibustion materials, moxibustion methods, moxibustion-related quantitative indicators (such as temperature, area, time/amount, frequency, and course of treatment), moxibustion feeling, and moxibustion location are all important factors affecting the effectiveness of moxibustion. Taking moxibustion materials as an example, various factors such as different storage years, origins, picking seasons, proportions of moxibustion, varieties, and preparation methods can impact the effectiveness of moxibustion in different ways. However, there is a lack of corresponding standards and norms in this regard. Therefore, conducting a series of standardization studies on moxibustion products and operational techniques and developing a comprehensive set of standardization documents can help standardize the clinical application of moxibustion, which in turn, will improve its clinical efficacy and promote the standardized and orderly development of the moxibustion industry.

Systematic integration of moxibustion effect and comprehensive disclosure of the mechanism

In the future, we should further increase investments, focus attention on moxibustion clinical dominant diseases, and use emerging technologies to reveal the scientific principle behind the effectiveness of moxibustion from the multi-level and multi-link ideology of “local initiation–central system–target organ response.” Through the deep integration of moxibustion research with bioinformatics, artificial intelligence, big data analysis, and other technologies, a systematic analysis model of the moxibustion mechanism can be built to promote the high-quality development of moxibustion. To promote the evaluation of the curative effect of moxibustion and the formation of evidence.

Promoting the evaluation of efficacy and formation of evidence on moxibustion-advantageous diseases

In the future, methods for the evaluation of efficacy of moxibustion as well as acquisition of evidence on specific diseases for which moxibustion can be used should

be strengthened, and a multi-center large sample RCT of moxibustion-advantageous diseases should be carried out to provide high-quality clinical evidence. Further, evidence grading and evaluation should be carried out to promote the use of moxibustion in the diagnosis and treatment guidelines of relevant diseases, both domestically and internationally, thus facilitating widespread application of moxibustion globally.

Develop new moxibustion treatment equipment

Traditional moxibustion is an important part of traditional Chinese medicine therapy; however, many problems remain to be solved in its real-world clinical operations. For example, doctors need to hold moxibustion for a long time, making it time- and labor-intensive; the appropriate moxibustion temperature is difficult to control; moxa fire can easily fall and burn the skin; prolonged moxibustion, or too much moxa, can produce too high a concentration of moxa smoke. Several factors, such as these, affect the clinical efficacy of traditional moxibustion therapy and limit its widespread use. Thus, continuous improvement and optimization of modern moxibustion treatment equipment to gradually replace traditional moxibustion therapy is also one of the future development directions for moxibustion therapy.

Establish a safety evaluation system for moxibustion products

Compared with other moxibustion materials, moxa has better flammability and durability; therefore, it has been used in clinical practice as the best moxibustion material^[9]. However, with the increase concentration of moxa smoke and the extension of contact time, the eyes and respiratory system are constantly stimulated, and frontline workers using moxibustion are greatly affected. Some studies have reported the feasibility of guiding suggestions for controlling the safe range of moxa concentration in a moxibustion room environment^[10,11]. However, it is still necessary to expand the scope of investigation, carry out a large-scale epidemiological study on moxibustion safety among relevant practitioners, explore the effects of moxibustion products, and establish a safety evaluation system for moxibustion products.

Taken together, all of these will provide a solid foundation and enable moxibustion to be used worldwide.

Conflict of interest statement

The authors declare no conflict of interest.

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Author contributions

Huangan Wu and Luyi Wu drafted the manuscript. All authors reviewed and approved the manuscript.

Ethical approval of studies and informed consent

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Data availability

Not applicable.

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