

# A Device for Separating and Recycling Materials of Needle Warming Therapy

Ni Zhixin<sup>1, †</sup>, Tang Xiaodong<sup>2, †</sup>, Li Weihong<sup>2, \*</sup>

<sup>1</sup>Department of Traditional Chinese Gynecology, Changhai Hospital, Shanghai, China

<sup>2</sup>Department of Acupuncture and Massage, Changhai Hospital, Shanghai, China

## Email address:

liwh1971@126.com (Li Weihong)

\*Corresponding author

<sup>†</sup> Ni Zhixin and Tang Xiaodong are co-first authors.

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**Abstract:** Background: Needle Warming Therapy is built on the therapeutic characteristics of Acupuncture and Moxibustion. This kind of therapy is proved to be able to treat many kinds of diseases and disorders. After Needle Warming Therapy, the waste needles and burned moxa cone ashes are always in a mess. Additionally, the dangerous of being pricked by the needle tip and the waste of burned moxa cone ashes were verified. Study Aim: To design a device for separating and recycling waste materials after Needle Warming Therapy, and protecting medical staff from hurt by acupuncture needle tips. Method: We found the main contradictions through communication with clinical acupuncturists and clinical practice. Design style based on full communication with medical staff. Then we used cardboard model to make physical objects according to the drawing style for clinical verification. The final style was determined after repeated modification and practice. Result: After repeated experiments, a more mature style was born. Its main advantages are lightweight, portable, detachable, and low production cost. It makes medical staff more convenient and secure to separate and recycle materials of Needle Warming Therapy.

**Keywords:** Needle Warming Therapy, Waste Needle, Moxa Cone Ash, Separating, Recycling

## 1. Introduction

Both acupuncture and moxibustion are treasures of Traditional Chinese Medicine. They have earned a worldwide reputation based on their long history of well-established efficacy. Needle Warming Therapy is built on the therapeutic characteristics of Acupuncture and Moxibustion. The therapeutic theory of Needle Warming Therapy is as follows: when the needle stimulation is placed on the acupuncture points, the heating effect produced by the burning moxa cone (at the needle tail) can induce widespread reactions to the skin, cells, blood system and nerve system [1-2]. Needle Warming Therapy is proved to be able to strengthen nerve signal transmission, promote blood and lymphatic circulation, improve microcirculation, nurture tissue, relieve vascular spasm as well as promote vasodilation and promote metabolism [3-6].

Needle Warming Therapy includes placing needle

stimulation [7] and heating effect [8] at different acupuncture points to treat and/or prevent body and mental disorders. When the treatment is finished, the residual ashes of burned moxa cone remain at the tail of needle. It typically requires medical staff to clean the ashes and pull out the needle. While the treatment result is established, there is a certain limitation to the waste disposal process. For example, the needles usually need to be pulled out manually by medical staff in order to finish the last step of the treatment. However, there is no guarantee to personal security due to the possibility of being pricked by the needle tip. The ashes of burned moxa cone are always thrown away and mixed with the abandoned needles in the Sharps Box. As we all know, moxa cone is made from dry mugwort, which has the significant therapeutic effect to the body and mental disorders, such as vascular spasm, muscle soreness, blood stasis and nerve atrophy as well [9-10], and the burned ashes also have the therapeutic effect to some disorders. Therefore, it is a wiser choice to recycle burned moxa cone ashes rather than abandon them.

In fact, medical staff have already noticed these problems, but there were no good ways to solve them. Patients have also been complaining that the acupuncture room is not clean enough. Through discussion with medical staff, we have found the contradictions to be solved: 1. The need for a light and simple device for medical staff to use, which can be carried with them. 2. Device should be able to solve the danger of being stabbed by acupuncture needle tips. 3. Device should be able to collect and recycle the ash independently. In clinical practice, we used cardboard model to make repeated experiments. After fully communicating with acupuncturists, nurses and patients, we determined the style and structure of the device.

## 2. Composition Structure

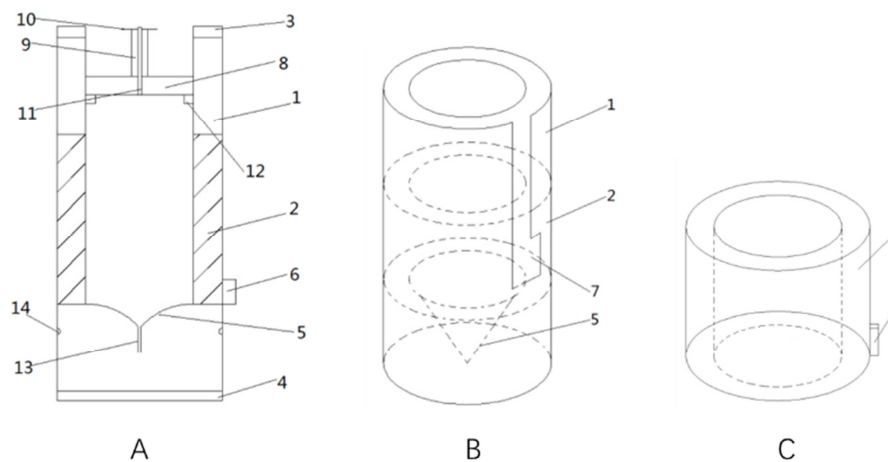
This device is composed of a main structure, a container for mixed waste needles and burned moxa cone ashes, upper lid and bottom lid as well. With an interlayer, the upper part of the main structure boasts a magnet to attract waste needles. The upper lid can be pushed in and pulled out to change the pressure in the container to separate burned moxa cone ashes from the needles and deliver them to the bottom of the main structure. The bottom lid can release and collect the burned moxa cone ashes for further utilization. The size of this device is adjustable to fit users' white gown pocket. Hence, this

device is portable and can recycle the materials after treatment of needle warming therapy.

The cylindrical-shape device of the present invention (Figure 1A a simplified orthographic view of the device) mainly includes a main structure, an upper lid 8 and a bottom lid 4. The two lids are designed to be taken off. In the main structure, there is a funnel-shaped interlayer structure 5. The space of the container upon the interlayer is used to hold the waste needles with a magnet 2 while the space below the interlayer is designed to contain the burned moxa cone ashes.

The upper lid is a piston with a handle 9 and an air valve 11 which is beneficial to the balance of air pressure in the device. In order to prevent the piston from entering the inside of the device, snap rings 12 can be found near the peristome. The magnet 2 inside the wall 1 of the device can attract the needles tightly, while the burned moxa cone ashes can go through the pass which comprises two plastic slices 13 at the center of the funnel-shaped interlayer structure 5. To keep the air-pressure balance inside the device, several stomas 14 can be found at the bottom of the present invention.

The cylinder-shaped magnet with a protruding structure 6 (Figure 1C, a simplified side view of the magnet) can be equipped inside the cylinder-shaped main structure wall with a long groove (as shown in Figure 1B, a simplified side view of the main structure).



**Figure 1.** As shown in A is a simplified orthographic view of the device present invention. B is a simplified side view of the main structure. C is a simplified side view of the magnet.

## 3. Conclusions

Acupuncture and moxibustion are the two most important clinical therapies in the theoretical system of acupuncture and moxibustion. The former is similar to mechanical stimulation, while the latter belongs to thermal stimulation. Modern research suggests that there are differences in the therapeutic mechanisms of the two therapies [11]. An ancient medical book named Inner Canon of Huangdi has a saying: "Acupuncture does not do, moxibustion is appropriate." Thus, the understanding ancient Chinese people on the clinical use of acupuncture and moxibustion is also different. The analgesic effect of acupuncture has long been known to the

world. Whether it is the exploration of basic mechanism or the demonstration of clinical research, the analgesic effect of acupuncture on somatic pain has been repeatedly verified [12]. Since ancient times, moxibustion has also been used in the treatment of somatic pain.

In Traditional Chinese Medicine theory, cold evil from outside can make the pain syndrome, contracting meridians and blocking Qi and blood. In the treatment, we should disperse cold evil, dredge meridians and tendons, warm the body and promote Qi and blood circulation. Acupuncture has a good function of relaxing tendons and dredging collaterals, but can't warm and disperse cold evil. Moxibustion has a good effect of warming and dispersing cold evil, but it can't relax

tendons and dredging collaterals very well. On researcher used acupuncture, moxibustion and Needle Warming Therapy to treat pain respectively. Although each treatment had curative effect, the curative effect of each treatment was obviously different. The results showed that the Needle Warming Therapy was superior to that of acupuncture and moxibustion alone in terms of the effect and pain relief [13]. Therefore, the combination of acupuncture and moxibustion will help to treat this kind of disease.

The International Academy of Pain defines pain as "unpleasant feelings and emotional experiences resulting from real or potential tissue damage or similar conditions". Chronic pain is a disease and we should take pain seriously. Some scholars [14] in China summarized the analgesic effect of Needle Warming Therapy through literature research. Through a comprehensive search of literature, they summarized and analyzed the 51 articles included, and reached the conclusion that: 1. Compared with acupuncture and Western medicine, Needle Warming Therapy alone can exert analgesic effect in many systems, which is superior to ordinary acupuncture and Western medicine. 2. Compared with medicines and massage, the analgesic effect of Needle Warming Therapy combined with medicines and massage increases, and the joint function activity increases significantly. 3. Needle Warming Therapy has an overall regulating effect, plays an effective analgesic effect in many systems of pain, shortens the treatment time.

Needle Warming Therapy is worthy of further promotion and application in clinic. In order to carry out Needle Warming Therapy more conveniently, we invented this device. The present invention was designed to solve the aforementioned problems. Since it is manufactured by combining the upper lid, bottom lid, main structure and a magnet, the warming therapy recycling device of the present invention can be produced at a low cost but with a durable using time.

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