Moxibustion is a treatment that uses thermal stimulation generated when herbal materials are burned, indirectly or directly, on the affected area or acupoint. Three cases are presented to report the efficacy of direct moxibustion on cutaneous warts. Three patients with chronic cutaneous warts received direct moxibustion made of Artemisia argyi (Dongbang Inc., Chungnam, Korea). Moxa burning was performed using moxa cones. Approximately 80% of a cone was burned, until patients reported feeling a burning sensation, at which time the cone was removed and another one burned. As part of this approach, patients underwent 5–19 moxibustion procedures during and after wart removal. After warts were completely eliminated, moxa burning was performed on each patient until approximately 60% of a cone was burned or the patient felt heat sensitization but no pain. In these cases, moxibustion seemed to have an effect on cutaneous warts. A possible mechanism is that direct moxibustion likely induces tissue damage from burning and, subsequently, a wound healing effect at a different temperature level. Our reports suggest that it would be worthwhile to conduct further studies on the safety and efficacy of moxibustion on warts or to develop a medical device that uses modified moxibustion.

Key words: warts, cutaneous warts, moxibustion, case report
month history of cutaneous warts on the fingers around her nails. The patient said she had first noticed the primary lesion in March 2014 and visited a dermatology clinic two months later. She was diagnosed in May 2014 with cutaneous warts and received cryotherapy with liquid nitrogen one or two times a week over a six-month period.

From November 10, 2014 to March 16, 2015, the patient received a total of 19 moxibustion treatments; the moxibustion was administered at an interval of once a week for 19 weeks (Figures 2 and 3). In addition, beginning on November 10, 2014, she began taking an herbal decoction or extract for a diagnosed qi deficiency with damp stagnation pattern; she continued taking this therapy until December 10, 2014.

**Case 2.** A 26-year-old Korean man visited Amar Clinic of Korean Medicine, on May 10, 2012, with a year-long history of cutaneous warts on the sole of his left foot. He had been applying dimethyl sulfoxide, fluorouracil (0.5%), and salicylic acid (10%) in a cutaneous solution (Verrumal, Neopharm Ltd., Petach Tiqva, Israel) daily for several months. He also had self-administered indirect moxibustion a few times before the first visit. From May 10, 2012 to October 16, 2012, the patient received a total of 16 moxibustion treatments at the clinic, at an interval of once every 10 days over a 22-week period (Figure 4).

**Case 3.** A 31-year-old Korean male visited Amar Clinic of Korean Medicine, on November 7, 2009, with a five-month history of cutaneous warts on the toe of the right foot with no former treatment.

From November 7, 2009 to December 5, 2009, the patient received 5 moxibustion treatments, at an interval of one treatment weekly over a five-week period (Figure 5).

**DISCUSSION**

As a condition entity, cutaneous warts are a common skin condition worldwide. Cutaneous warts are a manifestation of human papillomavirus (HPV) infection, and the condition

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**Figure 1.** Cone-shaped moxa made of *Artemisia argyi* (0.1 g of wormwood, 120 mm in diameter; 180 mm in height) is used in this study.

**Figure 2.** (A-1) *November 17, 2014:* White or skin-colored warts appear on every finger; there is a notable protrusion in the center of lesions. (B) *November 24, 2014:* After one moxibustion treatment, lesions seemed to have been burned. (C) *January 19, 2015:* After 10 moxibustion treatments, cornification warts on the medial side of the thumb were eliminated. (D) *February 4, 2015:* After 12 treatments with moxibustion, cornification warts on the lateral side of the thumb and eponychium were partially eliminated. Black dots that were small, clotted blood vessels were seen. (E) *March 16, 2015:* Warts disappeared after 19 moxibustion treatments.
has prevalence rates ranging between 5% and 30% in children and young adults.\(^8,\)\(^9\) The development of epidermal thickening and hyperkeratinization occurs following infection at the basal layer and subsequent clonal proliferation, which eventually results in a visible wart.\(^10\)

There are numerous treatments for warts, including destructive therapy, virucidal therapy, antimitotic therapy, and immunotherapy.\(^11\) Epidermal damage can be produced by chemical means, such as salicylic acid, or by physical means including cryotherapy, lasers, photodynamic therapy, or hyperthermia.\(^10\)

There are a few studies that have investigated the effects of localized thermotherapy on warts.\(^12^-^14\) In the previous studies, local hyperthermia showed certain efficacy and safety for the treatment of warts. However, the biological mechanisms by which hyperthermia exert its effects on warts are not fully understood and remain to be clarified. Previous research has suggested that local hyperthermia might minimize or eradicate warts by an array of mechanisms; these could include local destruction of infected tissue or promotion of specific immune response against HPV-infected keratinocytes.\(^13,15,16\)

Moxibustion is a treatment that uses thermal stimulation that is generated when \(A.\) \(\text{argyi}\) or other herbal materials are burned on the affected area.\(^1\) The quantity and quality of the thermal stimulus produced by moxibustion depend on the moxibustion methods used, especially with regard to combustion temperature.

In direct moxibustion, a cone-shaped herbal preparation is attached on the skin surface and supplies heat directly. In 2010, Hong et al. observed external and central temperatures of different-sized moxa cones used during direct moxibustion. In their study, maximum central temperatures of moxa cone ranged from 500°C to 700°C; maximum external temperature of moxa cones ranged from 450°C to 500°C.\(^17\) In a 2011 study that observed temperature changes of moxa cones, Kim showed that maximum surface temperature of different-sized moxa cones ranged from 568°C to 640°C. Using a rat model, Kim\(^18\) also observed temperature changes of the subcutaneous area in the rat skin in which maximum temperature ranged from 41°C to 49°C, according to size of moxa cones used.

In these three cases, we changed moxa cones when 80% of a moxa cone had burned, and the patient felt the burning before the warts or lesions were eliminated. A sensation of burning is necessary during the treatment phase. After warts were completely eliminated, skin seemed to get burned or develop wounds. Consequently, we changed moxa cones when 60% of a moxa cone had burned or the patient felt heat sensitization but no pain in each session. We tried to let the patients feel warm or heat sensation only during the procedure. A temperature value of 46°C is considered the thermal threshold that the human body can tolerate or feel the pain of being slightly burned, while 38°C is the temperature that is a little higher than the body temperature of humans and makes humans feel comfortable.\(^19\)

In 2015, Choi et al. measured thermal dose parameter \(t_{43}\), an equivalent exposure time at 43°C, of direct moxibustion, and it is
Informed consent was obtained from all patients. Kyung Hee University Hospital at Gangdong (KHNMC-OH-...CONSENT ETHICS COMMITTEE APPROVAL AND PATIENT CONSENT

This study was approved by the Institutional Review Board, Kyung Hee University Hospital at Gangdong (KHNMC-OH-2015-05-004). Informed consent was obtained from all patients.

Figure 5. (A) November 07, 2009: Small, bumpy wart with tiny black dots on the soles of the toe was seen. (B) December 05, 2009: After five moxibustion treatments, wart was eliminated.

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