Treatment of Lymphedema with *Saam* Acupuncture in Patients with Breast Cancer: A Pilot Study

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ABSTRACT

Background: Lymphedema is a troublesome complication affecting quality of life (QoL) in many women after breast-cancer treatment. Recent studies have suggested that acupuncture can reduce symptoms of lymphedema in breast-cancer survivors.

Objectives: This was a pilot study. It was designed to assess the feasibility and the safety of acupuncture with the *Saam* acupuncture method for treating lymphedema in Korean patients after surgical therapy for breast cancer.

Materials and Methods: This was a prospective, single-arm, observational pilot study using before and after measurements. The study was conducted at the East-West Medical Center at the Daegu Catholic University Medical Center, in Daegu, Korea. The subjects were 9 patients with breast cancer who presented with lymphedema of the upper limb ipsilateral to surgery. *Saam* acupuncture was administered 3 times per week for 6 consecutive weeks, for 30±5 minutes at each session. The primary outcome measure was severity of lymphedema as assessed by stages of lymphedema, a visual analogue scale (VAS), and by circumferential measurements of the upper extremity. The secondary outcome measure was QoL, which was assessed by a self-administered questionnaire using the Short Form-36 questionnaire.

Results: Acupuncture reduced severity of lymphedema significantly, as assessed by the VAS ($P < 0.001$) as well as by circumferential measurements of the upper extremity. Four weeks after the final treatment, symptoms were not aggravated. SF-36 scores remained significant for health status at the end of treatment.

Conclusions: The *Saam* acupuncture method appeared to provide reduction of lymphedema among women after they had undergone surgery for breast cancer. A randomized, controlled prospective study with a larger sample size is required to clarify the role of acupuncture for managing lymphedema in patients with breast cancer.

Key Words: Acupuncture, *Saam* Acupuncture, Complementary Medicine, Breast Cancer, Lymphedema.

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INTRODUCTION

LYMPHEDEMA IS A CONDITION of lymphatic fluid retention in the interstitial tissue and results from impaired drainage of lymphatic fluid.^{1,2} In patients with breast cancer, lymphedema can occur after surgery or radiation treatment for the disease. Lymphedema commonly results in swelling, skin changes, and pain associated with a sensation of fullness in a limb, as well as difficulty with performing daily tasks because of decreased flexibility in the joint of the affected limb.^{2,3} Furthermore, progressive lymphedema is complicated by recurrent infections and nonhealing wounds, as well as emotional and social distress.³⁻⁵

Lymphedema is a troublesome complication affecting quality of life (QoL) of many women after breast-cancer treatment. Breast cancer is the second most common cancer among Korean women and is the leading cause of cancer-related deaths worldwide.^{6,7} With advances in breast-cancer treatment, survival rates of patients with breast cancer have been improved,⁸ and there has been an effort to reduce and treat the complications following surgery for breast cancer. However, there are no curative treatments for lymphedema yet, although there are several methods of relieving it, such as manual lymph drainage, compression bandaging, and limb exercises.^{2,9-11}

Studies have suggested that acupuncture can provide symptomatic relief and decrease arm swelling in breast-cancer survivors who have lymphedema.^{9,12-16} de Valois et al.¹² showed improvements in well-being related to reducing lymphedema-related symptoms and a range of psychologic problems. Alem and Gurgel¹³ reported significant improvements in range of movement of the shoulder as well reduction of the degree and symptoms of lymphedema following acupuncture treatment. However, there have been few randomized controlled trials for using acupuncture in lymphedema management in patients with breast cancer.¹⁷ Furthermore, there are no available data on the effectiveness of acupuncture for treating lymphedema in patients with breast cancer in Korea. Therefore, the reported safety and efficacy of acupuncture does not necessarily translate into a useful practice for all patients with breast cancer, especially those in Korea.

Saam (or *Sa-ahm*) acupuncture is a unique Korean method and is currently used by Korean clinicians. However, there is no reported study using *Saam* acupuncture yet for patients with breast cancer. This study investigated *Saam* acupuncture and, to the current authors' knowledge, this is the first study on using *Saam* acupuncture to manage breast-cancer-related lymphedema.

This study was designed to assess the feasibility and safety of acupuncture with the *Saam* acupuncture method for treating lymphedema following surgical therapy for Korean patients with breast cancer.

MATERIALS AND METHODS

Study Design

This pilot study was a prospective, single-arm observational study. Participants received 18 sessions of acupuncture, delivered 3 times per week, for 6 weeks. Severity of lymphedema was assessed via stages of lymphedema and a visual analogue scale (VAS). Patients were evaluated 1 week before treatment commenced (baseline), once per week during treatment, on the final treatment day, and 4 weeks after the final acupuncture session. The institutional review board at Daegu Catholic University Hospital in Korea approved this study. Figure 1 shows the study design.

Study Participants

The authors identified subjects from the medical records, and recruitment was performed from September 2012 through December 2012. Informed consent was obtained

FIG. 1. Flow diagram of the study. VAS, visual analogue scale; SF, Short Form

before participant enrollment according to a clinical trial protocol, and a total of 9 Korean women with breast cancer were enrolled.

The inclusion criteria were as follows: (1) lymphedema in the upper extremity as a result of surgery for breast cancer; (2) ≥ 2 cm difference in a circumferential measurement of the affected upper limb in comparison to the contralateral limb; (3) clinical diagnosis of lymphedema for at least 6 months; (4) Karnofsky performance score of > 60 , which means ability to participate in the trial oneself or with occasional assistance; (5) voluntary participation; (6) follow-up for the duration of the study; (7) a cessation of other pharmacologic or alternative treatments, such as exercise and compression sleeves/gloves, for lymphedema at least 1 weeks before the trial, if such treatments were used. The exclusion criteria were as follows: (1) primary or secondary lymphedema caused by other diseases; (2) other pharmacologic or alternative treatments, such as exercise and compression sleeves/gloves for lymphedema, for lymphedema during the trial; (3) progressive or metastatic breast cancer; (4) serious

medical or psychiatric conditions that made the patient unsuitable to participate in the trial.

Interventions

The study protocol involved 6 weeks of the treatment with 3 acupuncture sessions per week. For all sessions, vital signs, including blood pressure, pulse rate, and body temperature, were measured before the treatment.

Acupuncture was performed by Traditional Korean Medicine (TKM) physicians who were registered with the government and were specialists in the acupuncture treatment. The acupuncture needles used were sterile, disposable stainless steel needles (15×0.20 mm or 30×0.20 mm; Woojin Acupuncture Inc., Chungcheongnam-do, Korea), and a total of 4–8 needles were used.

This study used a style of Korean acupuncture known as *Saam* acupuncture. *Saam* acupuncture treats illness by tracing the fundamental cause of the disease. It follows the Yin–Yang theory and the Five Element theory, and *Saam's* principles involve supplementing Deficiency and draining

TABLE 1. ACUPUNCTURE POINTS USED TO TREAT LYMPHEDEMA IN PATIENTS WITH BREAST CANCER

Meridian	Pattern (Acupoint ^a)		Deficiency Syndrome (Jeong-Gyeok)		Excess Syndrome (Seung-Gyeok)		Cold Syndrome (Yeol-Gyeok)		Heat Syndrome (Han-Gyeok)	
			Tonification	Sedation	Tonification	Sedation	Tonification	Sedation	Tonification	Sedation
Liver (LR)			KI 10	LU 8	LU 8	HT 8	KI 2	LU 5	LU 5	HT 8
			LR 8	LR 4	LR 4	LR 2	LR 2	LR 8	LR 8	LR 2
Heart (HT)			LR 1	KI 10	KI 10	SP 3	LR 2	KI 10	KI 10	SP 2
			HT 9	HT 3	HT 3	HT 7	HT 8	HT 3	HT 3	HT 8
Spleen (SP)			HT 8	LR 1	LR 1	LU 8	HT 8	LR 8	LR 8	LU 10
			SP 2	SP 1	SP 1	SP 5	SP 2	SP 9	SP 9	SP 2
Lung (LU)			SP 3	HT 8	HT 8	KI 10	SP 2	HT 3	HT 3	KI 2
			LU 9	LU 10	LU 10	LU 5	LU 10	LU 5	LU 5	LU 10
Kidney (KI)			LU 8	SP 3	SP 3	LR 1	LU 10	SP 9	SP 9	LR 2
			KI 7	KI 3	KI 3	KI 1	KI 2	KI 10	KI 10	KI 2
Pericardium (PC)			LR 1	KI 10	KI 10	SP 3	LR 2	KI 10	KI 10	SP 2
			PC 9	PC 3	PC 3	PC 7	PC 8	PC 3	PC 3	PC 8
Gall Bladder (GB)			BL 66	LI 1	LI 1	SI 5	BL 60	LI 2	LI 2	SI 5
			GB 43	GB 44	GB 44	GB 38	GB 38	GB 43	GB 43	GB 38
Small Intestine (SI)			GB 41	BL 66	BL 66	ST 36	GB 38	BL 66	BL 66	ST 41
			SI 3	SI 2	SI 2	SI 8	SI 5	SI 2	SI 2	SI 5
Stomach (ST)			SI 5	GB 41	GB 41	LI 1	SI 5	GB 43	GB 43	LI 5
			ST 41	ST 43	ST 43	ST 45	ST 41	ST 44	ST 44	ST 41
Large Intestine (LI)			ST 36	SI 5	SI 5	BL 66	ST 41	SI 2	SI 2	BL 60
			LI 11	LI 5	LI 5	LI 2	LI 5	LI 2	LI 2	LI 5
Bladder (BL)			LI 1	ST 36	ST 36	GB 44	SI 5	ST 44	ST 44	GB 38
			BL 67	BL 40	BL 40	BL 65	BL 60	BL 66	BL 66	BL 60
Triple Energizer (TE)			GB 44	BL 66	BL 66	ST 36	GB 38	BL 66	BL 66	ST 41
			TE 3	TE 2	TE 2	TE 10	TE 6	TE 2	TE 2	TE 6

^aAcupoints were written in *Han Geul* and the meaning of each acupoint is as follows: *Jeong-Gyeok*, taking the acupuncture point in the relevant meridian of the Deficient organ and tonifying the organ; *Seung-Gyeok*, taking the acupuncture point in the relevant meridian of the Excessive organ and sedating the organ; *Yeol-Gyeok*, taking the acupuncture point in the relevant meridian of the Cold organ and warming the organ; *Han-Gyeok*, taking the acupuncture point in the relevant meridian of the hot organ and cooling the organ.

Excess.¹⁸ After identifying a pattern of each patient's symptoms and signs, target meridian and acupuncture points were selected for each patient. Basic combination formulas of *Saam* acupuncture were determined according to the pattern, which is relevant to one of four syndromes (Table 1). Acupuncture points were selected according to recommendations of TKM clinical experts^{19–21} and standard acupuncture textbooks.^{22,23}

Restrictions on needling the affected area included not using acupuncture points on the affected upper extremity, ipsilateral lower extremity, and ipsilateral side of the body. The skin was swabbed with an alcohol preparation pad before acupuncture was administered. Depending on the points selected, needles were inserted 5–20-mm deep into the skin and were gently manipulated manually to obtain De Qi (a needle sensation referring to pain, numbness, and distension felt around the point after the needle is inserted to a certain depth as well as the operator's sensation of tension around the needle).²⁴ Acupuncture was administered for 30 ± 5 minutes at each session. Two methods of needle manipulation based on *Saam* acupuncture were used as described in a previous study.²⁵ After removing the acupuncture needles, acupressure pellets were applied on the same acupuncture points to produce longer-lasting therapeutic effects. The pellets remained in place on the same acupuncture points for 1 hour after the treatment.

Study Outcomes

The primary outcome measurement was severity of lymphedema, which was assessed via stages of lymphedema, a VAS, and circumferential measurements of the upper extremity. Stages of lymphedema were classified as 0–III, according to International Society of Lymphology criteria (Table 2).²⁶

For evaluation of perceived symptoms caused by lymphedema, a questionnaire with a VAS ranging from 0 (none) to 100 (severe) was applied. The VAS is an instrument used to measure a characteristic or attitude believed to range across a continuum of values and that cannot easily be measured directly.²⁷

Upper-extremity measurements were performed with a simplified measuring method²: The circumference of the participant's upper arms, the elbow, and the forearms was measured, in both the affected and the unaffected limbs. A nurse–specialist trained in measuring lymphedema performed the measurements. The upper-arm was measured at 10 cm above the olecranon process, and the forearm was measured at 10 cm below the olecranon process. The edema rate of the upper extremity was calculated by dividing the difference between the affected and the unaffected arms by the circumference of the unaffected arm and then multiplying the result by 100.

The secondary outcome measure was QoL, which was assessed by a self-administered questionnaire from the Medical Outcomes Study 36-Item Short Form Health Survey (SF-36).

TABLE 2. STAGES OF LYMPHEDEMA ACCORDING TO THE INTERNATIONAL SOCIETY OF LYMPHOLOGY²⁶

Stage	Signs and symptoms
0	Latent or subclinical Swelling absent despite impaired lymph transport May exist months or years before clinically apparent edema occurs
I	Early accumulation of protein-rich fluid Edema resolves with limb elevation
II	More fluid accumulation not resolving with limb elevation Pitting, tissue fibrosis, woody texture
III	Lymphostatic elephantiasis without pitting Irreversible skin changes: acanthosis; fat deposits; warty growths; skin thickening; & hyperkeratosis

This is a widely used generic instrument for measuring QoL and consists of eight domains, including vitality, physical functioning, bodily pain, general health perceptions, physical role functioning, emotional role functioning, social role functioning, and mental health.²⁸ The SF-36 also includes a single item, health status, that provides an indication of perceived change in health. The SF-36 was administered before the first treatment (visit 1) and at the time of the last treatment (visit 18), and after 4 weeks of the last acupuncture (visit 19). All items of the SF-36 were scored according to the scoring rules.²⁹

Statistical Analysis

Statistical analyses were performed using the SPSS statistical package, version 14.0 (SPSS Inc., Chicago, IL). A *P*-value of <0.05 was considered to be statistically significant. Using quantitative data recorded over 19 visiting days in the case-report form, the mean VAS value, and the circumference and the edema rate of the upper extremity were calculated for each participant, and these values were summed for all participants. For individual participants, changes in stages of lymphedema, mean VAS, and mean circumference and edema rate of the upper extremity from baseline to 4 weeks after the final acupuncture session were tested using paired *t*-tests. To investigate changes in severity of lymphedema, a repeated-measure one-factor analysis using the VAS, and the circumference and the edema rate of the upper extremity was performed. To compare SF-36 scores across all measurement points, a repeated-measures analysis of variance was used.

RESULTS

Characteristics of the Participants

The authors identified 61 patients who had lymphedema after breast-cancer surgery from May 2006 to June 2012 from the medical records and by recruitment. Among these

patients, 9 did not meet the inclusion criteria, 4 were deceased, and 17 were missing during the follow-up period. Among 31 of 61 patients who met the inclusion criteria, 22 refused to participate in this study because of old age, living too far away, difficulty with follow-up for the duration of the study, and personal reasons. Nine Korean women with breast cancer were finally enrolled.

All participants completed the full course of 18 acupuncture treatments. Compliance with follow-up was good, with all participants providing data for the study's primary endpoint.

The baseline characteristics of the participants are shown in Table 3. The mean age at baseline was 58.4 years (standard deviation [SD]=7.21; range: 48–72). Two participants had comorbidities, such as chronic ileocolitis and hypertension. All participants had undergone axillary lymph-node dissection in addition to breast surgery (either mastectomy or breast-conserving surgery) to treat breast cancer. The mean duration of lymphedema was 67.4 months (SD=38.12; range, 21–132). No participant reported the use of other pharmacologic or alternative treatment for managing lymphedema at baseline or during the entire observation period.

Effects of Acupuncture on Severity of Lymphedema Assessed by Stages of Lymphedema and by a VAS

Five of 9 participants presented with stage I lymphedema, and 4 participants presented with stage II lymphedema.

TABLE 3. DEMOGRAPHIC AND CLINICAL CHARACTERISTICS AT BASELINE

Variable	N (%) or Mean $\pm$ SD
Age (years)	58.44 $\pm$ 7.21
Height (cm)	155.78 $\pm$ 5.36
Weight (kg)	57.89 $\pm$ 11.13
Menopausal status	
Premenopause	1 (11.1)
Postmenopause	8 (88.9)
Comorbidity	
Yes	2 (22.2)
No	7 (77.8)
Type of surgery	
Modified radical mastectomy	6 (66.7)
Breast-conserving surgery with axillary lymph node dissection	3 (33.3)
Duration of lymphedema (month)	67.44 $\pm$ 38.12
Concurrent use of Entelon [®]	
Yes	5 (55.6)
No	4 (44.4)
Previous use of other pharmacologic or alternative treatment	
Yes	0 (0)
No	9 (100)

Entelon[®] consists of *Vitis vinifera* extract and is usually used to reduce symptoms of lymphedema in patients in Korea.

SD, standard deviation; HRT, hormone replacement therapy.

lymphedema. The most common symptoms related to lymphedema were pain and heaviness of the affected limb. There was no change in the stages of lymphedema during the acupuncture treatment sessions as well as 4 weeks after the final treatment. Changes in mean VAS score from baseline to 4 weeks after the final acupuncture session are presented in Figure 2. Repeated-measure one-factor analysis showed a significant reduction in the average VAS score for severity of lymphedema at the end of treatment ($P < 0.001$).

Effects of Acupuncture on Severity of Lymphedema Assessed by Circumferential Measurements of the Upper Extremity

At baseline, the mean $\pm$ SD of circumferential measurements at the upper arm, the elbow and the forearm were significantly different between the affected and the unaffected upper extremity ($P < 0.001$, $P = 0.002$, and $P = 0.013$, respectively). As shown in Figure 3, repeated-measure one-factor analysis revealed a significant reduction in the average circumference of the upper arms, the elbow, and the forearms for both the affected and the unaffected limb at the end of treatment ($P < 0.001$, $P < 0.001$, $P < 0.001$ for the affected limb; $P = 0.027$, $P < 0.001$, and $P < 0.001$ for the unaffected limb, respectively).

As shown in Figure 4, edema rates of the upper arm, the elbow, and the forearm at baseline were $11.7 \pm 4.4\%$, $8.7 \pm 5.5\%$, and $13.2 \pm 7.6\%$, respectively. Repeated-measure one-factor analysis revealed a significant reduction in the average edema rates of the elbow and the forearm at the end of treatment ($P = 0.021$ and $P < 0.001$, respectively).

FIG 2. Change in mean visual analogue scale (VAS) scores for severity of lymphedema from the baseline to 4 weeks after the final treatment. SE, standard error.

FIG. 3. Changes in the average circumference of the upper extremities over time. (A) the upper arm of the affected limb, (B) the elbow of the affected limb, (C) the forearm of the affected limb, (D) the upper arm of the unaffected limb, (E) the elbow of the unaffected limb, and (F) the forearm of the unaffected limb. SE, standard error.

FIG. 4. Changes in edema rates of the upper extremities over time. (A) the upper limb, (B) the elbow, and (C) the forearm. SE, standard error.

Effects of Acupuncture on QoL of Patients with Breast Cancer and Lymphedema, as Shown on the SF-36

Health status score was significantly improved at the end of the treatment, whereas scores for other domains did not show significant changes from the baseline to 4 weeks after the final acupuncture session (Table 4).

Safety

Acupuncture was well-tolerated with few adverse events. During the treatment, 2 participants experienced lymphangitis. The current authors did not consider the occurrence of lymphangitis during the study as a result of acupuncture, because needling was restricted on the affected arm and lymphangitis did not occur at the acupuncture points. In addition, the 2 patients who experienced lymphangitis during this study had histories of recurrent lymphangitis even before participating in this study. These participants were treated with antibiotics for lymphangitis while continuing to have the acupuncture treatment. There was no adverse events, such as pain, bruising, bleeding, fainting, lightheadedness, and tiredness. In addition, no serious adverse events occurred in 162 treatment sessions and during the 4-week follow-up period.

DISCUSSION

This study assessed the feasibility and safety of *Saam* acupuncture for treating lymphedema following surgical therapy in Korean patients with breast cancer. In this study,

TABLE 4. SF-36 OUTCOMES FROM BASELINE TO EACH MEASUREMENT POINT^a

Variables	Visit 1 Mean $\pm$ SD	Visit 18 Mean $\pm$ SD	Visit 19 Mean $\pm$ SD	F ^b (P-value ^{b,c})
PF	80.00 $\pm$ 28.84	84.44 $\pm$ 27.69	84.44 $\pm$ 25.58	1.842 (0.191)
RP	79.86 $\pm$ 25.93	77.17 $\pm$ 22.37	85.42 $\pm$ 17.29	0.806 (0.464)
BP	73.61 $\pm$ 29.04	75.00 $\pm$ 25.72	80.56 $\pm$ 18.30	1.120 (0.351)
GH	53.89 $\pm$ 25.54	69.44 $\pm$ 29.62	60.56 $\pm$ 32.63	0.844 (0.448)
RE	90.74 $\pm$ 14.12	92.59 $\pm$ 11.63	94.44 $\pm$ 10.59	0.727 (0.499)
VT	67.3 $\pm$ 25.93	73.61 $\pm$ 22.32	68.75 $\pm$ 29.50	2.595 (0.106)
SF	91.67 $\pm$ 12.13	89.71 $\pm$ 15.46	87.50 $\pm$ 24.63	0.636 (0.544)
MH	73.33 $\pm$ 28.90	78.89 $\pm$ 21.29	79.44 $\pm$ 24.01	0.267 (0.769)
HS	47.22 $\pm$ 29.17	69.44 $\pm$ 20.83	69.44 $\pm$ 11.02	5.224 (0.018)

Note: Domains are scored 0–100. Higher scores indicate better quality of life.

^aData are presented as mean ($\pm$ SD).

^bRepeated-measures analysis of variance at visits 1, 18, 19.

^cP=significance on a 2-tailed paired t-test. **Bolding** indicates statistical significance ($P < 0.05$).

SF-36, Short Form–36; SD, standard deviation; PF, physical functioning; RP, Role limitation because of physical problem; BP, bodily pain; GH, general health; RE, role limitation caused by emotional problems; VT, vitality; SF, social functioning; MH, mental health; HS, health status.

the treatment was associated with improvement in most of the outcome measurements. *Saam* acupuncture reduced mean VAS score as well as all circumferential measurements at both upper extremities except the edema rate of the elbow. The effects of this type of acupuncture were maintained at 4 weeks after the treatment. These results suggest that *Saam* acupuncture may be a useful treatment modality for lymphedema associated with breast-cancer surgery, but further research needs to be carried out.

In general, patients with breast cancer who have undergone surgery are advised to avoid needling in the affected area to reduce the possibility of introducing infection or exacerbating swelling of the arm.³⁰ In this regard, use of acupuncture on the affected arm in patients with breast cancer who have lymphedema has been controversial. Within the last few years, studies have provided published evidence that acupuncture is safe and effective in relieving lymphedema following breast cancer surgery.^{12–16} de Valois et al.,¹² and Alem and Gurgel¹³ applied acupuncture on the unaffected region of the body except the affected limb to avoid side-effects, including infection, and showed reduction of lymphedema following acupuncture treatment. However, Cassileth et al.¹⁶ administered acupuncture in both affected and unaffected limbs and additional acupuncture points without causing serious adverse events.

In this study, acupuncture points were used that avoided the affected area, and showed reduction of lymphedema consistent with the results of previous studies.^{12–15} A particularly interesting finding of the current study was that decrease in circumferential measurements was also observed in the unaffected upper limb opposite to the surgery site. The current study's results suggest that *Saam* acupuncture treatment to specific acupuncture points according to the 12 meridians has produced both local and distant effects, based on the theory of acupuncture: Acupuncture points have an effect on the surrounding area and the corresponding meridian as well as on the related meridians.^{24,31}

The impact of lymphedema on a patient's QoL are well-documented and lymphedema can cause physical problems and psychosocial distress.^{32,33} Previous studies have shown that acupuncture improved emotional and physical well-being as well as reduced symptoms associated with lymphedema.^{12,34} In view of the limited study on QoL of patients with breast cancer who have lymphedema and who are given acupuncture treatment, the current authors investigated the effects of *Saam* acupuncture on QoL in women with breast cancer treatment-related lymphedema, using the SF-36. Overall, acupuncture treatments were acceptable to the participants and all 9 patients completed the trial and follow-up without problems in this study. However, the SF-36 results did not reflect the benefits in emotional, psychosocial, and physical wellbeing. Of the eight SF-36 domains, only the perception of health status showed significant improvement, and this lasted up to 4-week follow-up.

Acupuncture has an increasing role in symptom management support in cancer survivors,^{35,36} but there is no consensus on the optimum treatment frequency or the duration of acupuncture. Nevertheless, the protocols of acupuncture treatment for lymphedema following breast-cancer surgery varied according to the studies.^{12–15}

In the present study, the frequency and the duration of *Saam* acupuncture treatment were 3 times a week for 6 weeks. However, the current authors' preliminary study using the protocol of *Saam* acupuncture at twice per week for 4 weeks, which had been performed before this trial, did not show any beneficial effects in lymphedema (unpublished data). These findings suggest that the effects of *Saam* acupuncture appear to be influenced by the treatment protocol. Further study is required to determine the optimum frequency and duration of *Saam* acupuncture for treating lymphedema in patients with breast cancer.

There are many different styles of acupuncture.³¹ The current study used a Korean acupuncture method—the *Saam* acupuncture method—based on TKM, whereas most studies used acupuncture from Traditional Chinese Medicine. *Saam* acupuncture had been developed ~400 years ago, originated by a Buddhist monk known as “*Saam*.”¹⁸ It works by applying acupuncture to the acupuncture points called the Five *Shu* points. The Five *Shu* points are specific acupuncture points located below the elbow and knee belonging to the 12 meridians and thereby controlling the meridian vessels.^{18,21,37–39} The Five *Shu* points are assigned to the characters of Wood, Fire, Earth, Metal and Water for each meridian, and *Saam* acupuncture consists of treating these Five *Shu* points.^{37,38}

It is proposed that most illnesses are rooted in the interruptions or imbalances of a network of meridians.³⁸ The basic strategy of treating illness with *Saam* acupuncture is to harmonize these interruptions manifested by Stagnation and irregularities, or imbalances caused by Deficiency and Excess.^{38,39} When using *Saam* acupuncture, a patient is diagnosed whether a certain organ in that patient's body has an Excess or a Deficiency, according to the patient's meridian condition and symptoms related to his or her inner organs. Common modalities of Oriental diagnosis—including observing, questioning, palpation, tongue diagnosis, pulse, and abdominal diagnosis—can be utilized for diagnosis. Organs diagnosed as having Excess require sedation, and Deficient organs require tonification.^{38,39}

The Five *Shu* points may be selected by Deficiency or Excess in correlation with tonification and sedation.³⁷ For example, lymphedema can be caused by weakness of the Heart meridian, which is treated by using tonification of the HT meridian. In this current study, the patients were treated with *Saam* acupuncture and, depending on the patient's pulse pattern, the appropriate meridian for acupuncture treatment was chosen. For the Heart meridian, LR 1 and HT 9 were tonified, whereas KI 10 and HT 3 were sedated. For the Kidney meridian, LU 8 and KI 7 were tonified, whereas SP 3

and KI 3 were sedated. For the Lung meridian, SP 3 and LU 9 were tonified, whereas HT 8 and LU 10 were sedated.

Saam acupuncture is one of the most widely adopted techniques used by clinicians and in the educational institutions in Korea today; however, there is no reported study using *Saam* acupuncture in patients with breast cancer yet. The strength of *Saam* acupuncture is the holistic and systematic balancing of organ functions rather than simple stimulation of local areas.^{18,20,40} Therefore, this method can be applicable and effective for addressing various internal disorders or psychosomatic problems as well as serving as common pain controls.⁴⁰ Furthermore, *Saam* acupuncture can be practiced without danger of injuring the organs, because this method uses acupoints at the ends of the four limbs or distal from the elbow and knee joints.¹⁸

Acupuncture can be used safely when performed by qualified practitioners.^{24,40,41} In previous studies,^{14,16,41,42} no serious adverse events were reported and most adverse effects were minor events, such as bleeding, pain, and bruising at the needling sites. In the present study, there was no serious adverse effects, which is comparable with the findings of previous studies.

In previous studies that investigated the effect of acupuncture in patients with lymphedema, there were wide variations in the duration of lymphedema since diagnosis. In this study, the mean duration of 67 months with a range up to 132 months was longer than the inclusion in many studies, which are limited at 60 months.^{14,16} Although several studies reported the duration of lymphedema over a 5-year period of time, the researchers did not show reduction of lymphedema following acupuncture treatment but concluded that acupuncture may not exacerbate the symptoms of lymphedema.^{12,13,17} Although the current study was a small pilot study, it is worth noting more strongly that despite patients having symptoms that were chronic, responses to the treatment were noted.

Limitations of this study included the uncontrolled study design in a single setting and the small number of participants. These factors limited the current authors' ability to apply the results to the general population. Further studies, including a large, randomized and controlled trial are required to provide reliable evidence. Despite these limitations, to the best of the current authors' knowledge, this is the first study to show the feasibility of acupuncture for treating lymphedema in Korean patients with breast cancer. Furthermore, this is the first study using *Saam* acupuncture to manage breast-cancer-related lymphedema. The results suggest that *Saam* acupuncture may be a useful treatment for women with lymphedema following surgery for breast cancer.

CONCLUSIONS

The present pilot study showed the feasibility of *Saam* acupuncture for treating lymphedema in Korean patients

with breast cancer. The results provide preliminary data indicating that *Saam* acupuncture may be a feasible complementary and alternative treatment to reduce lymphedema among patients with breast cancer in Korea. A randomized, controlled prospective study with a larger sample size is required to clarify the efficacy and safety of *Saam* acupuncture for lymphedema in patients with breast cancer.

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DISCLOSURE STATEMENT

The authors declare that there is no conflict of interest.

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