

# Effects of Skin Rehabilitation Massage Therapy on Pruritus, Skin Status, and Depression in Burn Survivors

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**Purpose.** Hypertrophic scarring and depression are the principal problems of burn rehabilitation. This study was done to verify the effects of skin rehabilitation massage therapy (SRMT) on pruritus, skin status, and depression for Korean burn survivors.

**Methods.** A pretest - posttest design using a nonequivalent control group was applied to examine the effects of SRMT for 3 months in a group of 18 burn survivors. The major dependent variables - including pruritus, objective and subjective scar status, and depression - were measured at the beginning and at the end of the therapy to examine the effects of SRMT.

**Results.** Burn survivors receiving SRMT showed reduced pruritus, improved skin status, and depression. The remaining scar also showed improvement in skin pigmentation, pliability, vascularity, and height (compared to the surrounding skin) as measured on the Vancouver Scar Scale (VSS).

**Conclusions.** The findings demonstrate that SRMT for burn survivors may improve their scars both objectively and subjectively, and also reduce pruritus and depression.

**Key Words :** Burns, Massage, Pruritus, Depression

## INTRODUCTION

As burn injuries heal, hypertrophic scarring, pruritus, and depression are principal problems (Field et al., 2000; Vitale, Fields-Blache, & Luterman, 1991; Willebrand et al., 2004). In particular, deep burns (partial- and full-thickness) frequently form hypertrophic scars, characterized by elevation, redness, and rigidity, and these may persist for several months (Bray et al., 2003).

Scar management is an important aspect in the rehabilitation of burn survivors because scar tissue causes deformity and loss of function (Edgar & Brereton, 2004). Early use of massage therapy is effective in decreasing

scar vascularization. It can also minimize the adverse effects of hypertrophic scars, including soft tissue contraction and irreversible disfigurement (Serghiou et al., 2002).

Massage therapy was defined as the manipulation of the skin and underlying tissues with varying degrees of hand pressure so as to reduce pain, produce relaxation, or improve circulation (Dochterman & Bulecheck, 2004). Classic massage comprises effleurage (stroking and gliding), petrissage (kneading), and tapotement (percussion). Various kinds of massage are often used in burn rehabilitation centers in abroad. Manual massage may be used and often the various approaches are combined (Roques, 2002). Japanese shiatsu massage uses

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strong digital pressure over acupuncture points. Shiatsu emphasizes finger pressure not only at acupoints but also along the body's meridians (Ernst, 2003).

Once burn scars have matured enough to tolerate shearing forces, massage may be incorporated into the scar management regimen. It aids in softening or remodeling scar tissue by freeing adhering fibrous bands, thereby making the scar become more elastic. Clinically, massage is found to alleviate itching in burn survivors (Serghiou et al., 2002).

Although massage therapy is often advocated for treating burn scars, solid evidence of benefit is still lacking. Three studies have examined the effects of massage on burn survivors, and statistically significant physiological and psychological effects were found (Field et al., 2000; Kwon & Kim, 2000; Patino et al., 1999). Massage therapy for burn survivors seems to provide benefits in terms of reducing anxiety, depression, and pain. However, it failed to demonstrate any appreciable effect on the vascularity, pliability, or elevation of the hypertrophic scar (Field et al., 2000; Kwon & Kim, 2000; Patino, Novick, Merlo, & Benaim, 1999). The problem is that the outcomes of each study differ because there is considerable variability in the duration of treatment, type of massage administered, amount of pressure applied to the body, approach of the therapist, and apparatus used in treatment (Moyer, Rounds, & Hannum, 2004).

It has been reported that skin rehabilitation massage therapy (SRMT) is useful in improving the healing process of disfigured burn survivors (Oh, 2004). SRMT is defined as the manipulation of the skin and underlying tissues with light palm stroking, acupressure, and an occlusive dressing by the certificated skin rehabilitation nurse and home management by the primary caregiver to provide benefits in physiological and psychological effects. Few specialized burn hospitals in Korea perform acute burn management and surgical skin reconstruction, but long-term skin rehabilitation seems to have been overlooked. Also, in other countries, massage therapy has been shown to have positive effects in reducing postburn itching and pain and in improving psychological symptoms (Field et al., 2000; Patino et al., 1999), but reports in Korea are rare (Kwon & Kim, 2000).

Therefore, this study was done to verify the effects of SRMT on pruritus, skin status, and depression for Korean burn survivors. The objectives were to examine the effects of SRMT on pruritus and objective and subjective skin status, to examine the effects of SRMT on

depression, and to examine the relationships between depression and other burn characteristics (pruritus and skin status) in burn survivors.

## METHODS

### *Design*

A pretest-posttest design using a nonequivalent control group was employed to test the effects of SRMT on pruritus, skin status, and depression in burn survivors.

### *Participants and procedures*

Participants in the SRMT group were drawn from patients enrolled in two skin rehabilitation clinics in Seoul between November 2004 and February 2005. Participants in the control group were drawn from patients who were enrolled in another Burn Center, Seoul, between September, 2005 and February 2006 to prevent contamination of SRMT. A convenient sampling method was used: the inclusion criteria were (a) 18 years or older, (b) diagnosis of partial- or full-thickness burn on forearm or hand, and (c) agreement to participate.

All participants were examined by the investigator who assessed their burn scars using the VSS before and 3 months after the intervention. Pruritus, subjective skin status, and depression of all participants were measured using a self-administered questionnaire. Effects were assessed by comparing data before and 3 months after SRMT except subjective skin status. Subjective skin status was measured 3 months after SRMT to assess the burn survivor's perceived skin status.

Institutional permission to collect data was obtained after the researcher explained the research purposes and procedures to the chairperson of three institutions. The cover letter to the questionnaire assured respondents that their responses were voluntary and that their responses would be treated confidentially and anonymously. Informed consent was obtained from study participants. A total of 18 burn survivors participated in the SRMT group and 17 burn survivors in the control group.

### *Description of Skin Rehabilitation Massage Therapy*

Certified skin rehabilitation nurses applied SRMT for 30 minutes once a week for 3 months. In addition, the primary caregiver massaged the burn survivor at home for 10 minutes every day for 3 months.

The SRMT procedure, or as developed by Jung Ok Oh (2002), the O.J.O Methods, was as follows:

- Burn survivor lies on a bed with their hand and forearm placing at the level of the nurse's wrist when the nurse is standing.

- SRMT was performed using light stroking of the palm followed by acupressure on unscarred parts of the forearm and hand using a finger and a soothing Skin Rehabilitation Center (SRC) oil<sup>®</sup> designed for burn survivors.

- Cleansing oil was applied with a nonirritant sponge.

- A soothing SRC refresher<sup>®</sup> designed for burn survivors was applied to affected skin.

- An occlusive dressing with SRC Vita C serum<sup>®</sup> and SRC Hyaron-S lotion<sup>®</sup> was applied.

- Soothing SRC refresher<sup>®</sup> was applied to cleanse the skin.

- A small amount of balm and SRC sunscreen<sup>®</sup> (SPF 35) was applied.

- Finally, a small amount of talcum powder was applied.

### Measurements

Data concerning personal characteristic, characteristics of the burns, degree of pruritus, severity of the burn scar, subjective skin status, and level of psychological depression were recorded.

### Degree of pruritus

Pruritus was measured using the Itch Man Scale (Blakeney & Marvin, 2000). The scale ranges from 0 to 4, with 0 representing no pruritus and 4 the worst possible pruritus. The study participants were asked to view the scale and state the number that represented their present level of pruritus.

### Burn scar assessment

Burn scars were objectively measured on the Vancouver Scar Scale (VSS) (Sullivan, Smith, Kermode, McIver, & Courtemanche, 1990). This scale measures pigmentation, vascularity, pliability, and height (above the surrounding skin) of scar tissue. The VSS has 4 levels with a total possible score of 0 to 14, where 0 reflects normal skin and 14 very bad scarring.

Each burn scar was examined and rated by the skin rehabilitation nurse using the VSS at three different burn clinics.

### Subjective skin status

Subjective skin status was measured using the Patient

Assessment Scale developed by researcher for this study. The items are similar to the VSS. This scale assesses the burn survivor's perspective on pigmentation, pliability, size, and dryness of the burn scar. It consists of 4 items and participants are asked to respond on a 4-point Likert-type scale (from 0 to 3). Scores range from 0 to 12, with high scores indicating good skin status. The alpha coefficient for the present study was 0.93.

### Depression

Depression was measured using the Korean Center for Epidemiologic Studies Depression Scale (CES-D) (Cho & Kim, 1993). This scale gauges depressed mood, feelings of guilt and worthlessness, feelings of helplessness and hopelessness, psychomotor retardation, loss of appetite, and sleep disorders. It consists of 20 items and participants are asked to respond on a 4-point Likert-type scale (again, from 0 to 3). Scores range from 0 to 60, and scores higher than 25 indicate depression. Alpha coefficients for the scale have been reported as 0.85–0.90 (Cho & Kim, 1993); the alpha coefficient for the present study was 0.92 - 0.93.

### Data analysis

Descriptive and t-test statistics were used with the SPSS (V12.0 for Windows) program. Analysis of variance was used to compare parametric data and chi-square test and Fisher's exact test were used for non-parametric data. Differences were considered significant at  $p < .05$ . Pearson's  $r$  was used to determine the nature and magnitude of these relationships.

## RESULTS

### Homogeneity of SRMT and control groups

A total of 35 participants (18 in the SRMT group and 17 in the control) participated in this study. Personal and burn-related characteristics are presented in Table 1. The SRMT group consisted of 14 males (77.8%) and 4 females (22.2%), while the control group consisted of 12 males (70.6%) and 5 females (29.4%). A mean age ( $\pm$  SD) of the SRMT group was 33.3 ( $\pm$  8.3) years, while the control group was 39.1 ( $\pm$  8.2) years ( $t = -2.070$ ,  $p = .046$ ). There were no statistically significant differences between the groups in terms of gender, marital status, education, or burn-related characteristics.

**Effects on pruritus, and objective and subjective skin status**

Descriptive statistics on pruritus, and objective and subjective skin status are presented in Table 2. There was a significant more decrease in pruritus in the SRMT

group than control group ( $t = -2.942, p = .006$ ). The VSS score for the SRMT group decreased significantly from a baseline value of  $9.1 \pm 3.3$  to a post-treatment value of  $4.3 \pm 2.4$ . Comparison of the total scores of the VSS between the two groups showed a significant difference ( $t =$

**Table 1.** Demographic and Burn Related Characteristics of Burn Survivors

Variable	Category	SRMT (n = 18)		Control(n = 17)		$\chi^2$ or t	p
		n	%	n	%		
Gender	Male	14	77.8	12	70.6	0.237 †	.627
	Female	4	22.2	5	29.4		
Marital status	Unmarried	11	64.7	5	29.4	3.768 †	.052
	Married	6	35.3	11	64.7		
Education	Below high school	12	66.7	15	88.2	2.398 †	.121
	Post-college	6	33.3	2	11.8		
Burn type	Scald, flame	11	61.1	9	52.9	0.238	.625
	Chemical, electric, other	9	38.9	8	47.1		
Depth of burn	Deep second-degree	2	11.1	5	29.4	1.873 †	.228
	Deep second- to third-degree	16	88.9	12	70.6		
		Mean $\pm$ SD		Mean $\pm$ SD			
Age (years)		33.28 $\pm$ 8.27		39.06 $\pm$ 8.21		-2.070	.046
Post-burn day		127.6 $\pm$ 171.1		95.3 $\pm$ 83.7		0.703	.487

SRMT = Skin rehabilitation massage therapy group

† Fisher's exact test

**Table 2.** Mean Comparisons on Pruritus, Objective and Subjective Skin Status between SRMT and Control Groups

Variable	Group	Pre-test	Post-test	Difference	t	p
		Mean $\pm$ SD	Mean $\pm$ SD	Mean $\pm$ SD		
Pruritus	SRMT	1.94 $\pm$ 1.06	1.07 $\pm$ 0.73	-0.92 $\pm$ 1.38	-2.942	.006
	Control	1.59 $\pm$ 1.00	1.94 $\pm$ 0.90	0.35 $\pm$ 1.00		
VSS † Pigmentation	SRMT	2.33 $\pm$ 0.84	1.35 $\pm$ 0.61	-0.94 $\pm$ 0.83	-2.910	.007
	Control	1.94 $\pm$ 0.75	1.71 $\pm$ 0.59	-0.24 $\pm$ 0.56		
Pliability	SRMT	2.33 $\pm$ 1.78	0.94 $\pm$ 0.97	-1.41 $\pm$ 1.46	-3.797	.001
	Control	1.35 $\pm$ 1.22	1.59 $\pm$ 0.80	0.24 $\pm$ 1.03		
Vascularity	SRMT	2.61 $\pm$ 0.61	1.00 $\pm$ 0.71	-1.59 $\pm$ 1.00	-4.963	.000
	Control	1.71 $\pm$ 0.85	1.59 $\pm$ 0.71	-0.12 $\pm$ 0.70		
Height	SRMT	1.78 $\pm$ 0.81	1.00 $\pm$ 0.71	-0.77 $\pm$ 0.56	-6.062	.000
	Control	0.65 $\pm$ 0.93	1.12 $\pm$ 0.49	0.47 $\pm$ 0.62		
Total VSS	SRMT	9.06 $\pm$ 3.32	4.29 $\pm$ 2.37	-4.71 $\pm$ 3.12	-5.793	.000
	Control	5.65 $\pm$ 2.87	6.00 $\pm$ 2.12	0.35 $\pm$ 1.80		
Subjective skin status Pigmentation	SRMT		2.07 $\pm$ 0.46		4.250	.000
	Control		1.12 $\pm$ 0.78			
Pliability	SRMT		2.07 $\pm$ 0.26		4.725	.000
	Control		1.12 $\pm$ 0.78			
Scar size	SRMT		2.07 $\pm$ 0.46		4.522	.000
	Control		0.76 $\pm$ 0.66			
Dryness	SRMT		2.07 $\pm$ 0.46		6.516	.000
	Control		0.76 $\pm$ 0.66			
Total	SRMT		2.07 $\pm$ 0.33		5.753	.000
	Control		0.94 $\pm$ 0.60			

SRMT: Skin rehabilitation massage therapy group (n = 18), Control: Control group (n = 17)

† VSS = Vancouver Scar Scale

**Table 3.** Mean Comparisons on Depression between SRMT and Control Group

	Pre-test	Post-test	Difference	t	p
	Mean $\pm$ SD	Mean $\pm$ SD	Mean $\pm$ SD		
SRMT (n = 18)	31.12 $\pm$ 13.77	19.93 $\pm$ 12.34	-14.85 $\pm$ 12.49	-2.920	.007
Control (n = 17)	23.35 $\pm$ 13.79	20.25 $\pm$ 11.99	-2.63 $\pm$ 10.07		

**Table 4.** Correlations between Depression and Other Burn Characteristics

(N = 35)

		Pigmentation	Pliability	Vascularity	Height	Total VSS †	Subjective Skin Status	Pruritus
Depression	r	.232	.361	.467	.433	.463	-.323	.540
	p	.226	.055	.011	.019	.011	.087	.004

† Vancouver Scar Scale

-5.793,  $p = .000$ ). There were also significant differences for the pigmentation ( $t = -2.190$ ,  $p = .007$ ), pliability ( $t = -3.797$ ,  $p = .001$ ), vascularity ( $t = -4.963$ ,  $p = .000$ ), and height ( $t = -6.062$ ) between the two groups.

Burn survivor's scar status was rated better in the SRMT group than control group after 3 months treatment ( $t = 5.753$ ,  $p = .000$ ). Mean scores on pigmentation ( $t = 4.250$ ,  $p = .000$ ), pliability ( $t = 4.725$ ,  $p = .000$ ), scar size ( $t = 4.522$ ,  $p = .000$ ), dryness ( $t = 6.516$ ,  $p = .000$ ) were significantly higher in the SRMT group than control group.

### Effects on depression

There was a significant more decrease in depression in the SRMT group than control group ( $t = -2.920$ ,  $p = .007$ ). (Table 3)

Relationships between depression and other burn characteristics

Pearson's  $r$  revealed a significant relationship between depression and vascularity ( $r = .467$ ,  $p = .011$ ), height ( $r = .433$ ,  $p = .019$ ), total VSS score ( $r = .463$ ,  $p = .011$ ), and pruritus ( $r = .540$ ,  $p = .004$ ) (Table 4).

## DISCUSSION

The intervention group showed less pruritus, improved skin status, and diminished depression after 3 months of SRMT. In this study, SRMT reduced pruritus (compared with control patients), a finding consistent with previous studies (Field et al., 2000; Kwon & Kim, 2000; Patino et al., 1999). There is a lack of consensus among burn centers as to the best products to use. A moisturizing cream for scar massage is recommended, and usually used for 10 minutes, 3 times a day (Johnson & Richard, 2003). In this study, SRMT was undertaken with nonirritant veg-

etable oil, refresher, and a good moisturizing cream and these appear beneficial to reduce hypertrophic scarring and pruritus.

This study provided evidence that SRMT has a significant positive effect on the healing of burn scars. After SRMT, a big improvement in scores on the VSS was identified. The stroking type of massage used in this study was similar to that used in the study by Field et al. (2000). Differences in our outcomes may be ascribed to the longer length of treatment, use of acupressure and occlusive dressings, and the daily home regimen provided by the primary caregiver. Patino et al. (1999) reported no significant effects of massage on vascularity, pliability, and size of hypertrophic scars, although a reduction in pruritus was reported. Their use of friction massage is subject to criticism because it can easily accentuate inflammation (Roques, 2002).

In terms of depression, Field et al. (2000) reported similar results, although another study shows no significant change (Kwon & Kim, 2000). In one trial, depression was reduced more than 73% compared to a control group (Moyer et al., 2004). These authors suggest that massage helps patients feel cared for. Patients may be more ready to discuss and deal with difficult psychological issues once they are less anxious and have come to trust their care providers. This is the one way in which massage can be an important adjunct to manage mental health problems (Vickers & Zollman, 1999).

In this study, there is a significant positive relationship among depression, objective skin status and pruritus. This finding is inconsistent with another study that reported no significant relationship between depression and visible scarring (Lawrence, Fauerbach, Heinberg, & Doctor, 2004). These results suggest that skin status and pruritus may influence depression. Such a relationship

should be examined further and additional interventions to decrease depression should be tried.

Our research suggests that SRMT may benefit burn survivors by reducing pruritus, enhancing their skin status, and alleviating depression. Thus, SRMT may help burn survivors and their primary caregiver face the challenge of living with and caring for burns.

The limitations of our study should be noted. First, we used only a small number of participants. Future research with a larger sample size would demonstrate stronger cause-and-effect relationships. Second, the beneficial effect on burn scars may have shown up simply because of the subjective nature of the VSS. Future research would benefit from the use of a variety of reliable and objective burn-scar assessment tools. In other words, further studies are needed to test the effects of a SRMT using more rigorous and quantitative examination tools than currently exist.

## CONCLUSION

Deep partial and full-thickness burns frequently result in hypertrophic scars, which are characterized by elevation, redness, and rigidity, and may persist for several months. This study was done to verify the effects of SRMT on pruritus, skin status, and depression for Korean burn survivors.

In this study, burn survivors received SRMT every week for 3 months; the sessions were 30 minutes long and carried out by certified skin rehabilitation nurses. In addition, a primary caregiver gave massage at home for 10 minutes every day for 3 months. SRMT was performed using light palm stroking with soothing oil, acupressure, and an occlusive dressing. SRMT has the effect of decreasing pruritus, enhancing skin status, and alleviating depression, at least with burns on the forearm or hand.

In summary, the use of SRMT appears helpful in reducing pruritus, improving skin status, and lowering depression in burn survivors. Thus, SRMT can help the burn survivors and their family deal with the challenge of living with the aftereffects of a severe burn.

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