p-ISSN 1859 - 3461
e-ISSN 3030 - 4008

PRELIMINARY EVALUATION OF THE THERAPEUTIC EFFECTIVENESS OF SILICONE PRESSURE DRESSING (GELZONE) IN THE PREVENTION OF POST-BURN SCARRING

Phan Thi Thuc Trang, Vu Quang Vinh
Le Huu Trac National Burn Hospital

ABSTRACT

Objective: *To conduct a preliminary evaluation of the effectiveness of silicone pressure dressing (Gelzone) in preventing post-burn scars.*

Methods: *A prospective descriptive, uncontrolled clinical trial was carried out on 30 patients with post-burn sequelae scars of the extremities who presented at the Center for Plastic and Reconstructive Surgery - Le Huu Trac National Burn Hospital, between August 2024 and August 2025.*

Results: *Most patients were female (66.7%), with a mean age of 29.2 ± 13.8 years. Thermal injury accounted for the majority of burn causes (86.7%). Scars were predominantly located in the lower extremities (76.7%), especially on the legs (56.7%). Hypertrophic scars were the most common type (73.3%), with 76.7% of patients experiencing both pain and pruritus. The mean VAS pain score significantly decreased from 6.8 ± 1.5 before treatment to 1.3 ± 1.4 at 6 months ($p < 0.001$). Vancouver Scar Scale parameters, including pigmentation, vascularity, pliability, and height, showed statistically significant improvement after treatment, particularly at 3 and 6 months ($p < 0.001$).*

Conclusion: *Gelzone silicone pressure dressing demonstrated promising effectiveness in improving pain and clinical characteristics of post-burn scars. This method appears to be safe and effective, warranting broader clinical application and further investigation.*

Keywords: *Silicone pressure dressing, post-burn scars*

1. INTRODUCTION

Burns represent a major global public health problem. According to the World Health Organization (WHO), approximately 180,000 burn-related deaths occur each year, the majority of which are in low- and middle-income countries [1]. Epidemiological studies indicate that in developed countries, hundreds of thousands of burn cases require medical treatment annually (approximately 486,000 cases per year in the United States) [2]. In Vietnam, burns and their sequelae remain

[1]Chịu trách nhiệm: Phan Thị Thục Trang, Bệnh viện Bỏng Quốc gia Lê Hữu Trác
Email: thuctrangvb@gmail.com
Ngày gửi bài: 05/10/2025; Ngày nhận xét: 02/11/2025; Ngày duyệt bài: 26/11/2025
https://doi.org/10.54804

p-ISSN 1859 - 3461
e-ISSN 3030 - 4008

a significant concern, particularly among children and rural workers.

Burn injuries, especially deep burns, are associated with prolonged wound healing and a high risk of pathological scarring (keloids and hypertrophic scars). The reported incidence of post-burn scarring varies widely, ranging from 8% to 67% depending on the study. Burn contractures are also common (38 - 54% of patients at discharge) and may require reconstructive surgery, with approximately 5 - 20% of patients undergoing surgical intervention within 10 years [2]. Post-burn scars not only impair function but also cause itching, pain, and cosmetic disfigurement, thereby reducing patients' quality of life both physically and psychologically [3].

The primary goals of scar management are to improve scar appearance, soften scar tissue, reduce pruritus, and limit contractures, thereby restoring both function and aesthetics of the affected area. Current therapeutic options for scars are diverse, among which pressure garment therapy remains the most widely applied and long-established method. It is considered the global standard of care for the prevention and management of burn scars [4]. In addition, silicone-based products (e.g., silicone gels and silicone sheets) are widely used to soften and flatten scars. These medical-grade silicone dressings adhere closely to the skin, maintain hydration, and promote more uniform scar maturation [3]. Numerous international studies have evaluated the effectiveness of silicone gels and silicone sheets in burn scar management.

Although silicone pressure dressings such as Gelzone have been applied in the treatment of postoperative and burn scars in several centers, clinical evidence regarding their effectiveness remains limited. In Vietnam, no studies have yet been published on the use of Gelzone for the prevention and treatment of burn scars. Therefore, this study was conducted to provide a preliminary evaluation of the therapeutic effectiveness of silicone pressure dressing (Gelzone) in the prevention of post-burn scarring.

2. SUBJECTS AND METHODS

2.1. Study subjects

The study was conducted on patients with post-burn sequelae scars of the extremities who presented to the Center for Plastic and Reconstructive Surgery - Le Huu Trac National Burn Hospital between August 2024 and August 2025.

Inclusion criteria:

Patients with post-burn sequelae scars of the extremities.

No chronic dermatological diseases in the perilesional area.

Gave informed consent in the study.

Exclusion criteria:

Patients who declined to participate.

Patients are unable to comply with follow-up or treatment requirements.

2.2. Methods

Study design

This was a prospective descriptive study in the form of an uncontrolled clinical trial.

Sample size: A convenience sampling method was applied, recruiting all patients who met the inclusion and exclusion criteria. In total, 30 patients were treated with silicone pressure dressing (Gelzone).

p-ISSN 1859 - 3461
e-ISSN 3030 - 4008

Procedures

History taking: Information was obtained from patients, family members, and medical records, including:

Age, sex, cause of burn (domestic accidents, traffic accidents, other causes), burn agents (scalds, flame, electricity, quicklime, acid, and others), scar age (from formation to hospital admission).

Prior treatments: topical medication, pressure therapy and surgery.

Medical history.

Clinical examination: Assessment included:

Scar location: Arm, forearm, thigh, lower leg, foot.

Scar type: Hypertrophic scar, keloid.

Scar characteristics: presence or absence of contracture.

Treatment:

All patients were instructed to use silicone pressure dressing (Gelzone) for 12 hours per day over a period of 3 - 6 months. The dressing was applied by wrapping the silicone sheet around the scar, with fixation achieved by attaching Velcro strips to the fabric base of the dressing.

Follow-up and evaluation:

Pain intensity was assessed according to international standards using the Visual Analogue Scale (VAS) [5]**:**

VAS Score	Pain Intensity	Clinical Characteristics
0	No pain	Completely no pain sensation
1 - 3	Mild pain	Dull, tolerable pain with minimal impact on daily activities.
4 - 6	Moderate pain	Noticeable pain affecting daily activities and sleep, but manageable with conventional analgesics.
7 - 9	Severe pain	Intense, persistent pain significantly impairing mobility, eating, and sleep; requires strong analgesics.
10	Very severe pain	Unbearable, paroxysmal pain resulting in complete loss of daily functioning; requires urgent pain management intervention.

Evaluation of scar morphology and characteristics was performed using the Vancouver Scar Scale (VSS) [6], assessing pigmentation, pliability, vascularity, and scar height, with photographic documentation at 1, 3, and 6 months post-treatment.

VANCOUVER	
Pigmentation 0: Normal 1: Hypopigmentation 2: Hyperpigmentation	Vascularity 0: Normal 1: Pink 2: Red 3: Purple
Pliability 0: Normal 1: Supple 2: Yielding 3: Firm 4: Ropes 5: Contracture	Height (mm) 0: Flat 1: <2mm 2: 2-5mm 3: >5mm
Total score	**13**

p-ISSN 1859 - 3461
e-ISSN 3030 - 4008

Data processing and Statistical analysis

Data were expressed as mean ± standard deviation ($\bar{x}$ ± SD) or as percentages (%). Comparisons were performed using the Student's t-test and the Chi-square (χ^2) test. Statistical analyses were conducted with SPSS version 20.0, and differences were considered statistically significant at $p < 0.05$.

3. RESULTS

Table 3.1. Characteristics of study patients

Characteristics		Number (n)	Percentage (%)
Age ($\bar{x}$ ± SD, years)		29.2 ± 13.8	
Sex	Male	10	33.3
	Female	20	66.7
Burn agent	Scald (hot water)	14	46.7
	Flame (alcohol, oxygen)	12	40.0
	Trauma/Other causes	3	10.0
	Electrical	1	3.3
	Quicklime	0	0.0
	Acid	0	0.0
Medical history	Hypertension	1	3.3
	Diabetes mellitus	1	3.3
	Hematologic disease	0	0.0
	None	28	93.4
Scar age ($\bar{x}$ ± SD, years) (min-max)		2.1 ± 1.8 (0.5 - 5)	

Female patients predominated (66.7%), with a mean age of 29.2 years. The main causes of burns were thermal injuries (scalds 46.7% and flame 40.0%). Most patients had no comorbid medical conditions (93.3%). The mean scar age was 2.1 years.

Table 3.2. Distribution of scar locations

Location	Number (n)	Percentage (%)
Forearm	2	6.7
Arm	0	0.0
Hand	4	13.3
Thigh	1	3.3
Lower leg	17	56.7
Foot	5	16.7
Other	1	3.3
Total	30	100.0

p-ISSN 1859 - 3461
e-ISSN 3030 - 4008

Scars were predominantly located on the lower extremities (76.7%), with the lower leg being the most common site (56.7%). Scars on the upper extremities were less frequent (20.0%).

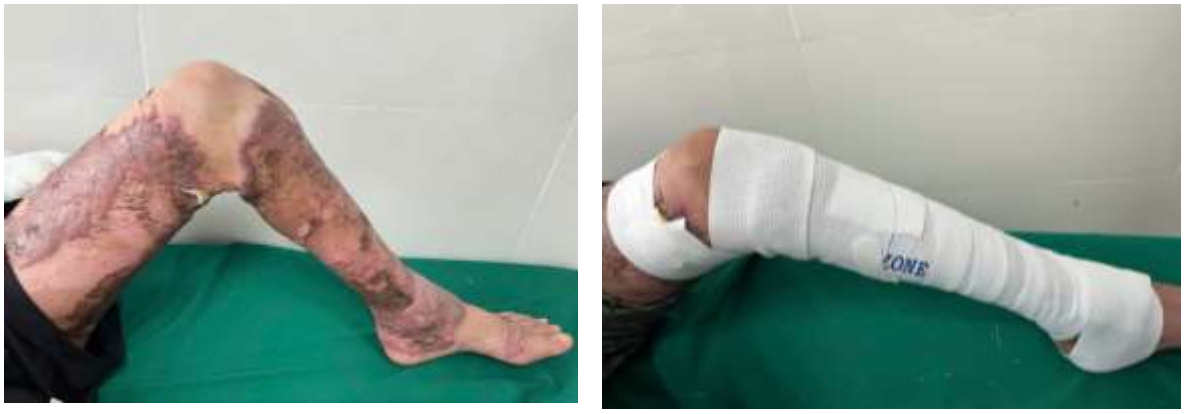


Figure 1. Hypertrophic scar of the thigh and left lower leg, 3 months after electrical spark burn (Patient: Duong Quoc H, 38 years old)

Table 3.3. Characteristics and properties of scars

Variable		Number (n)	Percentage (%)
Type of scar	Hypertrophic	22	73.3
	Keloid	8	26.7
Scar contracture	Present	3	10.0
	Absent	27	90.0
Symptoms	Pain only	1	3.3
	Itching only	5	16.7
	Pain and itching	23	76.7
	No symptoms	1	3.3

Hypertrophic scars were the most common (73.3%). The majority of scars did not present with contracture (90.0%). Pain combined with itching was the predominant symptom (76.7%).

Table 3.4. Assessment of pain intensity using the VAS scale

Time point	Mean score ± SD				p
	Before treatment[1]	After 1 month[2]	After 3 months[3]	After 6 months[4]	
VAS	6.8 ± 1.5	4.2 ± 1.8	2.5 ± 1.6	1.3 ± 1.4	$P_{1-2}<0.001$, $p_{1-3}<0.001$, $p_{1-4}<0.001$

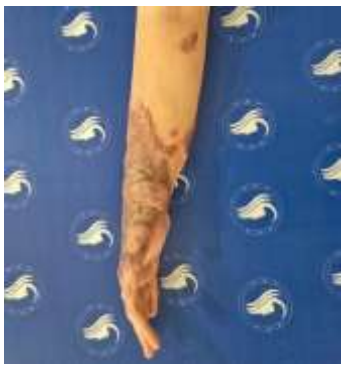
The mean VAS pain score decreased significantly at all post-treatment time points compared with baseline ($p < 0.001$).

p-ISSN 1859 - 3461
e-ISSN 3030 - 4008

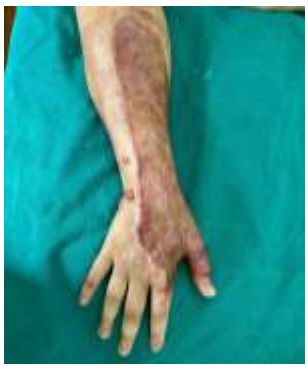
Table 3.5. Assessment of scar characteristics using the Vancouver Scar Scale (VSS)

Parameter	Mean score ± SD				P
	Before treatment[1]	After 1 month[2]	After 3 months[3]	After 6 months[4]	
Pigmentation	2.5 ± 0.6	2.1 ± 0.7	1.6 ± 0.8	1.2 ± 0.7	$p_{1-2}<0.05$, $p_{1-3}<0.001$, $p_{1-4}<0.001$
Vascularity	2.7 ± 0.7	2.0 ± 0.8	1.4 ± 0.7	0.9 ± 0.6	$p_{1-2}<0.001$, $p_{1-3}<0.001$, $p_{1-4}<0.001$
Pliability	2.9 ± 0.8	2.3 ± 0.9	1.7 ± 0.8	1.2 ± 0.7	$p_{1-2}<0.01$, $p_{1-3}<0.001$, $p_{1-4}<0.001$
Height	2.6 ± 0.9	2.2 ± 0.8	1.5 ± 0.8	1.0 ± 0.7	$p_{1-2}<0.05$, $p_{1-3}<0.001$, $p_{1-4}<0.001$
Total score	10.7 ± 2.1	8.6 ± 2.5	6.2 ± 2.3	4.3 ± 2.1	$p_{1-2}<0.001$, $p_{1-3}<0.001$, $p_{1-4}<0.001$

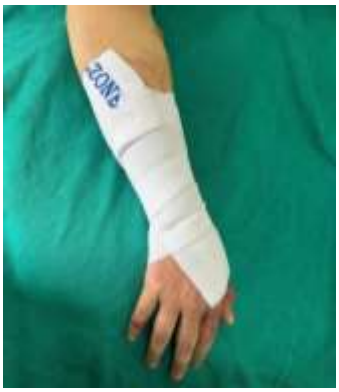
All Vancouver Scar Scale parameters showed statistically significant improvement at 1, 3, and 6 months after treatment compared with baseline. The most marked improvements were observed at 3 and 6 months.



1. Keloid scar on the left forearm



2. Hypertrophic scar after skin graft surgery



3. Continuous pressure dressing

4. Scar with reduced pigmentation, softened texture, and improved mobility

Figure 2. Significant improvement of scar appearance before and after 6 months of silicone pressure dressing (Patient: Vu Thu H., 20 years old)

p-ISSN 1859 - 3461
e-ISSN 3030 - 4008

4. DISCUSSION

Epidemiological characteristics

In our study, the proportion of female patients (66.7%) was higher than that of males. This may be explained by hormonal differences, particularly the role of estrogen, which has been suggested to influence fibroblast proliferation and collagen synthesis, thereby predisposing women to abnormal scar formation. Another possible explanation is selection bias, as women are more likely to seek aesthetic interventions. The mean age of participants was 29.2 years, representing young adults with high metabolic and regenerative activity, as well as increased exposure to trauma factors consistent with the pathogenesis of hypertrophic scars. Our findings differ somewhat from those of Li et al., who studied 104 patients with burn scars (63 males, 41 females; mean age: 21.8 ± 18.7 years) and reported a mean scar age of 14.9 ± 30.8 months [7].

The primary cause of scarring was thermal burns (86.7%), with scalds (46.7%) being the most common. This pattern reflects the living and working conditions in Vietnam, where domestic accidents such as scalds from boiling water and alcohol flames are highly prevalent.

Clinical characteristics of scars

Scar distribution was predominantly in the lower limbs (76.7%), especially the lower legs (56.7%). In contrast, other studies often reported higher proportions of keloids in different anatomical sites. For example, Hart et al. observed that 14/22 (63.6%) scar sites were located in the upper extremities [8], The predominance of lower-limb scars in our study may be attributed to injury mechanisms (e.g., spillage of hot water on the legs, barefoot burns) and continuous mechanical stress on the feet during ambulation, which may trigger abnormal wound healing. Hypertrophic scars accounted for the majority (73.3%), which is consistent with the fact that hypertrophic scarring is more common than keloid formation following burns.

Combined pain and pruritus were reported by 76.7% of patients, highlighting these as the most troublesome symptoms associated with abnormal scars. Both are believed to be linked to excessive proliferation of sensory nerve endings in scar tissue and the release of inflammatory mediators such as histamine and cytokines [4].

Treatment outcomes

This study included 30 patients with post-burn hypertrophic scars, without a control group. All patients were treated with continuous silicone pressure dressings (Gelzone) and evaluated using the Visual Analogue Scale (VAS) for pain and the Vancouver Scar Scale (VSS) for scar characteristics (vascularity, pigmentation, pliability, and height) before treatment and at 1, 3, and 6 months. Results showed a marked and statistically significant reduction in both VAS and VSS scores over time. From 3 months onward, patients reported significant pain reduction, and scar characteristics improved, with scars becoming softer and flatter, as reflected in decreased VSS scores. At 6 months, both VAS and VSS scores were substantially reduced compared to baseline, confirming the clinical efficacy of Gelzone in alleviating pain and improving scar quality.

The therapeutic effects may be attributed to the continuous hydration provided by silicone, which softens fibrotic

p-ISSN 1859 - 3461
e-ISSN 3030 - 4008

scar tissue and reduces mechanical stimulation of sensory nerve endings, thereby relieving pain. The applied pressure exerts a sustained compressive force on the scar, limiting excessive angiogenesis and fibroblast proliferation, key drivers of inflammation and nerve irritation. Moreover, compression may help reorganize collagen bundles into a more ordered structure, reducing nerve entrapment.

Previous studies have evaluated the effectiveness of silicone gel, pressure therapy, or their combination in managing burn scars. A systematic review by Wang et al. (2020) demonstrated that topical silicone gel significantly reduced pigmentation, height, and pliability of scars compared to no treatment, establishing silicone as the “gold standard” in hypertrophic scar management [9]. Similarly, a meta-analysis by Chirico et al. (2017) showed that pressure therapy at 15 - 25 mmHg significantly improved VSS scores compared to controls (MD = -0.60, $p < 0.01$) [10].

Randomized controlled trials (RCTs) combining pressure and silicone yielded mixed findings. Li-Tsang et al. (2010) in China conducted a four-arm RCT (pressure, silicone gel, combination, and control) for 6 months and found that the combination group achieved the greatest improvement in scar thickness at 2 months ($p<0.001$) and significant height reduction at 6 months in both the pressure-only and combination groups, with the latter showing the most pronounced benefit. Interestingly, silicone gel alone primarily alleviated pain and pruritus rather than reducing scar thickness [7]. In contrast, Harte et al. (2009) (RCT, 22 patients) reported no significant differences in VSS improvement rates between pressure-only and combined pressure + silicone therapy [8].

Our findings suggest that silicone gel or sheets may be more suitable for flat scars of limited size, whereas silicone pressure dressings such as Gelzone integrate the dual benefits of compression and silicone occlusion. These dressings are particularly practical for scars over highly mobile regions (e.g., arm, forearm, thigh, lower leg, foot), where maintaining consistent pressure is otherwise challenging.

Limitations: This study has several limitations. The sample size was small (n=30) and recruited from a single center, which may limit generalizability. The absence of a control group precludes definitive conclusions regarding comparative efficacy. Additionally, the follow-up period of 6 months may be insufficient to fully assess long-term scar recurrence.

5. CONCLUSION

This preliminary evaluation indicates that silicone pressure dressings (Gelzone) are an effective modality for the prevention and treatment of post-burn scars. The study demonstrated statistically significant improvements ($p<0.001$) in clinical outcomes, including reductions in pain and pruritus, and enhanced scar characteristics (pigmentation, vascularity, pliability, and height) after 6 months of treatment. With its safety and efficacy, Gelzone represents a practical option in the prophylactic management of extremity scars, with the potential to improve patient quality of life after burns.

REFERENCES

1. Burns. <https://www.who.int/news-room/fact-sheets/detail/burns>, accessed: 06/09/2025.
2. Van Baar M.E. (2020). Epidemiology of Scars and Their Consequences: Burn Scars. *Textbook*

p-ISSN 1859 - 3461
e-ISSN 3030 - 4008

on Scar Management: State of the Art Management and Emerging Technologies. Springer, Cham (CH).

3. Jiang Q., Chen J., Tian F., et al. (2021). Silicone gel sheeting for treating hypertrophic scars. *Cochrane Database of Systematic Reviews*, 2021(9).
4. Harris I.M., Lee K.C., Deeks J.J., et al. (2024). Pressure-garment therapy for preventing hypertrophic scarring after burn injury. *Cochrane Database Syst Rev*, 2024(1), CD013530.
5. E. C. Huskisson (1974). Measurement of pain. *The Lancet*, 1127-1131.
6. Chae J.K., Kim J.H., Kim E.J., et al. (2016). Values of a Patient and Observer Scar Assessment Scale to Evaluate the Facial Skin Graft Scar. *Ann Dermatol*, 28(5), 615.
7. Li-Tsang C.W.P., Zheng Y.P., Lau J.C.M. (2010). A randomized clinical trial to study the effect of silicone gel dressing and pressure therapy on posttraumatic hypertrophic scars. *J Burn Care Res*, 31(3), 448-457.
8. Harte D., Gordon J., Shaw M., et al. (2009). The use of pressure and silicone in hypertrophic scar management in burns patients: a pilot randomized controlled trial. *J Burn Care Res*, 30(4), 632-642.
9. Wang F., Li X., Wang X., et al. (2020). Efficacy of topical silicone gel in scar management: A systematic review and meta-analysis of randomised controlled trials. *Int Wound J*, 17(3), 765-773.
10. Ai JW., Liu J., Pei S.-D., et al. (2017). The effectiveness of pressure therapy (15-25 mmHg) for hypertrophic burn scars: A systematic review and meta-analysis. *Sci Rep*, 7(1), 40185.