

화상환자의 소양증 관리를 위한 경타법 적용 효과

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INTRODUCTION

Post-burn pruritus, a frequent and troublesome complication during the burn wound healing process, is reported in over 80% of burn patients during the acute stage post-injury, even when prophylactic measures are in place [1-4]. This itching sensation is seen to intensify throughout the healing process, specifically during proliferation and remodeling stages, which could persist for up to 2 years until complete wound healing [1,5,6].

While the exact pathophysiology of post-burn pruritus is yet to be comprehensively understood, evidence suggests that it may be more closely aligned with neuropathic rather than pruritogenic pruritus [7]. Pruritus demonstrates anatomical, neurophysiological, and pharmacological parallels to pain, which indicates a potential malfunction in the afferent pathway, as supported by the anatomical and functional properties of itch pathways and their relation to understanding itch perception and pruritic diseases [1,7].

Burn scar tissue typically considers the dryness and itchiness as a standard part of the healing process [1]. Pruritus due to dry skin can induce scratching, thereby enhancing the risk of infection and skin barrier impairment [8]. Post-burn pruritus, a prevalent and serious complication of burn injuries, arises

typically in the area of the skin graft during the process of nerve regeneration, and is associated with the damage to the skin barrier caused by the burn [6,7,9]. The main factors contributing to the intensification of post-burn pruritus vary, including dry skin, wound infection, and environmental stimuli such as heat, humidity, or dryness [5]. Secondary damage due to scratching may postpone the wound healing process [10]. Despite the use of pharmacological treatments, patient satisfaction with pruritus management is fairly low, averaging 5.7 out of 10 [11].

Treatments for post-burn pruritus encompass a variety of systemic and topical therapies, including pharmacological treatments like antihistamines and topical emollients, as well as non-pharmacologic methods such as pressure and massage therapy [12]. A few studies showed that compression and massage may be effective on post-burn pruritus by controlling collagen synthesis and reducing circulating stress hormones [2,13-15].

Although many non-pharmacological methods such as cooling, acupuncture, and psychological interventions have been explored for pruritus management, there is a lack of evidence specifically focused on the percussion method [12-14]. The potential efficacy of percussion as a treatment for pruritus can be understood through the gate control theory of pain [16,17]. According to

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this theory, pressure stimuli, such as those generated by percussion, can reach brain receptors swiftly due to their larger, more myelinated receptor fibers. This effectively 'closes the gate' before pain fibers can reach these receptors, mitigating the sensation of itch [16]. Unlike other physical interventions, massage like percussion offers a distinct advantage by providing a targeted and rapid mechanical stimulus, which may be particularly beneficial in treating localized or persistent forms of pruritus [15]. Furthermore, the use of percussion is consistent with other pressure-based interventions, such as massage or vibration, which have been previously identified as useful in pruritus management [17]. The incorporation of the percussion method aligns with an ongoing effort to develop more personalized, patient-centered approaches that consider individual preferences and needs.

Despite the prevalence of post-burn pruritus among burn patients, systematic management and routine evaluation are often overlooked. Inconsistent symptom-focused approaches have been applied based on subjective patient complaints. This indicates a lack of agreement on symptom management and assessment tools, and the absence of clear guidelines on prioritizing interventions. Common nonpharmacologic treatment covers the use of moisturizers, skin hygiene education, and maintaining proper fluid intake [12]. Nevertheless, patients frequently suffer from relentless itching, leading to secondary wounds and skin infections due to scratching. Considering these challenges, this study aims to explore the potential effects of percussion as a non-pharmacological self-management strategy for pruritus. Specifically, the research seeks to test two hypotheses:

Hypothesis 1: The percussion therapy will significantly decrease the severity of pruritus in individuals with burn injuries.

Hypothesis 2: The percussion therapy will enhance patient satisfaction with itchiness treatment.

Through these hypotheses, the study intends to contribute to the understanding and management of pruritus in burn patients by examining the effectiveness and satisfaction associated with percussion therapy.

Methods

Design

This preliminary study utilized a single-group pretest-posttest

pilot design to evaluate the potential impact of percussion. Our study was conducted as a pilot study, focusing on preliminary investigations, and assessing the feasibility of a larger-scale project. Our pilot study enabled us to validate key aspects of the research process, including inclusion and exclusion criteria, and provided insights to refine the methodology for a potential full-scale investigation without extensive resources, aligning with the standard purpose of pilot studies [18].

Setting and Sample

Purposive sampling methodology was implemented in this study. The research was conducted at a regional burn hospital's rehabilitation ward in Seoul, South Korea. The participants were selected based on the following criteria: being adults aged 18 years or older, having been diagnosed with a burn injury of deep second-degree or more severe, having undergone skin graft, and voluntarily agreeing to participate in the study. Assessments of both general and disease-specific characteristics such as gender, age, burn location, extent and severity of burn injury, post-injury duration, surgical history, and prescribed medical treatments were conducted before and after the intervention. Individuals with a history of mental health disorders, persistent skin conditions like atopic dermatitis, scabies, or lichen planus, as well as chronic liver or kidney diseases, were excluded from participating in the trial. All study participants were treated with standard interventions, including pharmaceutical treatments or skin moisturizers.

Sample size estimation was performed using G*Power 3.1.9.2 (Heinrich-Heine-Universität Düsseldorf, Germany), assuming an effect size of 0.35, α error of .05, and power of 0.80. This estimation resulted in an ideal sample size of 67 for a single group. Nevertheless, a total of 100 patients were successfully enlisted for the study, and there were no participant withdrawals throughout the research period.

Ethical consideration

The research study received approval from the Institutional Review Board (with Institutional Review Board no (2014-077)). Participants were recruited through a method that ensured their voluntary participation, having been fully informed about the study's objectives and procedures. All participants provided written consent and were assured of their right to discontinue

their participation or refrain from completing the survey at any point.

Measurements

Information was gathered on the demographic profile of participants, along with burn-related attributes such as the location, extent, depth of the burn, the time elapsed since the injury (in days), whether skin graft surgery was performed, and whether antihistamines were used. The severity and discomfort of pruritus, as well as the satisfaction level concerning pruritus management, were quantitatively assessed utilizing the Numeric Rating Scale. [19]. The employed Numeric Rating Scale ranged from 0, representing no pruritus, to 10, symbolizing the most severe pruritus imaginable to the participant. Study participants were instructed to look at the scale and select the number corresponding to their current severity of pruritus, the distress it caused, and their level of satisfaction with the management of pruritus.

Materials and methods

Data was collected through the administration of a structured questionnaire. The participants involved in the study were provided with written materials and oral instructions to enhance their ability to self-manage pruritus.

Patients admitted to the burn rehabilitation ward at the study hospital after acute burn management were included in this study. The intervention was dual-faceted, comprising video and handout materials for non-pharmacological management, prepared by a team of 10 clinical experts, including 2 burn surgeons, 3 rehabilitation physicians, and 5 nurses with over 5 years of clinical experience in the burn ward.

The video materials instructed participants on techniques for percussion and cold therapy, general skin care, and dietary guidelines. Percussion, or light stroking, involved a 3-5 minute procedure of cupping the hand and gently tapping the itch-affected area from the periphery towards the heart. Alongside the intervention, standard care for pruritus was continued, including the application of moisturizers and pharmaceutical treatment. Room temperature was controlled at 18-20 degrees Celsius in winter and 26-28 degrees Celsius in summer.

The self-management intervention instructed participants to

watch a 15-minute video and apply percussion therapy whenever itchiness was felt, in any location. The severity of itchiness was gauged by the average score over a 24-hour period, starting from waking until the same time the next day. To ensure consistency in treatment and minimize measurement errors, the researcher and a trained nurse from the ward personally provided the itchiness self-management education. The intervention lasted for one week, and the post-measurement was conducted immediately thereafter.

Data Analysis

Data acquired from the study was analyzed using the SPSS 22.0 software (SPSS Inc., Chicago, USA). Prior to the main analysis, the normality of the data distribution was tested using the Shapiro-Wilk test. The test results confirmed that the data followed a normal distribution ($p > 0.05$), and hence parametric tests were applicable. The general characteristics of the participants, along with their burn-related characteristics, were analyzed and presented as percentages, mean values, and standard deviations. A paired t-test was employed to compare the status of participants before and after treatment. A p-value less than 0.05 was deemed to indicate statistical significance.

Results

Table 1 displays the demographic and burn-related attributes of the study participants. The majority of the participants were male (91%), with an average age of 45.7 years. The most common areas of burn injuries were the shoulder, arm, or hands (75%), followed by the hip, legs, or feet (69%), the trunk (48%), and the head and neck (34%). A majority of patients (82%) were diagnosed with third-degree burns, and the average Total Body Surface Area (TBSA) affected by burns was 25.2%, with a standard deviation of 18.6. The average time elapsed since the burn injury was reported to be 165 days.

Table 2 reveals statistically significant findings from the post-test results, which showed a marked reduction in the severity and distress caused by pruritus. The average severity significantly decreased from 5.5 ± 2.4 to 4.7 ± 2 after intervention ($t=6.90$, $p=.000$). The pain due to itchiness significantly reduced from 5.0 ± 2.5 to 4.6 ± 2.4 after its application ($t=5.223$, $p=.000$). The satisfaction level with itchiness treatment was 5.6 ± 2.0 before the use of percussion therapy, and it significantly

increased to 6.0±2.0 after its application ($t=-2.525, p=.014$) (Table 2).

Discussion

This research investigated the influence of percussive therapy on pruritus severity, pruritus-induced distress, and satisfaction with pruritus management in patients suffering from deep second-degree burns. The primary discovery of the current research is the significant impact that percussion therapy exhibits on pruritus in burn victims. Participants in our study experienced a notable reduction in both the severity and distress associated with pruritus. Although there is a paucity of studies specifically examining the direct impact of percussive therapy on pruritus management, previous research has suggested that physical therapies such as pressure or massage interventions may alleviate pruritus and pain in individuals with burns [20–22].

Research has shown that compression massage can effectively alleviate post-burn pruritus in cases where active hypertrophic

scars are present [2,20,21,23]. Individuals with moderate-sized burn scars who regularly received massage therapy showed enhancement in scar condition [22]. As per a study that stratified the intensity and degree of pruritus into three categories: mild (scoring 1-3), moderate (scoring 4-7), and severe (scoring 8-10) [24], participants in the present research reported moderate levels of pruritus-induced distress, which were sustained during both pharmacological and non-pharmacological treatments. This finding suggests that health care providers should prioritize pruritus management and adopt systematic methodologies to manage these symptoms effectively.

The satisfaction with pruritus treatment was measured as 5.6±2.0 before the intervention and significantly increased to 6.0±2.0 after the intervention ($t=-2.525, p=.014$). Despite 63% of the study participants receiving standard itch-relieving treatment, the severity and distress of pruritus manifested at a moderate level. This result aligns with findings where around 70% of burn patients underwent itch-relieving treatment, yet the satisfaction with pruritus management was not satisfactory

〈Table 1〉 General Characteristics and Burn Characteristics

(N=100)

Characteristics	Categories	n (%) or Mean±SD
Gender	Male	91 (91.0)
	Female	9 (9.0)
Age (yr)	(range 18-75)	46.7±10.14
Burn sites [†]	Head and neck	34 (34.0)
	Trunk	48 (48.0)
	Shoulders, arms and hands	75 (75.0)
	Hips, legs and feet	69 (69.0)
Burn range (%)		25.2±18.61
Burn depth (degrees)	Deep 2nd degrees	15 (15.0)
	3rd degrees	82 (82.0)
	4th degrees	3 (3.0)
Period since burn injury (day)	(range 50-530)	165±86.03
Antihistamins use	Yes	63 (63.0)
	No	37 (37.0)

[†] Multiple answer.

〈Table 2〉 Burn characteristics of pruritus, distress, satisfaction

(N=100)

Variables	Range	Pre-test (n=100)	Post-test (n=100)	t	p
		M±SD	M±SD		
Severity of pruritus	0-10	5.5±2.4	4.7±2.4	6.90	.000
Distress of pruritus	0-10	5.0±2.5	4.6±2.4	5.223	.000
Satisfaction of pruritus management	0-10	5.6±2.0	6.0±2.0	-2.525	.014

[3,25]. Such outcomes indicate that pruritus management in burn patients is not being systematically conducted and is failing to yield satisfying results. Therefore, medical professionals treating burn patients should recognize the need for a more proactive and systematic approach in the management of pruritus.

Existing literature identifies Transcutaneous Electrical Nerve Stimulation (TENS) as a well-established strategy for managing pain and post-burn pruritus [26]. TENS has been widely utilized as a noninvasive treatment, showing significant decreases in post-burn pruritus [27]. The non-pharmacological self-management strategy explored herein demonstrated efficacy comparable to that of TENS. Therefore, the findings suggest that this method may be regarded as a supplementary treatment alternative for patients suffering from post-burn pruritus, akin to the established benefits of TENS.

In this study, the authors utilized a Numeric Rating Scale (NRS) to quantify the severity and distress of pruritus, as well as satisfaction with pruritus management. The tool, crafted specifically to assess pruritus levels in burn patients, was designed to be concise and easy to administer within a clinical setting. The use of a Visual Analogue Scale (VAS) in gauging the severity and distress of pruritus is established to be reliable and valid[24]. However, patient satisfaction, being an outcome measure of pruritus management, cannot be fully evaluated by the VAS alone. Given the strong correlation between post-burn pruritus, depression, and quality of life, effective management of post-burn pruritus is critical in enhancing patients' overall quality of life [28].

The study affirmed the effectiveness of percussion therapy in managing post-burn pruritus, a condition that often remains uncontrolled despite the use of moisturizers and pharmacological treatments. Percussion techniques can be effortlessly executed and might help prevent secondary skin damage instigated by scratching. This approach is straightforward and can be conveniently applied not only during hospitalization but also post-discharge, thereby extending its benefits into the patient's recovery phase at home.

Limitation and Suggestion

As a one-group pretest-posttest study, there are inherent limitations to its internal and external validity [29]. Common threats to internal validity, including history, maturation, and testing effects, are present [29]. It is recommended that future

studies adopt a more stringent design, incorporating a control group or a randomized approach. The present study's focus on short-term outcomes of percussion effectiveness neglects critical long-term considerations, including psychological well-being and the quality of life of burn patients. Subsequent studies are encouraged to explore these extended effects, encompassing symptom management, mental health outcomes, and overall life quality. Additionally, the research was conducted in a single burn center in Seoul, South Korea, a factor that may limit the findings' generalizability. Future research efforts may benefit from multi-center collaborations, thus broadening the applicability and relevance of the results. Lastly, the study's key limitations include the absence of evaluation concerning the amount of percussion therapy applied by patients post-education, and the lack of assessment of the patient's understanding of the provided education. These omissions leave uncertainties about the actual implementation of the intervention and the overall impact of the education. Addressing these concerns in future research would contribute to a more comprehensive understanding of the subject matter.

Conclusion

Percussion therapy emerges as a promising treatment for post-burn pruritus during burn patient care. Our research demonstrates that straightforward and easily applied percussion techniques can aid in reducing the severity and distress associated with pruritus while enhancing satisfaction in managing post-burn pruritus. Nurses, who are often on the front lines dealing with a variety of symptoms, can use percussion as a non-invasive, standalone intervention in their care regimen.

Conflicts of Interest

The authors declared no conflict of interest.

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Evaluation of the Effects of Self-Managed Percussion Therapy Using Video Education: A One-Group Pretest-Posttest Pilot Study for Burn Patients' Pruritus Management

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Purpose: Post-burn pruritus is one of the most prevalent complications experienced by burn patients. Though medications are prescribed for pruritus, managing this condition can prove challenging. The aim of this research was to develop and disseminate non-pharmacological self-management educational resources, and subsequently evaluate the effectiveness of implementing a percussion therapy approach. **Methods:** A one-group pretest-posttest design was employed to evaluate the effect of percussion therapy on one hundred patients, all of whom had suffered deep second-degree burns and undergone skin graft surgery. Variables such as the severity of pruritus, distress caused by pruritus, and satisfaction with pruritus treatment were scrutinized. A paired t-test was conducted to compare these variables before and after the intervention. **Results:** The majority of participants were diagnosed with third-degree burns, and the average Total Body Surface Area (TBSA) affected was 25.2%. Post-test results revealed a marked reduction in both severity and distress caused by pruritus. The intervention led to significant decreases in average severity and pain due to itchiness, and an increase in the satisfaction level following the application of percussion therapy. **Conclusions:** The implementation of the percussion was identified as effective in diminishing post-burn pruritus, alleviating pruritus-associated pain, and enhancing satisfaction with pruritus treatment. The percussion approach presents itself as a non-invasive, non-pharmacological strategy for managing pruritus in burn patients.

Key words : Burn; Percussion; Pruritus

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