

# The Management of Burn Injuries by Dermatologist: A Single Center Pilot Study

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## ABSTRACT

**Background:** Burns are a major cause of morbidity and mortality worldwide. Most burn patients are treated in an outpatient setting. However, the type of burn injuries, frequency of burn injuries treated by dermatologists, and therapeutic approach is unknown.

**Objective:** To assess burn injury incidence in a single center academic dermatology practice, and describe demographic characteristics of burn patients seen by dermatologists.

**Methods:** A retrospective chart review analysis of 51 patients seen by 7 dermatologists from April 2010 to July 2014.

**Results:** Of the 51 patients seen, burns from hot metal were the main mechanism of injury followed by contact with hot liquids. Silver sulfadiazine was the most commonly prescribed treatment. At the time of the visit 84.3% (n=43) had other dermatological conditions.

**Conclusion:** Our study demonstrates that burns are not frequently seen by dermatologists. We hypothesize that longer wait times in specialty practices, the lack of burn-specific training and the complexities of burn care prevent dermatologists from being first line providers in this arena. A larger epidemiological study is needed to further elucidate these issues.

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## INTRODUCTION

Burns are a type of trauma where a transfer of external energy leads to damage of skin and soft tissue that can potentially lead to physical and psychological disability. In the United States, it is estimated that there are over 1 million burn injuries per year.<sup>1</sup> Of the 450,000 patients that received medical care for burns in 2013, the majority were treated in an outpatient setting.<sup>2</sup> Burn care is known to be costly, and with rising healthcare expenditure cost-effective outpatient burn care is critical.<sup>3,4</sup>

Burns are complex injuries often requiring a multifaceted approach to treatment and evaluation in order to address pain, infection, pruritus and scarring.<sup>5</sup> A 2001 study found that the formation of an interdisciplinary burn team including a dermatologist resulted in improved treatment compliance and a lower re-admission rate.<sup>6</sup> Given the extensive training dermatologists receive on the physiology and pathophysiology of the integumentary system, one would assume that dermatologists would be first line providers in this arena. However, a thorough literature review revealed a lack of studies conducted in dermatology clinics in the United States that would confirm or refute this assumption. A study conducted in Taiwan, however, showed that as few as 15.9% of outpatient burns are seen by dermatologists, indicating the importance of epidemiological data about burns and burn treatment in these settings.<sup>7</sup>

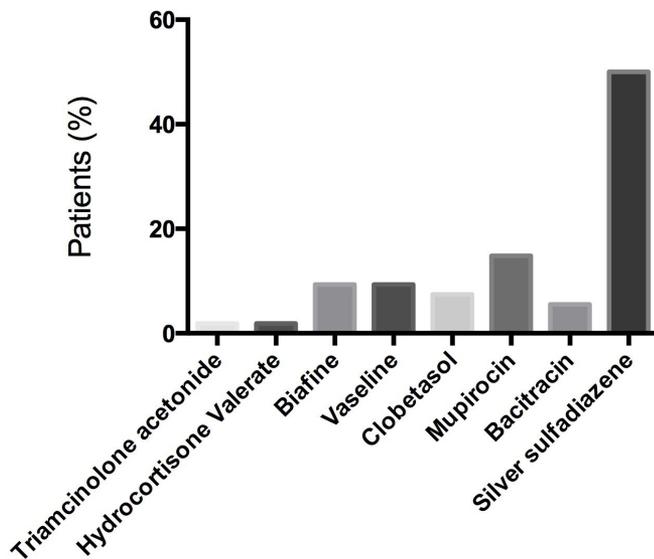
While the National Burn Registry collects data on inpatient treatment and outcome, no such data is available for outpatient

burn visits. In this single center study, we aimed to assess demographic characteristic as well as provide a perspective on epidemiological significance of burn injuries in a dermatology clinic.

## PATIENTS AND METHODS

This study was approved by the Institutional Review Board of Albert Einstein College of Medicine of Yeshiva University. A retrospective chart review was conducted at the Einstein-Montefiore Division of Dermatology. Electronic medical records were queried to identify dermatology visits with a burn diagnosis using ICD-9 codes for burns (940.0-949.5). Patients presenting with sunburns were excluded from the study. The following parameters were collected: gender, age, burn etiology, degree of burn injury, body part affected, duration of injury and type of treatment received. Burns were classified using the following classification system: 1st degree (erythema, epidermal loss), 2nd degree (blisters with epidermal loss, bullae and erosions) and 3rd degree (full-thickness burns).

"Burns are complex injuries often requiring a multifaceted approach to treatment and evaluation in order to address pain, infection, pruritus and scarring."

**FIGURE 1.** Prescribed treatment for burns.

## RESULTS

There were a total of 67 burn related visits distributed amongst 7 dermatologists from April 2010 to July 2014. Of these visits, 51 were initial consultations and 16 were follow-ups. Patient and injury characteristics are summarized in Table 1. The majority of the patients were female (84.4%). The mean age of the patients was 40.6±19.36 years, ranging from 1 to 91 years.

The most commonly reported etiologies were contact with metal (21.6%) followed by scald injury (17.6%). The average duration from the time of injury to visit was 8.6 days. Silver sulfadiazine was the most prescribed medication (52.9%) followed by mupirocin (15.6%) (Figure.1). In addition, the following dressings were used Telfa (n=2) and Xeroform (n=1). Out of 51 patients 33.3% (n=17) were categorized as 1<sup>st</sup> degree burns, with 2<sup>nd</sup> and 3<sup>rd</sup> degree burns in 31.4% (n=16) and 21.6% (n=11) patients, respectively. The upper extremity was the most commonly affected area (Figure 2). The majority of the patients (84.3%) sought medical attention for other dermatological conditions at the time of the visit.

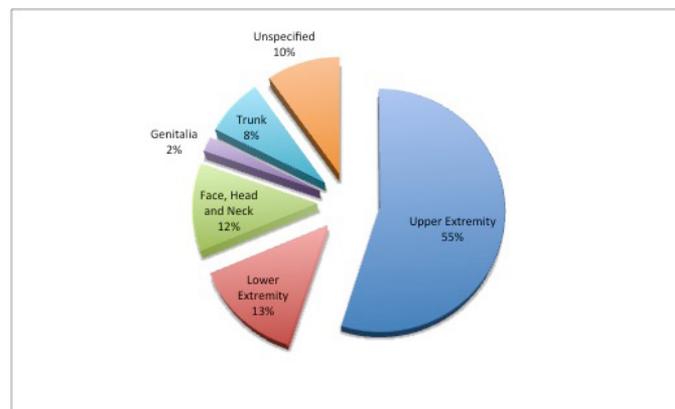
## DISCUSSION

In this single center study, we found that patients infrequently visited dermatologists with a burn as the chief complaint. Furthermore, the majority of these patients presented with additional reported dermatological comorbidities. This finding suggests that many patients presented for a separate dermatological complaint, and were treated for their burns incidentally, or that they had accessed dermatologic care in the past for a separate condition. We can speculate that perhaps patients do not consider their dermatologist for initial evaluation of their

burns. Most of the burns were caused by direct contact with a hot object followed by scald burns whereas nationally, the most common cause of burns is fire/flame followed by scald burns.<sup>8</sup> Most of the burns appeared to be unrelated to occupational exposure. Etiology of burn injury and body part affected are similar to patients presenting to an emergency department.<sup>9</sup> While we noted many similarities between our patients and those treated in the emergency department, the frequency of dermatologic visits was significantly lower.<sup>9-11</sup>

It is unclear what accounts for the lower frequency of burn injuries seen in our study. Several factors, such as appointment availability for acute burn injuries, burn injury training during residency and continued exposure to the field of burn care, need to be further explored to account for these differences. For example, severe pain associated with thermal injury may force patients to seek immediate care.<sup>12</sup> Furthermore, the low frequency of burns observed in our study may, in part, be explained by a shortage of dermatologists and the ensuing longer wait times for an appointment.<sup>13</sup> A study done in 2008, showed that the average wait time for a new appointment to see a dermatologist was 33 days.<sup>13</sup> Availability of follow-up appointments is critical, as burn wounds may require close monitoring for signs of infection and proper scar formation. To address this issue some practices have hired physician extenders; in fact, utilization of nurse practitioners and physician assistants has increased over the years, with shorter wait times in settings with these providers.<sup>13,14</sup> Therefore, employing physician extenders may encourage patients to seek specialty care from their dermatologist by mitigating barriers to entry. Additionally, to accommodate patients presenting with acute pain individual practices can allocate urgent care appointments to see patients on an emergent basis.

In a joint effort, the American Council of Graduate Medical Education and the American Board of Dermatology have identified proper wound care and management as one of the

**FIGURE 2.** Anatomic distribution of burn injuries.

**TABLE 1.**

Patient and Injury Characteristics		
<b>Age</b>		
Mean		40.6
St. Dev.		19.4
Range		1.0-91.0
<b>Gender</b>		
Male		15.6%(n=8)
Female		84.4%(n=43)
Average duration from injury to visit (days)		8.6
<b>Burn severity</b>		
1st Degree		33.3%(n=17)
2nd Degree		31.4% (n=16)
3rd Degree		21.6% (n=11)
Unspecified		13.7% (n=7)
<b>Etiology</b>		
Metal		11
Liquids		9
MRI		1
Laser		1
Chemical		1
NB-UVB		1
Unspecified		27

key milestones that need to be achieved by dermatology residents; however, there is no data on the nature and the amount of wound care training during residency.<sup>15</sup> Moreover, once in practice, continuing education is paramount to ensuring high quality wound and burn care.<sup>16,17</sup> The lack of education in these two areas is a harbinger of a wider dearth of academic focus on burns in dermatology. A recent review of dermatology literature revealed a paucity of clinically oriented coverage of topics pertaining to therapeutic management of burn patients. Upon review of the American Academy of Dermatology Annual Meeting Archives from 2009 to 2014, only 2 educational sessions were identified within the realm of burn care and management. Furthermore, there was a lack of clinically oriented literature pertaining to thermal burn care in several high impact factor dermatological journals (*Journal of Investigative Dermatology*, *JAMA Dermatology*, *Journal of Dermatological Science*, *Acta Dermato-Venereologica*, *Clinics in Dermatology*). Taken together, these findings suggest the necessity for further education about burn care within the field of dermatology in order to provide more competent and confident dermatological care for burn patients.

The therapeutic approach to burn care has its own challenges. The American Burn Association provides guidelines for

deciding which patients can be treated in an outpatient setting versus those that should be referred to burn centers.<sup>18</sup> Deep partial, and full thickness burns usually require excision in a surgical setting; however, patients with more superficial burns and burns at a later stage of healing may be managed in an outpatient setting.<sup>19,20</sup> Assessing burn depth may be challenging even for an experienced clinician.<sup>21</sup> Selection of treatment depends not only on burn etiology but also on the body part affected, the depth of the injury, and the body surface area (BSA) involved. Interestingly, silver sulfadiazine (SSD) was the most prescribed treatment by the providers in our study. SSD has been a treatment of choice for burns for decades mainly due to its antimicrobial properties. However, several clinical studies have found that SSD actually delays burn wound healing.<sup>22,23</sup> Notably, a study that reviewed 30 randomized clinical trials showed that SSD was consistently associated with delayed wound healing compared to other products.<sup>24</sup> These studies, together with our findings, suggest that lack of focus on burns in dermatologic training results in a disconnect between evidence and clinical practice.<sup>25</sup>

Our study was limited by its retrospective design and the lack of a standardized burn registry. Additionally, the data on total BSA, an important characteristic in judging burn severity, was not available. It is also important to note that several factors could potentially influence the frequency of burn patients seen in a particular dermatology clinic such as appointment availability, geographic location and socioeconomic factors. Several socioeconomic factors such as low income, low level of education and large family size have been associated with an increased risk of burn injuries.<sup>26</sup> Our study was conducted in the Bronx, a community engulfed with many socioeconomic disparities affecting health outcomes that may also influence burn injury incidence.<sup>27</sup>

With most burns seen in an outpatient setting, burn care may represent a niche not fully explored by dermatologists. Here, we set the stage for further discussion and address likely barriers. A shortage of dermatologists and the resulting long wait times for an appointment are likely impediments to the patient, accounting for lower incidence of burns seen by dermatologists. Furthermore, a lack of focus on burn care in residency, continuing medical education and dermatology literature impedes dermatologists from taking on a more active role in this field. Our study underscores the merits of a larger scale, multi-center epidemiological evaluation to fully elucidate the role of dermatologists in outpatient burn care.

## CONCLUSION

Our study demonstrates that burns are not frequently seen by dermatologists. We hypothesize that longer wait times in specialty practices, the lack of burn-specific training and the complexities of burn care prevent dermatologists from

being first line providers in this arena. A larger epidemiological study is needed to further elucidate these issues.

## DISCLOSURES

Dr. Friedman serves as a consultant for Galderma, Biogen, Aveeno, IntraDerm, Puracore, La Roche Posay, Amgen, Pfizer, PHD Skin Care; Advisory Board for Nerium International, Valeant, Nano BioMed, Microcures, and Novartis; Research grants from Valeant.

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