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# Outpatient treated burns in infants younger than 1 year in Helsinki during 2005–2009



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## ABSTRACT

In general, voluminous data exists concerning burns in children, but the data focusing specially on children less than 1 year of age is sporadic. We therefore focused on examining the special features of burns in children less than 1 year of age.

A retrospective study of all outpatient treated burn patients <1 year old at the Hospital for Children and Adolescents, Helsinki, Finland, from January 2005 to December 2009 was performed. During the 5-year period we identified 106 outpatient treated infants with burns, representing 15% of all pediatric burns during the study period.

The majority was male and aged 9–12 months. Most of the burns occurred at home, and in most cases a caregiver was present in the injury room. Scalds were the most common type of injury followed by contact burns. The most common source of scald was from cups containing hot drink, and the most common source of contact burn was hot stoves or oven doors.

Special attention needs to be targeted toward the prevention of burns in children less than 1 year of age. The majority of the injuries could have been prevented with more vigilance.

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## 1. Introduction

Infants and toddlers from birth to 4 years are especially prone to burns [1–4]. Among younger children, the most common age for burn appears to be between 1 and 2 years [2,3,5]. An increasing trend of burns requiring hospitalization in infants less than 1 year of age is observed and published [6–8].

Despite the voluminous data on burns in children, there seems to be paucity in the data focusing specially on children less than 1 year of age. Grouping pediatric burns into ages 0–2 years [9] or 0–4 years [10] or even with larger range [11], may limit the detailed information on the patterns and risk factors

typical for burn in this particular infant population. Infants under 1 year of age are a specific group. During the first year of life, the child begins to gradually develop independence of mobility. Until the age of 6 months, infants are virtually immobile. Mobility evolves from rolling to crawling and finally to walking around the age of 1 year. Along with the increasing capacity of moving by themselves, children are at greater risk for injuries in general, including burns, because of their natural inquisitiveness, with no awareness of dangerous situations [12].

The aim of this study was to analyze burns requiring hospital outpatient treatment in infants younger than 1 year during 2005–2009 in the Helsinki University Hospital district.

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Our specific aims were to chart the mechanisms of burns, their treatment and outcome in this group to identify whether they could be prevented.

## 2. Patients and methods

All admissions due to burns in patients under the age of 16 (ICD-10 codes T20–T32) were identified from the electronic hospital institutional database from January 1, 2005, to December 31, 2009. Inclusion criteria for this current retrospective study were that the child was aged less than 1 year when the burn occurred, ICD-10 codes T20–T32 were given as first diagnose codes and children required outpatient treatment in the Hospital for Children and Adolescents, Helsinki University Hospital, Helsinki, Finland, during the study period. During the 5-year study period, 692 admissions due to pediatric burns in the Hospital for Children and Adolescents in Helsinki, Finland, were recorded. Among the burn victims less than 1 year of age, there were 20 who required inpatient treatment and were excluded from this current study.

Computerized medical records of patients fitting the inclusion criteria were reviewed in detail for age, gender, date of first outpatient admission, number of outpatient visits, cause and mechanism of burn, initial and final TBSA (total body surface area) of burn, site of burn, location of the patient when the burn occurred and management of the burn by one investigator (E.L.). The initial TBSA was estimated in the emergency room by the pediatric surgery resident on call. The final TBSA was estimated by the senior pediatric surgeon or consultant plastic surgeon during the first dressing change. %TBSA was estimated to be 0.5 if the burned area was half the palm of the injured children or less than that. In those cases, where %TBSA was not available in the text, an estimation of the burned area was done retrospectively. In some cases photographs were available and in some cases the dimensions of the burns were measured in centimeters that guided the estimation. As this current study is a descriptive retrospective chart review focusing on the acute phase of the burn we included only the primary treatment. This study does not include follow-up of these patients.

Our policy is that on admission, the first estimation of the TBSA and degree of the burn is made. After that, the burned area is debrided from blisters, and burns are covered with Flamazine® (1% silver sulfadiazine; Flamazine, Smith & Nephew, Hull, UK) dressings. The next dressing change takes place usually after 2–3 days, when re-debridement and final estimation of the burned areas is completed.

### 2.1. Statistical analysis

Statistical analysis was conducted with NCSS 2009 (NCSS, NCSS, LLC, Kaysville, UT, USA).  $p$  values less than 0.05 were considered statistically significant. Correlation between age and final %TBSA was calculated by the Spearman rank correlation test, gender and final %TBSA, and the age and location of the burn was analyzed with the Mann–Whitney  $U$  test. Gender and location of the burn were further studied by cross-tabulation and the chi-square tests. A statistical analysis between the estimated TBSA and the final TBSA was

performed by Wilcoxon signed-rank test and the connection between the final TBSA and number of outpatients visits was tested by Spearman-correlation.

## 3. Results

This study comprised 106 burn victims who met our inclusion criteria, i.e. younger than 1 year of age who required outpatient treatment in hospital, representing 15% of all pediatric burns during the study period. Fig. 1 presents the admissions stratified by admission year. The history of the incident was consistent with the injury pattern in all cases, and thus investigations into child abuse were not performed. In only one case, information concerning the injury pattern was not available.

The demographic data of the patients are detailed in Table 1. There were 55 (52%) male patients with a majority, 61 (57%), aged 9–12 months. In statistical analysis, there were no differences between male or female children in terms of burn location or %TBSA. None of the patients needed operative treatment for their burns. None of the patients had complications due to treatment of their burns.

The number of outpatient clinic admissions varied from 1 to 13, with a median of four admissions. The first admission was usually performed two days after the injury. Dressings were changed and the burned area was checked. After that, outpatient clinical admissions happened every two to three days until the burn injured area was healed. We established a statistically significant connection between the final %TBSA and number of out-patients visits,  $p < 0.001$ .

The initial TBSA varied from 0.5 to 7%, mean 1.8%. The final TBSA varied from 0.5 to 7%, mean 1.4%, none had TBSA over 10%. The growth in the %TBSA tended to associate with older age, as illustrated in Table 1, however this correlation did not reach statistical significance,  $R = 0.11$ ,  $p = 0.25$ , nor did the correlation between gender and %TBSA in all patients,  $p = 0.30$ . A statistical analysis showed a statistically significant connection between the estimated TBSA and the final TBSA,  $p < 0.001$ .

Most of the burns occurred at home (86, 80%), and in most cases (71, 66%) a caregiver (parent or some other person) was present in the injury room. Home burns occurred outside during holiday trips, camping, visiting friends or relatives and

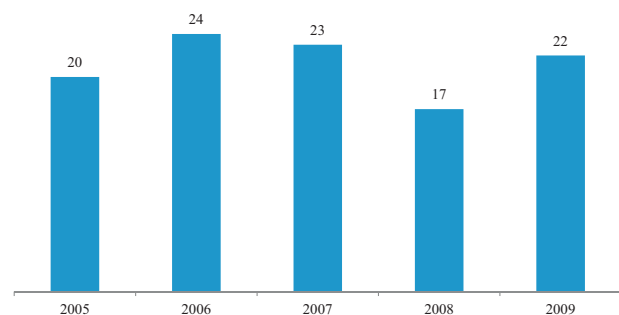


Fig. 1 – Number of burn patients less than year of age, stratified by admission year.

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