

Small Feet, Hot Streets: Pediatric Pavement Burns in Desert Climates

Marianne Estrada BS¹, Paul Kim MD xMS¹, Alexander Rowan MD¹, Vidhani Goel BS¹, Christopher Gonzalez DO¹, Brenna Chen MD¹, Kendra Coleman BS¹, Kavita Batra PhD¹, Rabia

Nizamani MD^{1,2}, Joshua Khorsandi BS¹, Stephanie Martinez MD^{1,2}

¹ Kirk Kerkorian School of Medicine at UNLV; ² Lions Burn Care Center



BACKGROUND

- In desert climates, **pavement temperatures can exceed 150°F**, creating hazardous environments where brief contact with heated surfaces can cause significant thermal injuries.¹
- Children are particularly vulnerable due to **developmental behaviors, limited awareness of environmental hazards, and outdoor activities** such as playing barefoot.²
- Pediatric patients have a **higher body surface area-to-mass ratio**, increasing susceptibility to fluid shifts, hypothermia, and metabolic instability following thermal injury.^{3,4}
- Despite the potential for deep tissue injury and substantial healthcare utilization, **pediatric pavement burns remain understudied**, particularly in high-temperature environments.

PURPOSE

To characterize the **injury severity, hospital course, and clinical outcomes** of pediatric pavement burns compared with other contact burns at a regional burn center serving a desert metropolitan area.

METHODS

- **Study Design:** Retrospective chart review at an American Burn Association-verified regional burn center from **2014–2023**.
- **Study Population:** Patients **<18 years** admitted with documented contact burns, excluding scald, flame, chemical, electrical, and friction burns.
- **Burn Classification:** **Pavement burns** (heated asphalt, concrete, or pavement) were compared with **other contact burns** (appliances, metal objects, grills).
- **Data Collection:** Burn registry data were validated through manual chart review. Variables included **demographics, TBSA, seasonality, ICU admission, ventilator use, length of stay, and mortality**.
- **Statistical Analysis:** Continuous and categorical variables were compared using **t-tests and chi-square tests**, respectively, with significance set at **p<0.05**.

Table 1: Demographic and seasonal comparison among pediatric patients with pavement burns vs other contact burns (n=98)

Variable	Categories	Pavement Burns (n=20, 20.4%)	Other Contact Burns (n=78, 79.6%)	P-value
Sex	Male	10 (50)	52 (66.7)	0.168
	Female	10 (50)	26 (33.3)	
Age	0 – 4.9	13 (65)	58 (74.4)	0.118
	5 – 9.9	0 (0)	8 (10.3)	
	10 – 14.9	5 (25)	7 (9.0)	
	15 - 18	2 (10)	5 (6.4)	
Season	Fall	1 (5.0)	19 (24.4)	<0.001
	Spring	0 (0)	17 (21.8)	
	Summer	18 (90.0)	28 (35.9)	
	Winter	1 (5.0)	14 (17.9)	
Weekday/Weekend	Weekday	12 (60.0)	52 (66.7)	0.576
	Weekend	8 (40.0)	26 (33.3)	

Table 2: Comparison of outcomes and health resource utilization outcomes among pediatric patients (pavement burns vs other contact burns) (n=98)

Variable	Pavement Burns (n=20, 20.4%)	Other Contact Burns (n=78, 79.6%)	P-value
Initial Temperature (M±SD)	37.1 ± 1.1	36.9 ± 0.5	0.307
Total Body Surface Area (M±SD)	4.2 ± 3.7	2.2 ± 2.4	0.041
Mortality	1/20 (5.0%)	0/78 (0%)	0.047
Length of Stay (M±SD)	4.1 ± 5.1	4.7 ± 6.1	0.644
Required ICU	3/8 (37.5)	2/29 (6.9)	0.025
Length of Stay in ICU (M±SD)	1.7 ± 0.6	2 ± 0.0	0.495
Required Ventilator	2/20 (10.0)	0/78 (0)	0.005
Ventilator Days (M±SD)	2	0	-

RESULTS

- Ninety-eight pediatric contact burn cases were identified, including 20 (20.4%) pavement burns.
- Patients with pavement burns were older on average (5.6±6.0 vs. 4.0±4.9 years, p=0.315) but not statistically different. (Table 1)
- **Pavement burns were highly seasonal, with 90% occurring in summer** compared to 36% of other contact burns (p<0.001). (Table 1)
- Pavement burns were associated with **larger TBSA** (4.2±3.7% vs. 2.2±2.4%, p=0.041), **higher mortality** (5.0% vs. 0%, p=0.047), **more frequent ICU admission** (37.5% vs. 6.9%, p=0.025), and **increased ventilator use** (10.0% vs. 0%, p=0.005). (Table 2)
- Mean hospital length of stay did not differ significantly (4.1±5.1 vs. 4.7±6.1 days, p=0.644). (Table 2)

CONCLUSIONS

Pavement burns, though less common than other contact burns in children, are associated with **significantly greater injury severity, ICU needs, and mortality**. These findings highlight the need for targeted prevention in high-temperature environments, **particularly in summer months**, and early recognition of pavement burns as high-risk injuries in children.

REFERENCES

