

Escharotomy Incisions in the Burn Foot & Toe with Compartment Syndrome

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INTRODUCTION

Patients with burn injuries to the lower extremities & feet are at risk for lower extremity compartment syndrome, especially if the burn injury is circumferential. The hypothesis was that two dorsal escharotomy incisions to release foot & toe compartment syndrome would be most efficacious in the prevention of lower extremity amputations.

METHODS

This was a retrospective chart review of foot compartment syndrome in burn patients in an urban district hospital setting (January 2001-May 2019). Thirty-seven burn patients required foot escharotomies and 3 of these patients also had escharotomies to the toes, (CPT codes 86.09 for ICD-9, 0JNR0ZZ, 0JNQ0ZZ for ICD-10). *Inclusion criteria* were: admission, burn injury, escharotomies for compartment syndrome. Patients were *excluded* if death occurred in < 3 days of the initial injury, or no documented incision placement. All 32 patients (59 feet; 21 toes) met inclusion criteria. This study was approved by the Institutional Review Board.

ESCHAROTOMY PROTOCOL

Evaluation for resolution of skin tightness & return of dorsalis pedis & posterior tibial signals on doppler after each step.

1. **Foot Incisions:** Using a cautery instrument or surgical blade, a linear longitudinal incision was placed on the dorsal aspect of the foot between the first & second metatarsals and fourth & fifth metatarsals. If further release was indicated, particularly with loss of posterior tibial signals, an additional linear longitudinal incision would be placed along the medial longitudinal arch, just inferior to osseous foot structures. The leg incisions should only extend down to the ankle joint, not past malleoli, & foot incisions should not extend proximal to the ankle joint. If there was no return of peripheral blood flow or fascial tightening or bulging of musculature, escharotomies were converted to fasciotomies.

2. **Toe Incisions:** If toes remained with slow cap fill time, & tight on manual exam even upon return of dorsalis pedis & posterior tibialis pulses or signals, the incision would be placed on the dorsal aspect of each toe, as this was a standard surgical approach for hammertoe correction or digital fractures.

INCISIONS (Red Lines)



Lateral Foot

Dorsal Foot & Toe

Medial Foot

Table 1. Patient Demographic Characteristics

Amputation	No	Yes	P value
Number of patients	21	11	--
Age (years)	20 (1-68)	41 (5-69)	0.3
%TBSA	40 (2-95)	36 (2-85)	0.6
Sex (M/F)	11/10	8/3	0.3
Diabetes Mellitus	4 (80%)	1 (20%)	0.5
Hours After Injury	6 (2-48)	6 (1-96)	0.04
	Median (range)		



1. Two Dorsal Escharotomies



2. Two Dorsal Foot and a Lateral & Medial Leg Escharotomies

Table 2. Comparison of Escharotomy Sites with Amputations & Fasciectomy

Escharotomy Site (#)	Amputation No	Amputation Yes	Fasciotomy Yes	Fascial Excisional Debridement
Dorsal (1)	2 (100)	0	0	2 (100)
Dorsal (2)	25 (83)	5 (17)	5 (17)	6 (20)
Dorsal (3)	4 (57)	3 (43)	4 (57)	2(29)
Dorsal (4)	0	1 (100)	0	0
Dorsal (2)/ Lateral (1)	1 (17)	5 (83)	4 (67)	2 (33)
Dorsal (2)/ Medial (1)	2 (100)	0	0	0
Dorsal (3)/ Medial (1)	0	2 (100)	0	0
Dorsal (2)/ Medial (1)/ Lateral (1)	0	3 (100)	2 (50)	2 (50)

Median (%)

CONCLUSION

1. Foot dorsal compartment release did not require more than two incisions at the skin/fat level & over the second & fourth metatarsal bones on the dorsum of the foot to decrease the lower extremity amputation rate in the majority of cases.
2. Dorsal/Lateral incisions had the highest number of amputations.
3. Toes require only one dorsal incision for adequate release of compartment syndrome.



3. Two year old with a circumferential burn & Two Dorsal Escharotomies



4. Two Dorsal Foot and 1 Lateral Foot & Leg Escharotomies

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