PREDICTORS OF FLAP AND LIMB SALVAGE FAILURE IN TRAUMA PATIENTS

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Purpose: Free and soft tissue transfers are an important part of military and civilian extremity reconstruction after trauma. However, most outcomes research is based on relatively small series because devastating soft tissue loss in civilian trauma is uncommon. Outcomes between military and civilian institutions are similar and can be compared across patient populations. The purpose of this study is to determine whether there are any predictors of flap and limb salvage failure to help guide extremity reconstruction.

Methods: This is a multi-institution retrospective review of patients treated with tissue transfer for extremity trauma at R Adams Cowley Shock Trauma Center (STC) and Walter Reed National Military Medical Center (WRNMMC) between 2005 and 2012.

Results: From 2005 to 2012, 610 tissue transfers were performed for extremity trauma, 359 at WRNMMC and 251 at STC. Half of these flaps were free tissue transfers. Patients were mostly male (91%) aged 15 to 81 years (mean 31, SD 12) with an injury severity score of 1 to 57 (mean 18, SD 10). Mechanism of injury (MOI) included blast (n=270), blunt (n=261), and penetrating (n=30). Flap failure occurred in 56 flaps (10%) and failed limb salvage resulting in amputation occurred after 79 flaps (14%). Using univariate analysis, there were no independent predictors of flap failure. Using multivariate analysis, there were also no independent predictors of flap failure. However, proximal vascular injury, free flaps, and flap failure were predictors of amputation.

Variable	Relative Risk	p-value	95% Confidence Interval
Baseline	1.00		
Sex (female)	0.647	0.278	0.294-1.32
Age	1.01	0.444	0.990-1.02
MOI			
Penetrating	1.42	0.237	0.793-2.54
Blunt	0.620	0.056	0.379-1.01
Injury severity score	0.996	0.747	0.974-1.02
Vascular injury	2.63	0.000	1.73-3.98
Transfer type (free)	1.64	0.012	1.11-2.42
Multiple extremities injured	1.32	0.251	0.821-2.13
Flap failure	1.98	0.004	1.24-3.15

Conclusions: While there were no independent predictors of flap failure, the presence of proximal vascular injury, use of a free flap, and flap failure were predictors of amputation. These variables also portend a greater need for amputation before attempted reconstruction. The decision to attempt limb salvage in a patient with these characteristics should be carefully considered because the likelihood of late amputation is significantly higher.