



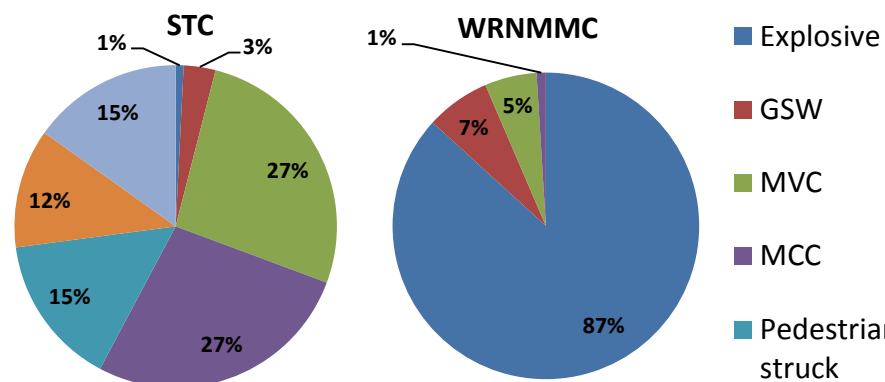
Late Amputation After Limb Salvage in Civilian and Military Trauma Patients



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Purpose: Given military conflicts in Iraq and Afghanistan, surgeons have gained significant experience concerning the management of soft tissue transfer for limb salvage in war wounded patients. However, we have yet to analyze the long term outcomes of limb salvage in the cohort of patients who undergo soft tissue transfer as part of their reconstruction. Furthermore, there are no comparisons between civilian patients and military patients, given the inherently different patient population and injury pattern. The purpose of this study is to compare limb salvage outcomes of civilian and military patients undergoing soft tissue transfer as part of their reconstruction.



Mechanism of Injury

Results: From 2005 to 2012, a total of 541 extremity cases requiring soft tissue coverage were reviewed, with 209 extremities reconstructed at STC and 332 extremities reconstructed at WRNMMC, respectively. The upper extremity cohorts significantly differed between the institutions, comprising 8% of extremity procedures at STC versus 41% of extremity procedures at WRNMMC. Heterotopic ossification and pain were a more common complications within the military trauma group compared to the civilian trauma group, 3 versus 7% and 2 versus 17% (p=0.034 and p=0.000), respectively. Given noted differences in mechanisms of injury and complication rates, subgroup analysis of the lower extremity group revealed significant differences in lower extremity complications and amputation rates. Infection and pain were the primary reason for amputation at WRNMMC (78%) and STC (50%) (p=0.312 for amputation and 0.259 for pain). While the amputation rate after flap failure was higher at STC, flap failure was not a common reason for failed limb salvage in either groups analyzed (9 versus 21%, p=0.257).

	STC		WRNMMC		p
	n	%	n	%	
Total Complications	64	25	84	27	0.701
Flap Failure	25	10	30	10	0.779
Pedicle Flaps	11	9	21	12	0.581
Free Flaps	14	11	9	6	0.200
Failed Limb Salvage	25	12	46	14	0.601
Upper Extremity	1	8	1	1	0.151
Lower Extremity	24	12	45	24	0.004

Complications

Conclusions: The military cohort of extremity injuries requiring soft tissue coverage had higher infection and pain rates than the civilian comparison cohort. Furthermore, lower extremity limb salvage outcomes were found to be significantly different in military patients than civilian patients undergoing soft tissue transfer based limb reconstruction. Psychosocial aspects of rehabilitation may play a role in late amputation because amputation secondary to medical necessity is similar between groups.

	STC	WRNMMC	p
	n(%)	n(%)	
Osteomyelitis	46(22)	58(30)	0.038
Soft tissue infection	22(11)	36(19)	0.046
Heterotopic Ossification	6(3)	13(7)	0.102
Pain	4(2)	42(22)	0.000

Amputations

	STC			WRNMMC			p
	Mean	Median	SD	Mean	Median	SD	
Age	36.6	35	14.2	25.7	24	6.4	0.000
ISS	15.8	13	10.2	19.5	17	9.6	0.000
Proc Prior	3.2	2	2.6	6.4	5	4.1	0.000
Days to Flap	14.0	7	30.7	34.2	19	82.1	0.000
Proc After	3.3	2	3.9	4.3	3	2.9	0.004
Hospital Days	26.9	23	16.5	67.2	54	43.1	0.000

Cohort Comparison

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 January 2005 and July 2012.