



Complications of Traumatic Frictional Burns in the Emergency Setting

Presented by Kyirsty Unger

Road Rash in the Adult ED

- Current practice standards
- TICU/13 A
- Wound Care / Burn Unit recommendations

Background

- Road rash is one of the most common conditions seen in the ED
- Road rash is a burn
- Often this injury is complicated by orthopedic or internal injuries
- Road rash does not trigger the clinical response for rapid wound care, fluid resuscitation, or surgical considerations that traditional burns receive.



(u/infamousboon1, 2018)

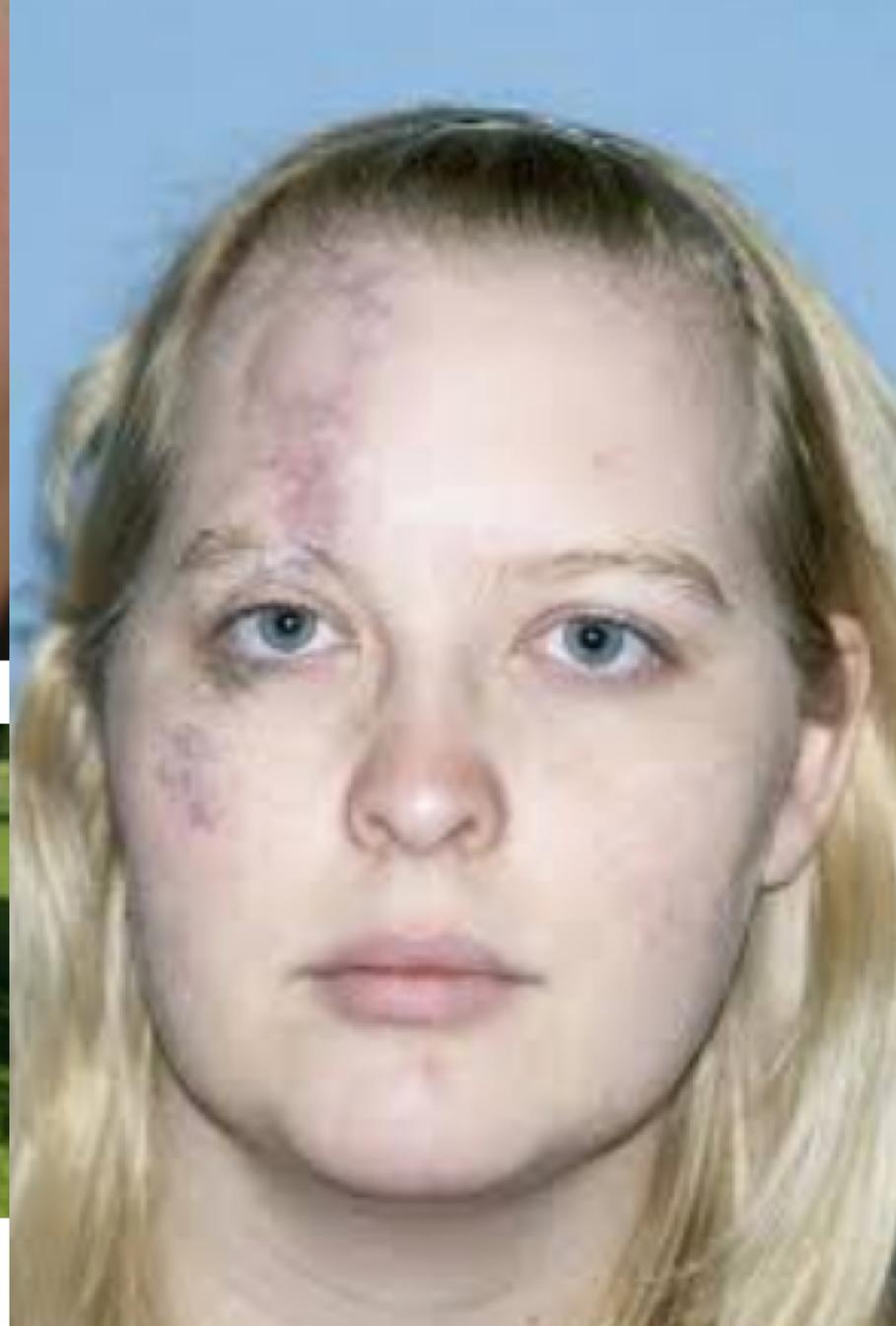




(Celebre, 2019)



(Arbritor, 2014)



(Miles & Elis 2006)

Early Hypothesis

- *Patients who do not get comprehensive wound care for their severe traumatic abrasions will have significant complications.*

Review of Literature 1965-2019

- Lay literature widely available
- 22 articles had some reference to road rash
- 7 articles specifically discussed road rash complications and/or management
- Level of evidence – expert opinion & case study
- Small sample sizes

Multiple Studies Are Needed

Preliminary Study 1: Quality Improvement chart review 2014 (n=100)

- wound care documentation
- discharge instructions
- Does this population experience complications related to soft tissue infections?

Study 2: Retrospective Chart Review. (n=261)

Aims to define the scope of the problem.

- Who is the population?
- How may people experience problems?
- What treatment are they given?
- When do problems occur?

Study 3: Prospective Cohort Study:

What does the problem look like and what are the long term outcomes?
Goals of this study will be to accurately describe the wound, how it changes over time, how is the patient affected?

Study 4: Intervention

Preliminary Study (n = 100, Jan - Oct 2014)

Care provided and documented	
Wound care within 24 hours	27%
Any wound care documented during ED or hospital stay	48%
Discharge instructions that referenced wound care	40%
Patient outcomes experienced with 4 months of injury	
Cellulitis	17%
Sepsis	8%
Surgical Site Infection	16%
Readmission	15%
Skin Grafting	2%

Study 2: Retrospective Chart Review

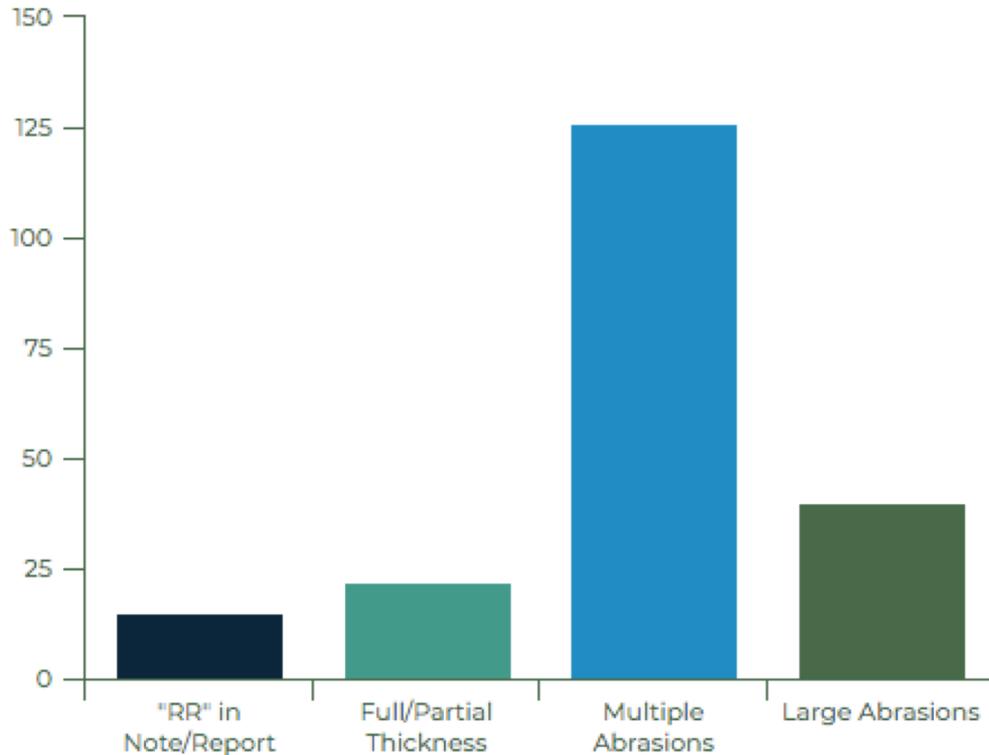
- *Complications of Severe Frictional Abrasions in the Emergency Department Setting: A Retrospective Study*
- Retrospective chart review of cases from 2016 to determine magnitude of complications in patients treated at OHSU (n = 261)

Snapshot in Oregon in 2016

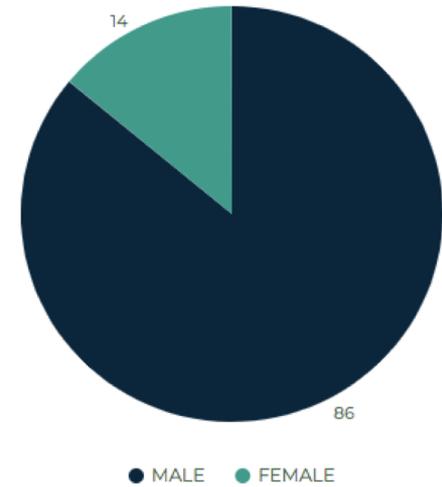
- 1,660 motorcycle and bicycle accidents were reported in Oregon.
 - OHSU treated 589 motorcycle and bicycle patients (entered into the OHSU trauma registry)
 - Of those patients, 84% (497) had ICD-10 codes associated with skin abrasions and traumatic wounds

PRELIMINARY RESULTS

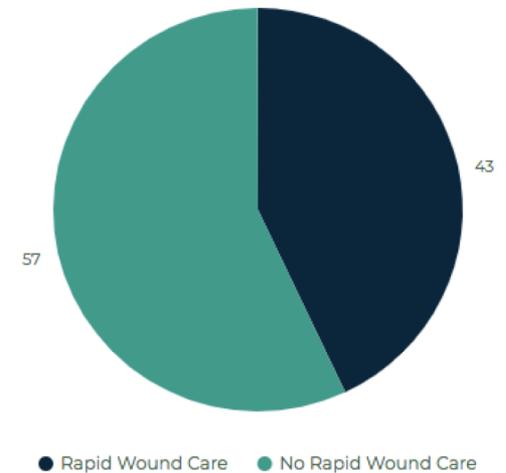
ROAD RASH DESCRIPTION



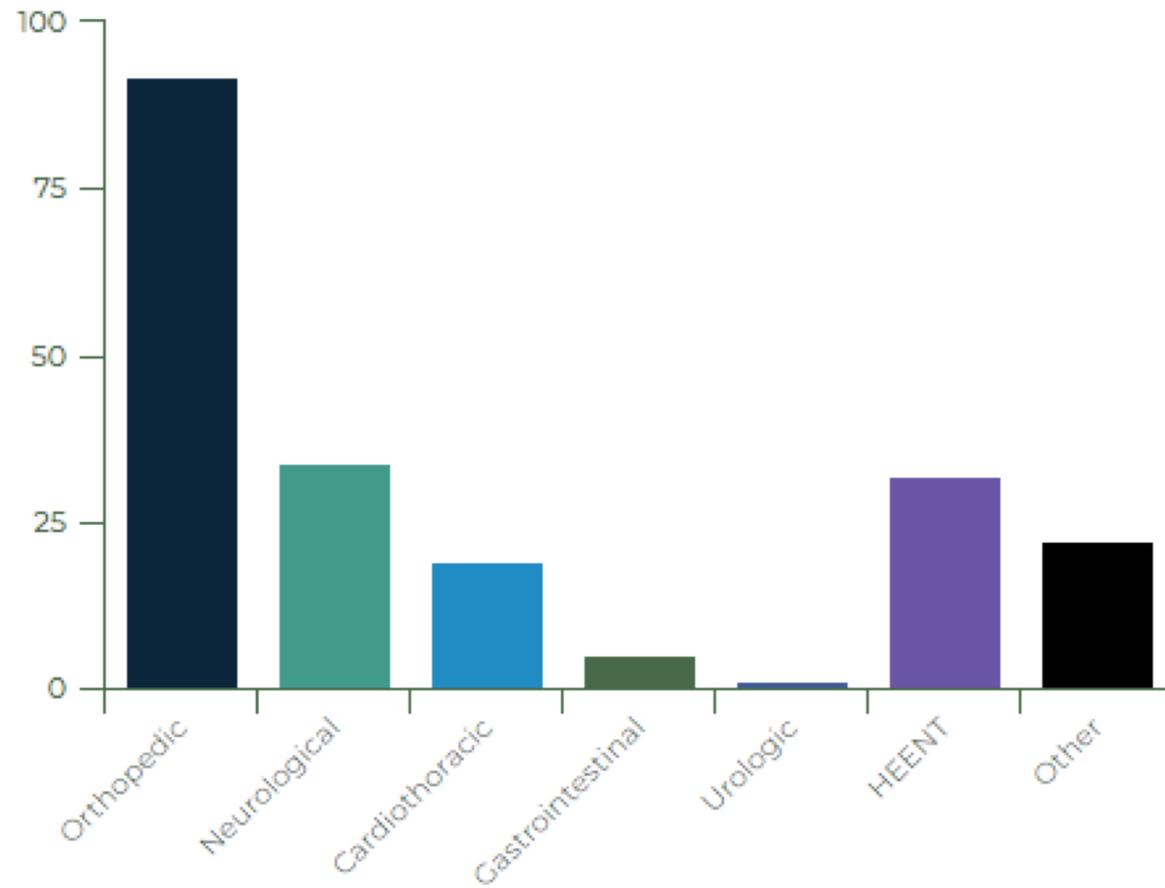
GENDER DISTRIBUTION



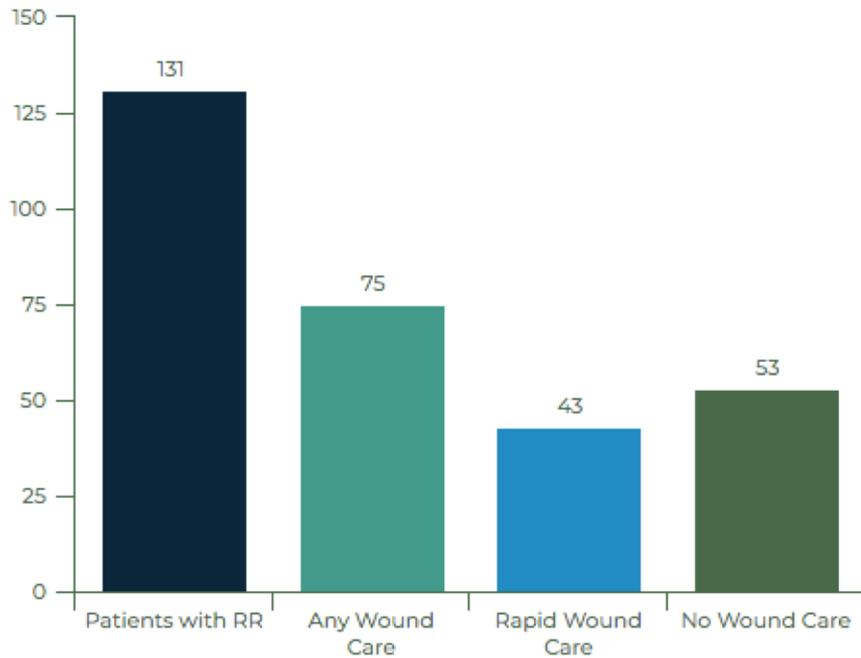
Rapid Wound Care



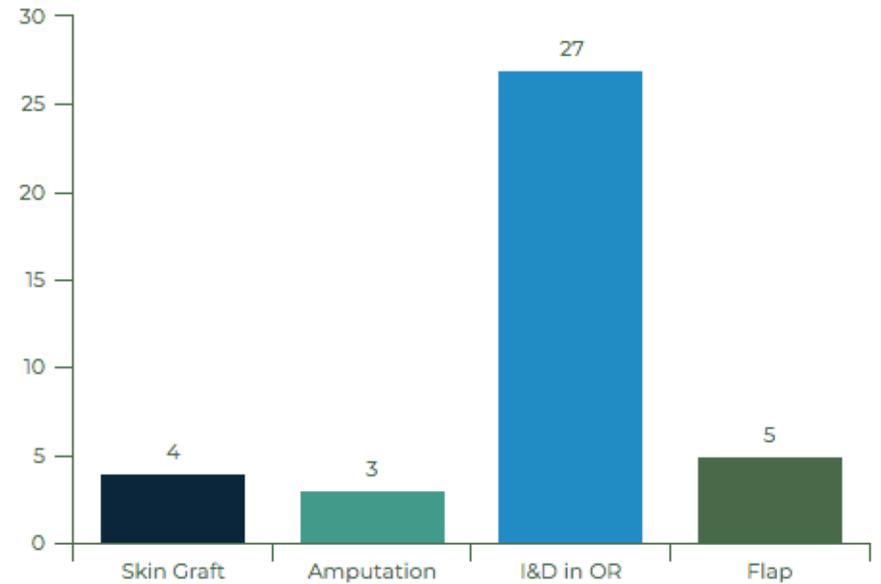
INJURIES BEYOND ROAD RASH



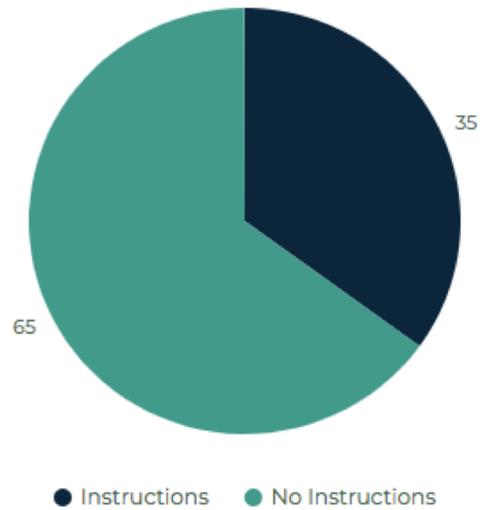
Wound Care Documentation



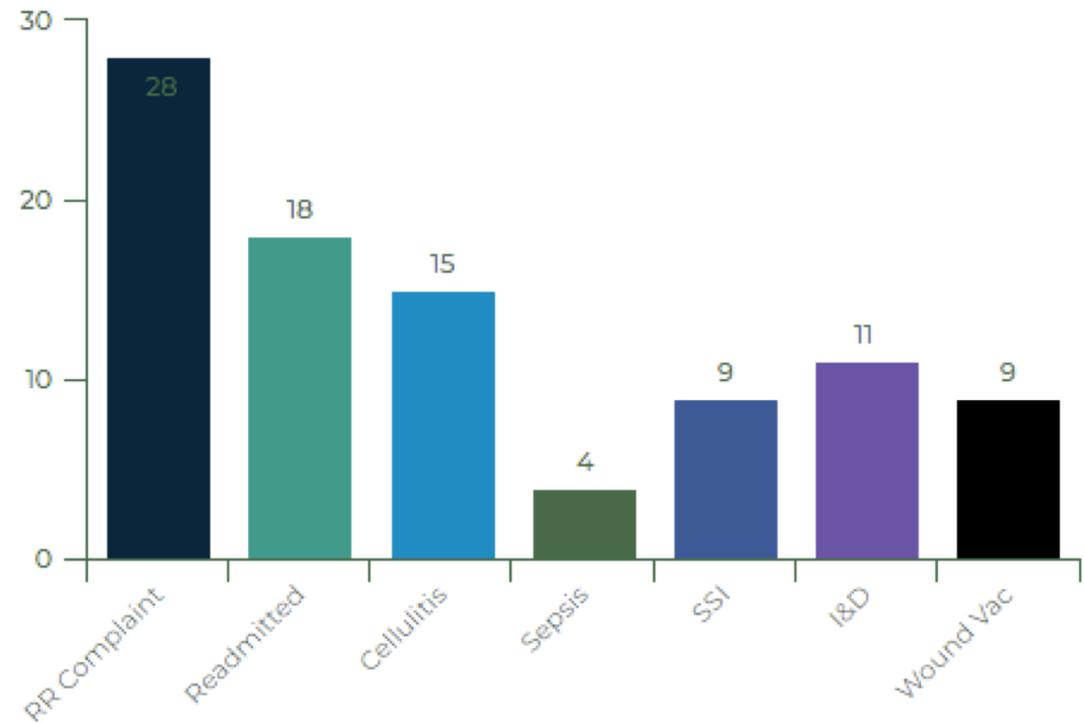
Inpatient Surgical Interventions



Discharge Instructions for Wound Care



POST-DISCHARGE COMPLICATIONS



Limitations

- Depends on retrospective data / subjective and limited documentation
- Only involves patients treated at OHSU, relies on Epic records that are seen at OHSU and CareEverwhere
- No information about patient outcomes following hospital treatment if they didn't have a complication
- We have no information about scarring, residual pain, functional changes
- ICD 9 versus ICD 10

2019-2020 updates

- Finished data collection
- Worked with biostatistician for analysis
- Presented at WIN conference
- Developing manuscript and plan for submission to the Journal of Burn care & Research.



Updated Analysis

- We included 207 patients for analysis.
- 1/3 of patients (74, 35.8%) received rapid wound care
- 1/2 received any wound care documented (116, 56.0%)
- 1/3 of patients received discharge orders or instructions related to wound care (64, 30.9%)
- 1/3 (72, 34.8%) had poor outcomes associated with road rash.
- Of these, (50 ,69.4%) during admission and (34, 47.2%) patients had post-discharge outcomes

	All patients n=207(100%)	Rapid wound care			Any wound care		
		No rapid wound care 133(64.3%)	Rapid wound care 74(35.8%)	p-value	No recorded wound care 91(44.0%)	Any wound care recorded 116(56.0%)	p-value
Patient demographics, n(%)							
Patient age, mean(SD)	44.13(16.72)	44.57(14.06)	0.8483	0.85	44.54(16.2)	44.09(15.53)	0.84
Patient sex (male)	175(100.0%)	112(64.0%)	63(36.0%)	0.86	80(45.7%)	95(54.3%)	0.24
Road rash characteristics, n(%)							
Trauma survey or EMS note of "road rash"	30(100.0%)	12(40.0%)	18(60.0%)	<0.01	8(26.7%)	22(73.3%)	0.04
Full thickness abrasion	39(100.0%)	16(41.0%)	23(59.0%)	<0.01	10(25.6%)	29(74.4%)	0.01
Multiple abrasions	204(100.0%)	131(64.2%)	73(35.8%)	1.00	91(44.6%)	113(55.4%)	0.26
Abrasions to back, thorax or flank	61(100.0%)	38(62.3%)	23(37.7%)	0.70	24(39.3%)	37(60.7%)	0.39
Injuries beyond severe road rash, n(%)							
Orthopedic	146(100.0%)	95(65.1%)	51(34.9%)	0.70	60(41.1%)	86(58.9%)	0.20
Neurologic	57(100.0%)	40(70.2%)	17(29.8%)	0.27	20(35.1%)	37(64.9%)	0.11
Cardiothoracic	35(100.0%)	26(74.3%)	9(25.7%)	0.17	21(60.0%)	14(40.0%)	0.04
Gastrointestinal	8(100.0%)	7(87.5%)	1(12.5%)	0.26	7(87.5%)	1(12.5%)	0.02
Urologic	4(100.0%)	2(50.0%)	2(50.0%)	0.62	1(25.0%)	3(75.0%)	0.63
Laceration	42(100.0%)	13(31.0%)	29(69.0%)	<0.01	7(16.7%)	35(83.3%)	<0.01
Head, eyes, ears, nose or throat	34(100.0%)	18(52.9%)	16(47.1%)	0.13	12(35.3%)	22(64.7%)	0.27
Care provided, n(%)							
Antibiotics prescribed	76(100.0%)	36(47.4%)	40(52.6%)	<0.01	14(18.4%)	62(81.6%)	<0.01
Discharge orders or instructions related to wound care	64(100.0%)	27(42.2%)	37(57.8%)	<0.01	9(14.1%)	55(85.9%)	<0.01
Inpatient outcomes, n(%)							
Inpatient admission	168(100.0%)	113(67.3%)	55(32.7%)	0.06	72(42.9%)	96(57.1%)	0.51
Inpatient length of stay	4.8(5.33)	5.82(6.37)	0.2764	0.76	3.71(4.51)	6.2(6.25)	<0.01
Diagnoses or interventions during inpatient admission*							
Surgical site infection	3(100.0%)	1(33.3%)	2(66.7%)	0.50	0(0.0%)	3(100.0%)	0.26
Bacteremia	9(100.0%)	5(55.6%)	4(44.4%)	0.48	2(22.2%)	7(77.8%)	0.30
Sepsis	8(100.0%)	5(62.5%)	3(37.5%)	0.31	3(37.5%)	5(62.5%)	1.00
Surgical interventions related to road rash during inpatient admission							
Skin grafting	4(100.0%)	0(0.0%)	4(100.0%)	0.01	0(0.0%)	4(100.0%)	0.14
Amputation	4(100.0%)	0(0.0%)	4(100.0%)	0.01	0(0.0%)	4(100.0%)	0.14
Incision and debridement	42(100.0%)	18(42.9%)	24(57.1%)	<0.01	4(9.5%)	38(90.5%)	<0.01
Flap surgery	8(100.0%)	2(25.0%)	6(75.0%)	0.02	0(0.0%)	8(100.0%)	0.01
Any diagnoses or surgical interventions related to road rash during inpatient admission	50(100.0%)	22(44.0%)	28(56.0%)	<0.01	7(14.0%)	43(86.0%)	<0.01
Post-discharge outcomes (4 months post-injury), n(%)							
Clinic visit for road rash complaint	45(100.0%)	19(42.2%)	26(57.8%)	<0.01	8(17.8%)	37(82.2%)	<0.01
Readmission	25(100.0%)	10(40.0%)	15(60.0%)	0.01	6(24.0%)	19(76.0%)	0.03
Number of readmissions, median (IQR)	0(0-5)	0(0-3)	0(0-5)				
Any post-discharge outcome related to road rash							
Cellulitis	23(100.0%)	8(34.8%)	15(65.2%)	0.00	3(13.0%)	20(87.0%)	<0.01
Sepsis	4(100.0%)	1(25.0%)	3(75.0%)	0.13	0(0.0%)	4(100.0%)	0.13
Surgical site infection	13(100.0%)	3(23.1%)	10(76.9%)	0.00	0(0.0%)	13(100.0%)	<0.01
Incision and debridement	16(100.0%)	5(31.3%)	11(68.8%)	0.00	1(6.3%)	15(93.8%)	<0.01
Skin grafting	1(100.0%)	0(0.0%)	1(100.0%)	0.36	0(0.0%)	1(100.0%)	1.00
Amputation	1(100.0%)	0(0.0%)	1(100.0%)	0.36	0(0.0%)	1(100.0%)	1.00
Vacuum-assisted closure of a wound	13(100.0%)	4(30.8%)	9(69.2%)	0.02	0(0.0%)	13(100.0%)	<0.01
Flap surgery	2(100.0%)	0(0.0%)	2(100.0%)	0.13	0(0.0%)	2(100.0%)	0.51
Any outcome related to road rash: any surgical site infection, clinic visit or surgical interventions related to road rash	72(100.0%)	33(45.8%)	39(54.2%)	<.001	13(18.1%)	59(81.9%)	<0.01

Conclusions/Next Steps...

- Retrospective data isn't accurate for capturing the impact and severity of traumatic abrasions.
- Further studies are needed-> Prospective Cohort Study
- Providing treatment and education for acute wounds could improve short term and long term patient outcomes
- Changing practice and expectations for nurses, physicians, patients

RESOURCES

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