Outcomes of laceration suture repair in the Emergency Department

(Running title: Outcomes of laceration repair)

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JM and DT conceived the study and prepared the study protocol. JM, DT and JK obtained ethics and governance approval. JM, SV, NG, MS-G, JW, AJ, BC and JK collected the data. JM and DT analysed the data. All authors contributed to writing the manuscript and approved the final, submitted manuscript.

Informed consent was obtained from all study participants and the study was approved by the Austin Health Human Research Ethics Committee.

Study data were collected and managed using the REDCap electronic data capture tool hosted by the Royal Melbourne Hospital Business Intelligence Unit.

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ABSTRACT

Objective

To assess patient satisfaction with laceration management, post-ED care, cosmesis, and complication rates

Methods

We undertook a prospective observational study of adult patients with lacerations sutured in two emergency departments (EDs) over a four-month period. ED data included participant demographics, laceration characteristics and management. A telephone survey was undertaken approximately 14 days post-ED discharge. Patient satisfaction with post-ED pain management, advice on wound care and follow-up, overall management, and wound cosmesis were evaluated using a six-item satisfaction scale (very dissatisfied to very satisfied). Details of wound infection, dehiscence and suture failure were recorded.

Results

Eighty-nine patients participated. The number (% [95% confidence interval]) of patients very satisfied with their laceration management were: post-ED pain management 55 (62.5% [51.5-72.4]), wound care advice 51 (57.3% [46.4-67.6]), follow-up advice 39 (43.8% [33.5-54.7]), overall management 61 (68.5% [57.7-77.7]) and cosmetic appearance 46 (51.7% [40.9-62.3]). Infection, dehiscence and suture failure occurred in 5 (5.6%), 8 (9.0%) and 8 (9.0%) cases, respectively. These complications were not associated with being very satisfied overall ($p=0.96$). Patients very satisfied with post-ED pain management, wound care advice, follow-up advice or wound cosmesis were much more likely to be very satisfied overall ($p<0.001$).

Conclusions

Most patients are very satisfied with their laceration management. However, there is scope for improvement, especially for follow-up and wound care advice. Complications are infrequent and not associated with overall satisfaction.

Key Words: complication, emergency department, laceration, satisfaction, suture

INTRODUCTION

Lacerations requiring primary suture closure are commonly managed in the Emergency Department (ED).¹⁻³ Since follow-up care is usually performed in the primary care setting, the opportunity for ED physicians to observe laceration repair outcomes is limited.⁴ These outcomes are broad and should focus on what patients value most – a good cosmetic result⁵ and a low rate of infection^{5,6}.

Previous studies of lacerations repaired in the ED have often focused on patient-rated and physician-rated cosmesis as a primary outcome.⁷⁻¹⁰ Fewer studies have assessed patient satisfaction with wound cosmesis and post-ED care, such as the provision of analgesia and advice on wound care and follow-up.^{4,11-13} Similarly, few studies have assessed patient satisfaction with their overall management.¹⁴⁻¹⁵

Studies that assessed patient satisfaction with overall management and cosmesis reported high levels of satisfaction. However, most were limited by small sample sizes and strict exclusion criteria. Moreover, reports of the outcomes of laceration repair in Australian EDs, focusing on the adult patient population, are scarce. The aim of this study was to assess adult patient satisfaction with laceration management and cosmesis in two Australian EDs. We also aimed to determine rates of laceration complications – infection, dehiscence and suture failure. The findings may highlight areas of ED wound management that could be targeted for improvement.

METHODS

We undertook a prospective observational study in the Austin Hospital and Royal Melbourne Hospital EDs between February and May 2019, inclusive. The Austin Hospital is a metropolitan, tertiary referral centre with a mixed (adults and paediatrics) annual ED census of approximately 90,000 patients. The Royal Melbourne Hospital is an inner-city adult trauma centre, with an annual ED census of approximately 80,000 patients. Informed consent was obtained from all study participants and the study was approved by the Austin Health Human Research Ethics Committee.

Patients were eligible for inclusion if they were aged 18 years or more and had a laceration requiring primary suture or staple closure. Exclusion criteria were refusal to participate in or inability to complete the follow-up survey (significant disability or cognitive impairment, severe illness, limited English as determined by the treating ED practitioner), inability to follow up the patient (e.g. no telephone), admission to hospital for ongoing wound management and suture repair by non-ED practitioners (e.g. plastic surgery registrar/consultant).

A convenience sample of patients was recruited when an investigator was present in the ED, mainly 08:00-20:00, Monday-Saturday. During these periods, consecutive patients who met the study entrance criteria were enrolled by a research student or emergency physician investigator.

There was no change in routine patient care. Prior to discharge, potentially suitable patients were approached and invited to participate in the study. While participating patients were in the ED, a structured closed-question data sheet, based on that of Hollander et al.¹⁶, was used to record patient and wound characteristics: demographics, co-morbidities, medications, smoking status, wound characteristics (mechanism of injury, wound site, length, width, shape, depth, margin, contamination, foreign bodies) and wound preparation, closure techniques and dressing type. Data on the prescription of antibiotics and analgesia, as well as the number of days before suture removal, were also recorded (Appendix 1: ED data collection document).

At least 14 days following laceration repair, patients were followed up by telephone. At least five attempts were made to contact each patient. A standardised script was delivered upon contact. If verbal consent was obtained to participate in the follow up survey, a questionnaire, designed and trialled for the study, was administered to assess the study outcomes. The follow up investigator was blinded to the patients' ED care.

The primary study outcome was patient satisfaction with a range of variables: post-ED pain management, wound care advice, follow-up advice, wound cosmesis and overall management. Satisfaction was measured with a six-item Likert scale ('very dissatisfied', 'dissatisfied', 'slightly dissatisfied', 'slightly satisfied', 'satisfied' or 'very satisfied') adapted from a validated American Pain Society questionnaire.¹⁷

Data on wound complications of infection, dehiscence and suture failure (sutures untying) were also recorded. Wounds were defined as infected if antibiotics were prescribed by an

independent physician following wound review. Wound dehiscence was determined if the patient reported that their wound “came apart” (Appendix 2: follow-up data collection document).

Due to a lower than expected recruitment rate, our original sample of 400 participants was not met. However, a *post hoc* power calculation indicated that the study had a power of 0.8 to demonstrate a difference in proportions between two participant groups of 30% (e.g. 40% versus 70%).

All data were reported descriptively (e.g. mean, proportions) with levels of uncertainty (e.g. SD, 95% confidence intervals [95% CI]). For satisfaction outcomes, comparisons were made between participants who reported being “very satisfied” and those who reported all other satisfaction responses combined. This approach was taken because the ultimate aim of management should be to achieve very satisfied patients. If a patient is not very satisfied, it can be assumed that there is potential for improvement in the variable examined.

The association of variables with certain laceration outcomes were analysed using the Chi-square test (for comparison of proportions) and Student’s t-test (for continuous data). SPSS for Windows statistical software (version 26.0, SPSS Inc., Chicago, Illinois, USA) was used to analyse all data. The level of significance was 0.05.

RESULTS

Of 106 enrolled participants, 89 participated in the follow-up survey. Of the 17 patients lost to follow-up, 12 were uncontactable and five declined participation when contacted (Figure 1). Patients who were followed up (complete data) and those who were not (incomplete data) did not differ substantially (Table 1).

Participants with follow up data (n=89) had linear lacerations in 60 (67.4%) cases and smooth margins in 66 (74.2%). The cause of injury was blunt trauma in 28 (31.5%) cases, wood in 10 (11.2%), a knife in 9 (10.1%) and glass in 7 (7.9%). The remaining 35 (39.3%) lacerations were a result of other mechanisms, often metal (e.g. angle grinders, saws). Lacerations were deeper than the subcutaneous layer in 15 (16.9%) cases, visibly contaminated in 12 (13.5%) cases, and foreign bodies were removed in 8 (9.0%). Wound irrigation was performed in 84 (94.4%) cases, scrubbing in 80 (89.9%) and debridement in 5 (5.6%). Wounds were repaired using single layer closure in 84 (94.4%) cases and simple interrupted technique in 88 (98.9%). Topical antibiotics were prescribed in 2 (2.2%) cases, oral antibiotics in 23 (25.8%) and opioid analgesia in 10 (11.2%).

Most participants were either satisfied or very satisfied with each of the components of their laceration management (Table 2). Nevertheless, the lowest rates of very satisfied participants were in the areas of follow-up advice, cosmetic appearance and wound care advice. Overall management had the highest proportion of very satisfied participants.

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Infection complicated the lacerations of five (5.6%, 95%CI 2.1-13.2) participants (Appendix 3). Two participants believed they contributed to the infection. No clear cause was present for the others. Dehiscence complicated eight repairs (9.0%, 95%CI 4.2-17.4), one of which required re-suturing. Suture failure (one or more sutures untying) also occurred in eight (9.0%, 95%CI 4.2-17.4) repairs. For three participants, more than one of these adverse events complicated their laceration. One participant experienced the combination of dehiscence and suture failure, the other two experienced infection, dehiscence and suture failure. As such, the total number of participants suffering infection, dehiscence and/or suture failure was 16 (18.0%, 95%CI 10.9-27.9), while the combined number of adverse events was 21.

The participants whose lacerations were repaired by nurse practitioners were the youngest and had the highest proportion of lacerations involving the hand (Table 3). Unlike the other practitioner groups, in which head and neck lacerations made up the largest proportion of wounds repaired, nurse practitioners did not repair any wounds affecting this site. Wounds repaired by the nurse practitioners were also the shortest in length.

The junior practitioner group (students, interns, residents) had the lowest proportion of very satisfied patients in terms of follow-up advice, wound care advice and overall management. In contrast, the consultant group had the lowest proportion of patients very satisfied with wound cosmesis, and the nurse practitioner group the lowest proportion very satisfied with post-ED pain management. Although nurse practitioners prescribed oral antibiotics most frequently, they were the least frequent prescribers of analgesia.

Complications were infrequent in each practitioner group. However, the highest rate of dehiscence occurred in wounds repaired by the nurse practitioners. The consultant group had one case of infection, dehiscence and suture failure in the same laceration. This laceration was a 10cm long, self-inflicted, knife wound of the forearm (participant 2 in Appendix 3).

No patient or wound characteristic was associated with overall satisfaction (Table 4).

However, patients very satisfied with post-ED pain management, wound care advice and follow-up advice and wound cosmesis were much more likely to be very satisfied overall ($p<0.001$).

DISCUSSION

The ultimate goal of laceration repair in the ED should be a complication free, cosmetically acceptable scar.⁵ Practitioners should aim to achieve high patient satisfaction with their overall laceration management. To our knowledge, no studies have assessed adult ED patient satisfaction with post-ED pain management, wound care advice, or follow-up advice.

This study found that most patients are either satisfied or very satisfied with their overall management. Indeed, overall management was the outcome with the highest proportion of very satisfied participants. The few studies that have assessed this outcome found similar high rates of satisfaction.^{14,15} Overall management satisfaction, although non-specific, likely reflects a patient's satisfaction with a range of components of management including cost, convenience of care and clinical outcomes.^{5,14} This assertion is supported by our finding that being very satisfied with components of management was associated with being very satisfied overall. The implication is that targeting components for improvement may increase overall satisfaction and improve patient-centred care.

Our findings indicate that follow-up advice and wound care advice are components of post-ED management with the most potential for improvement. This was particularly evident in the junior practitioner group, which had the lowest proportion of very satisfied patients with their overall management. Consistently giving comprehensive verbal and written advice on post-ED care advice is a potential solution. An intervention comprising provision of a standardised, pre-formatted written advice, tailored to the patient and their wound, could be evaluated in terms of both junior staff education and patient satisfaction.

Cosmesis is often the primary outcome of studies assessing laceration repair.⁷ It has been reported that the patient's perception of their wound cosmesis is more valuable than the practitioner's.^{10,11} As the scar has the potential to impact self-image, the more recent literature has focused on patient-rated cosmetics scores.¹⁰ Physician-rated cosmetic outcome is frequently determined via a visual analogue scale (VAS) or a validated 6-item wound evaluation score (WES)¹⁶, while patient-rated cosmesis is often reported using a VAS alone^{9,11,14}.

Patient satisfaction with the cosmetic outcome, as distinct from cosmesis scores, has been investigated less often. This study found that the large majority of patients were either satisfied or very satisfied with their repair cosmesis. This is consistent with other studies that have investigated this outcome.^{4,11,13} However, these studies varied in their patient populations and types of lacerations investigated. Indeed, the inclusion of paediatric patients, or the focus on lacerations affecting only one anatomical site, limits the generalisability of the results to the broad, adult ED population.

Infection and dehiscence were infrequent complications in this study, consistent with the existing literature. Previous studies have also reported infections rates of $\leq 5\%$.^{1,8,18}

Dehiscence rates have been more variable and dependent on both the patient population and the method used to define this outcome. Nevertheless, dehiscence typically occurs at a rate $\leq 15\%$.^{10,19-21} Although lacerations repaired by the nurse practitioners had the highest rate of dehiscence, this group also repaired the highest proportion of wounds affecting the hand.

Although conjecture, lacerations repairs at this site may be more prone to stress and, therefore, dehiscence. Also, hand wounds may have been more prone to post-ED pain which may explain why the nurse practitioners had the lowest rates of very satisfied patients with post-ED pain management.

We have reported some differences in the outcome measures of the staff subgroups e.g. nature of wounds and satisfaction with post-ED advice and overall management. However, the study was insufficiently powered to compare the subgroups statistically. Accordingly, the findings are hypothesis-generating and more detailed investigations are recommended to better explore subgroup differences.

We found that the occurrence of infection, dehiscence and/or suture failure was not associated with participant satisfaction. In contrast, Lowe et al.¹⁰ found that the two most significant factors associated with poor patient-rated cosmetic scores were patient reports of wound infection and dehiscence. Similarly, Quinn et al.⁸ found that infected wounds were more likely to receive a lower cosmetic rating. Patients may still be very satisfied overall if they perceive their lacerations cosmesis to be better than expected, despite suffering wound complications.

This study has limitations. The small sample size will limit its internal validity. Our slow recruitment was due to high rates of tissue adhesive use, frequent referral to plastic surgery and recruitment mainly in office hours. These variables may also have introduced selection bias. Follow-up at 14 days may have been too early as short-term and long-term practitioner-

rated cosmetic scores, using a validated tool¹⁶, correlate poorly.²² However, it is unclear whether the same applies for patient satisfaction with cosmesis. Alternatively, Lowe et al.¹⁰ reported that patient-rated cosmetic scores at 14 days and 3 months were moderately correlated. More research is required to confirm the relevance of short-term, patient-rated cosmesis.

Since all ED practitioners were aware of our study, they may have altered their usual practices to achieve a better result (the Hawthorne effect²³). Some variables related to laceration outcomes were not assessed e.g. time from injury to repair. Extended waiting times and other variables may have confounded patient satisfaction overall and should be investigated in future studies. Satisfaction scores are intrinsically subjective and our verbal satisfaction scale has not yet been validated for laceration repair. The overall satisfaction scale has, however, been used widely in other studies of patient satisfaction e.g. pain management.^{24,25} Satisfaction is a surrogate outcome for quality of care. We recommend further work to explore the relationship between this subjective versus more objective outcomes. Also, the reasons for patient dissatisfaction should be collected. Finally, regression analyses have demonstrated that demographic (e.g. older age) and clinical variables are associated with patient satisfaction.^{24,25} Such analyses are recommended in further studies.

Furthermore, the identification of wound complications was reliant on patient reports. The prescription of an antibiotic, a surrogate measure of wound infection, may not have been accurate. Also, the accuracy of patient-reported wound dehiscence is not certain. While verification of these complications through face to face follow-up, may improve future study

design, this may be inconvenient for the patient and associated with considerable loss to follow-up.²¹

CONCLUSION

The majority of patients are either satisfied or very satisfied with components of their ED laceration management, overall management and wound cosmesis. However, there is the potential for improvement, especially in follow-up and wound care advice. Interventions to improve these management components, with their effects evaluated, are recommended. Complications are infrequent and are not associated with patient satisfaction.

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Figure 1. Flow chart of study subjects

Table 1. Patient and laceration characteristics of the study group (complete data) and those lost to follow-up (incomplete data)

Patient and laceration characteristics	Complete data (N=89)	Incomplete data (N=17)
Age (years), mean (SD)	45.7 (21.3)	42.4 (20.0)
Gender, n (%)		
Male	66 (74.2)	13 (76.5)
Female	23 (25.8)	4 (23.5)
Site of laceration, n (%)		
Head or neck	32 (36.0)	6 (35.4)
Torso	2 (2.2)	0 (0.0)
Hand	25 (28.1)	4 (23.5)
Arm	11 (12.4)	3 (17.6)
Leg or foot	19 (21.3)	4 (23.5)
Practitioner, n (%)		
Student, intern, resident	24 (27.0)	3 (17.6)
Registrar	35 (39.3)	8 (47.2)
Consultant	8 (9.0)	3 (17.6)
Nurse practitioner	22 (24.7)	3 (17.6)
Length of laceration (cm), mean (SD)	4.0 (2.8)	4.4 (2.7)
Number of sutures, mean (SD)	5.0 (2.9)	5.0 (2.0)

SD: standard deviation

Table 2. Satisfaction outcomes at follow-up

Variable	Very dissatisfied	Dissatisfied	Slightly dissatisfied	Slightly satisfied	Satisfied	Very satisfied
Pain management* n (%)	1 (1.1)	1 (1.1)	1 (1.1)	4 (4.6)	26 (29.5)	55 (62.6)
Wound care advice n (%)	0 (0.0)	2 (2.3)	2 (2.3)	5 (5.6)	29 (32.6)	51 (57.2)
Follow-up advice n (%)	0 (0.0)	3 (3.4)	3 (3.4)	3 (3.4)	41 (46.0)	39 (43.8)
Overall management n (%)	0 (0.0)	0 (0.0)	4 (4.5)	2 (2.3)	22 (24.7)	61 (68.5)
Cosmetic appearance n (%)	0 (0.0)	3 (3.4)	4 (4.5)	5 (5.6)	31 (34.8)	46 (51.7)

*n=88

Table 3. Comparison of patients managed by the four practitioner groups

Variable	Student, intern, resident (n=24)	Registrar (n=35)	Consultant (n=8)	Nurse practitioner (n=22)
Patient age (years), mean (SD)	50.4 (26.1)	46.0 (19.7)	47.4 (26.6)	39.6 (15.1)
Gender, n (%) male	18 (75.0)	27 (77.1)	5 (62.5)	16 (72.7)
Mechanism, n (%)				
Glass	1 (4.2)	3 (8.6)	0 (0.0)	3 (13.6)
Knife	1 (4.2)	2 (5.7)	3 (37.5)	3 (13.6)
Wood	4 (16.7)	4 (11.4)	2 (25.0)	0 (0.0)
Blunt object	10 (41.6)	14 (40.0)	1 (12.5)	3 (13.6)
Other	8 (33.3)	12 (34.3)	2 (25.0)	13 (59.2)
Site of laceration, n (%)				
Head or neck	11 (45.8)	17 (48.6)	4 (50.0)	0 (0.0)
Torso	1 (4.2)	1 (2.8)	0 (0.0)	0 (0.0)
Hand	4 (16.7)	7 (20.0)	2 (25.0)	12 (54.5)
Arm	5 (20.8)	3 (8.6)	1 (12.5)	2 (9.1)
Leg or foot	3 (12.5)	7 (20.0)	1 (12.5)	8 (36.4)
Length of laceration (cm), mean (SD)	4.3 (2.8)	3.9 (2.5)	4.7 (3.7)	3.4 (2.8)
Number of sutures, mean (SD)	4.8 (3.2)	4.5 (2.4)	5.9 (3.6)	5.8 (3.2)
Satisfaction with cosmesis, n (%)				
Very satisfied	10 (41.7)	21 (60.0)	3 (37.5)	12 (54.5)
Not very satisfied	14 (58.3)	14 (40.0)	5 (62.5)	10 (45.5)
Satisfaction with pain management, [†] n (%)				
Very satisfied	12 (52.2)	27 (77.1)	6 (75.0)	10 (45.5)
Not very satisfied	11 (47.8)	8 (22.9)	2 (25.0)	12 (54.5)
Satisfaction with wound care advice, n (%)				
Very satisfied	11 (45.8)	22 (62.9)	5 (62.5)	13 (59.1)
Not very satisfied	13 (54.2)	13 (37.1)	3 (37.5)	9 (40.9)
Satisfaction with follow-up advice, n (%)				
Very satisfied	6 (25.0)	18 (51.4)	3 (37.5)	12 (54.5)
Not very satisfied	18 (75.0)	17 (48.6)	5 (62.5)	10 (45.5)
Satisfaction overall, n (%)				
Very satisfied	13 (54.2)	25 (71.4)	7 (87.5)	16 (72.7)
Not very satisfied	11 (45.8)	10 (28.6)	1 (12.5)	6 (27.3)
Complications, n (%)				
Infection	3 (12.5)	0 (0.0)	1 (12.5)	1 (4.5)
Dehiscence	2 (8.3)	1 (2.9)	1 (12.5)	4 (18.2)
Suture failure ^b	1 (4.2)	4 (11.4)	1 (12.5)	2 (9.1)
Infection, dehiscence suture failure [‡]	4 (16.7)	5 (14.7)	1 (12.5)	6 (27.3)

Oral antibiotic given, n (%)	4 (16.7)	7 (20.0)	2 (25.0)	10 (45.5)
Analgesia prescription given, n (%)	3 (12.5)	5 (14.3)	1 (12.5)	1 (4.5)

The groups were not compared statistically because the comparisons were underpowered

[†]One patient in the student, intern, resident group did not report their satisfaction with pain management

[‡]≥1 suture untied SD: standard deviation

Table 4. Comparisons of participants very satisfied and not very satisfied with their ED laceration management overall

Variable	Very satisfied with overall management		p
	Yes (n=61)	No (n=28)	
Age (years), mean (SD)	48.5 (21.3)	39.8 (20.4)	0.07
Gender, n (%)			
Male	47 (71.2)	19 (28.8)	0.36
Female	14 (60.9)	9 (39.1)	
Mechanism, n (%)			
Glass	5 (71.4)	2 (28.6)	N/A [†]
Knife	7 (77.8)	2 (22.2)	
Wood	6 (60.0)	4 (40.0)	
Blunt object	19 (67.9)	9 (32.1)	
Other	24 (68.6)	11 (31.4)	
Site of laceration, n (%)			
Head or neck	22 (68.7)	10 (31.3)	N/A [†]
Torso	2 (100.0)	0 (0.0)	
Hand	14 (56.0)	11 (44.0)	
Arm	9 (81.8)	2 (18.2)	
Leg or foot	14 (73.7)	5 (26.3)	
Length of laceration (cm), mean (SD)	4.1 (2.7)	3.7 (2.9)	0.58
Number of sutures, mean (SD)	5.2 (3.0)	4.8 (2.9)	0.59
Oral antibiotics prescribed, n (%)			
Yes	17 (73.9)	6 (26.1)	0.52
No	44 (66.7)	22 (33.3)	
Very satisfied with pain management, n (%)			
Yes	51 (92.7)	4 (7.3)	<0.001
No	9 (27.3)	24 (72.7)	
Very satisfied with wound care advice, n (%)			
Yes	48 (94.1)	3 (5.9)	<0.001
No	13 (34.2)	25 (65.8)	
Very satisfied with follow-up advice, n (%)			
Yes	39 (100.0)	0 (0.0)	<0.001

No	22 (44.0)	28 (56.0)	
Very satisfied with wound cosmesis, n (%)			
Yes	41 (89.1)	5 (10.9)	<0.001
No	20 (46.5)	23 (53.5)	
Infection, dehiscence and/or suture failure [‡] , n (%)			
Yes	11 (68.7)	5 (31.3)	0.96
No	49 (68.1)	23 (31.9)	

[†] small numbers in some categories violate the Chi-square test

[‡] ≥1 suture untied

APPENDIX 1

ED Data Collection Document

Patient details (from medical record or patient, if necessary):

Age: _____ years Sex: ☐ male ☐ female

Weight: _____ kg Height _____ cm/feet, inches

Co-morbidities: ☐ Diabetes ☐ Peripheral vascular disease ☐ Cancer ☐ Other:

Medications: _____

Smoking status: ☐ present smoker ☐ past smoker ☐ never smoked

Laceration (from medical record or doctor, if necessary):

Mechanism: ☐ Glass ☐ Knife ☐ Wood ☐ Blunt object ☐ Human bite ☐ Animal bite
☐ Other _____

Site: _____

Length: _____ cm Maximum width: _____ cm

Shape: ☐ Linear ☐ Non-linear ☐ Stellate

Depth: ☐ Epidermal ☐ Dermal ☐ Subcutaneous ☐ Into muscle
☐ Into tendon ☐ Into bone

Margin: ☐ Smooth ☐ Jagged

Contaminated? ☐ No ☐ Yes

Potential foreign body? ☐ No ☐ Yes

Foreign body removed? ☐ No ☐ Yes

Xray or Ultrasound? ☐ No ☐ Yes: foreign body seen ☐ No ☐ Yes

Wound preparation and closure:

Practitioner: ☐ student ☐ intern ☐ resident ☐ registrar ☐ consultant ☐ nurse

Anaesthesia: ☐ none ☐ yes, type and concentration _____
☐ local ☐ field ☐ nerve: type _____

Irrigation: ☐ none ☐ saline ☐ water ☐ betadine
☐ peroxide ☐ other _____

Scrub: ☐ none ☐ saline ☐ water ☐ betadine
☐ peroxide ☐ other_____

Debridement: ☐ no ☐ yes

Total layers of closure:_____

Deep sutures: ☐ none ☐ interrupted ☐ running ☐ combination

suture material_____

size of suture_____-0

number of sutures_____

Skin closure: ☐ simple ☐ vertical mattress ☐ horizontal mattress ☐ subcuticular
☐ running ☐ combination

suture material_____

size of suture_____-0

number of sutures_____

Dressing: ☐ none ☐ yes, type_____

Topical antibiotics ☐ no ☐ yes, name_____

Oral antibiotics ☐ no ☐ yes, name_____ dose_____ frequency_____

Organised for post ED:

Analgesia prescription ☐ no ☐ yes, name_____ dose_____ frequency_____

Review prior to suture removal ☐ no ☐ yes, in ED ☐ yes, by GP
☐ yes, by_____

Suture removal in _____ days ☐ in ED ☐ by GP ☐ by other_____

APPENDIX 2

Questionnaire – Patient follow up

Interview date/time: ____/____/____ :____ hours

Good morning/afternoon/evening, my name is from the Austin Hospital.

Could I please speak to (participant's name not recorded here) please?

I am calling from the Austin Hospital Emergency Department. Are you free to speak at the moment?

Approximately 14 days ago you attended the Emergency Department and had a laceration repaired. At that time, we advised you that we are undertaking a research project into the outcome of the lacerations and patient satisfaction with their management. You can help us with this project by answering several questions about the treatment you received in the Emergency Department.

This project has been approved by the Austin Hospital Human Research Committee. It will assist James Majer obtain his Doctor of Medicine degree.

These questions should take less than 3 minutes. Your answer will be confidential and will, in no way, affect the way you are treated in the future at the Austin Hospital. Your participation in this project is voluntary and you do not have to answer. Are you still willing to take part?

- ☐ Yes (verbal consent given) – Thank you, let's start the questions
- ☐ No (verbal consent not given) – That's OK, thank you for your time. Good bye.

Before we proceed, can I please confirm your full name, your date of birth and address?

- ☐ full name confirmed ☐ date of birth confirmed ☐ address confirmed
-

Did your wound get infected and require antibiotics?

- ☐ No ☐ Yes, antibiotic required and for how long: _____
- Did you take the full course? ☐ Yes ☐ No

Did your wound come apart (dehiscence/gape)? ☐ No ☐ Yes

Did any sutures untie? ☐ No ☐ Yes, how many? _____

Did any sutures fall out? ☐ No ☐ Yes, how many? _____

Did you have any other problems with your wound? _____

How satisfied or dissatisfied are you with the cosmetic appearance of your laceration now?

Here are your options:

☐ Very dissatisfied ☐ Dissatisfied ☐ Slightly dissatisfied ☐ Slightly satisfied ☐ Satisfied ☐ Very satisfied

How satisfied or dissatisfied are you with how your pain was managed *after* laceration repair in the ED? Here are your options:

☐ Very dissatisfied ☐ Dissatisfied ☐ Slightly dissatisfied ☐ Slightly satisfied ☐ Satisfied ☐ Very satisfied

How satisfied or dissatisfied are you with the wound care advice that was given to you in the ED? Here are your options:

☐ Very dissatisfied ☐ Dissatisfied ☐ Slightly dissatisfied ☐ Slightly satisfied ☐ Satisfied ☐ Very satisfied

How satisfied or dissatisfied are you with the follow up advice given regarding your laceration? Here are your options:

☐ Very dissatisfied ☐ Dissatisfied ☐ Slightly dissatisfied ☐ Slightly satisfied ☐ Satisfied ☐ Very satisfied

How satisfied or dissatisfied are you with the overall management of your laceration? Here are your options:

☐ Very dissatisfied ☐ Dissatisfied ☐ Slightly dissatisfied ☐ Slightly satisfied ☐ Satisfied ☐ Very satisfied

That's all there is. Thank you very much for your time.

Appendix 3. Characteristics of participants and lacerations complicated by infection

	Participant 1	Participant 2	Participant 3	Participant 4	Participant 5
Participant age (years)	19	24	63	20	43
Gender	Male	Female	Male	male	female
Smoking status	Past	Never	Present	present	never
Mechanism	Metal	Knife	Blunt object	Angle grinder	Blunt object
Co-morbidities	Nil	Nil	Nil	nil	nil
Site of laceration	Distal leg	Forearm	Scalp	Dorsum of hand	chin
Length (cm)	6	10	5	1.5	3
Depth	Subcutaneous	Subcutaneous	Subcutaneous	Subcutaneous	Subcutaneous
Visible contamination	No	No	No	Yes	No
Practitioner	Nurse practitioner	Consultant	Intern	Registrar	Registrar
Irrigation	Saline	Saline	Saline	Saline	Saline
Scrubbing	Saline	None	Chlorhexidine	Saline	Saline
Number of sutures	8	6	4	3	3
Prophylactic antibiotics	No	No	No	No	No
Other complications	Nil	Dehiscence 1 suture untied	Nil	Complete Dehiscence 1 suture untied	Nil
Cosmesis Satisfaction	Very satisfied	Satisfied	Very satisfied	Slightly dissatisfied	Slightly satisfied
Overall satisfaction	Very satisfied	Very satisfied	Very Satisfied	Very Satisfied	Satisfied
Comments	“The dressing got dirty at work, so I took it off and left my sock over it without a dressing”	Nil	Nil	“All issues were my own fault - going to work too soon and not seeking GP care afterwards”	Nil

Outcomes of laceration suture repair in the Emergency Department

(Running title: Outcomes of laceration repair)

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JM and DT conceived the study and prepared the study protocol. JM, DT and JK obtained ethics and governance approval. JM, SV, NG, MS-G, JW, AJ, BC and JK collected the data. JM and DT analysed the data. All authors contributed to writing the manuscript and approved the final, submitted manuscript.

Informed consent was obtained from all study participants and the study was approved by the Austin Health Human Research Ethics Committee.

Study data were collected and managed using the REDCap electronic data capture tool hosted by the Royal Melbourne Hospital Business Intelligence Unit.

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