

EMERGENCY MEDICINE

Wound Care Techniques in the Emergency Department

In the Emergency Department (ED) most wounds are closed by in-house medical staff. However, a number of wounds should not be closed either “*at all*”, in the case of some bite wounds, or “*not in ED but in theatre*”. At the outset this should be considered a key question in the decision making process.



Compound fractures and injuries involving vital structures such as tendons, arteries and nerves are examples of wounds that require referral.

Furthermore, before attempting to close a wound we should make an adequate clinical assessment of the patient's injury:

History

- Ask the patient about (and document) all the events leading up to the injury
- Mechanism is important, for example was this a Cat or Dog Bite?
 - These injuries are associated with a high risk of infection:



- Was the injury caused by a sharp cutting object?
 - A cut from sharp implement is correctly termed an “incised wound”.
 - A true laceration is caused by ‘tearing’ from blunt trauma.
- Take note of any allergies, past medical history and medications.
- It is important to ask about Tetanus status (update the patients tetanus as per your Local Guidelines). A patient Fact Sheet can be useful here.
- Is there likely to be a Foreign Body?

Vaccine recommendations for tetanus-prone wounds				
History of tetanus vaccination	Time since last dose of tetanus	Type of wound	Tetanus-containing vaccine required	Tetanus immunoglobulin (TIG) required
≥ 3 Doses	< 5 Years	All wounds	NO	NO
≥ 3 Doses	5-10 Years	Clean minor wounds	NO	NO
	5-10 Years	All other wounds	YES Booster dose	NO
≥ 3 Doses	> 10 Years	All wounds	YES Booster dose	NO
< 3 Doses or uncertain	Not applicable	Clean minor wounds	YES Complete course	NO
		All other wounds	YES Complete course	YES

Examination

- Inspection
 - Where is the Wound?
 - How deep?
 - How long? (Detail in the medical record)
 - Use pictures where possible to add to your description
- What is the Neurological Function of the area affected?
 - For example is there any change in sensation?
 - Is the motor function of the limb normal?
- Is there any evidence of vascular injury?
- Are the tendons intact or compromised?
- Is there need for an X-ray for Foreign Body?

A Glass Foreign Body

(NB – Ultrasound can also be useful for showing up Foreign Bodies)



- Is the wound contaminated?
- Be especially cautious with delicate wounds – always have a low threshold for a second opinion on wounds to areas such as the hand and face.

General Management of Wounds in the ED

- Consent for further exploration and examination using local anaesthetic +/- closure of the wound
- Gather Equipment
- Wound Preparation
- Anaesthesia (use no more than 3-5mg per Kg Lignocaine. 1ml 1% = 10mg)
- Wound Clean (use Saline or Chlorhexidine)
- Debridement and Examination
- Further Copious Irrigation (use Saline)



- Close wound as appropriate
- Update Tetanus Immunisation

Wounds NOT to Close in the ED

- Lip Injuries that are crossing the Vermillion border
- Wounds with involvement of Vital Structures such as arteries, nerves and tendons
- Deep Wounds (e.g. involving muscle)
- Penetrating Wounds
- Heavily Contaminated Wounds or Wounds with Foreign Bodies
- Compound Fractures
- Bites (see below) – use antibiotics
- NB - all of the above injuries require good basic wound care.
This may include a primary ED closure after taking advice about management and follow up.

Wound Closure

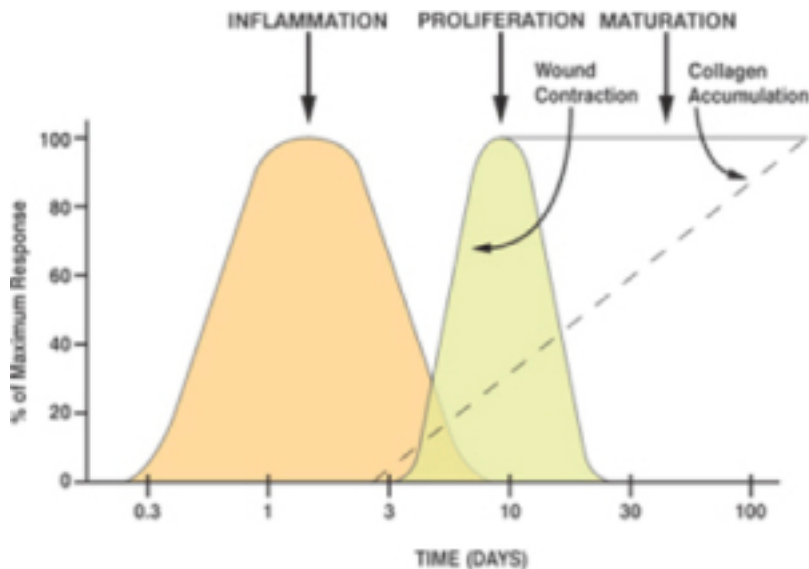
Basically, with any given wound during the in the healing process it tends to contract over time. With our suturing we want a slight **Eversion** (because wounds will tend to contract back down to a neutral position).

Although most wounds can be sutured in the ED there are many wounds that we should not be closing (see above)

Wounds may be closed by primary closure (primary intention), delayed primary closure or left to heal by secondary intention. By any of these means the wound healing process is a dynamic one. It can be divided into three phases.

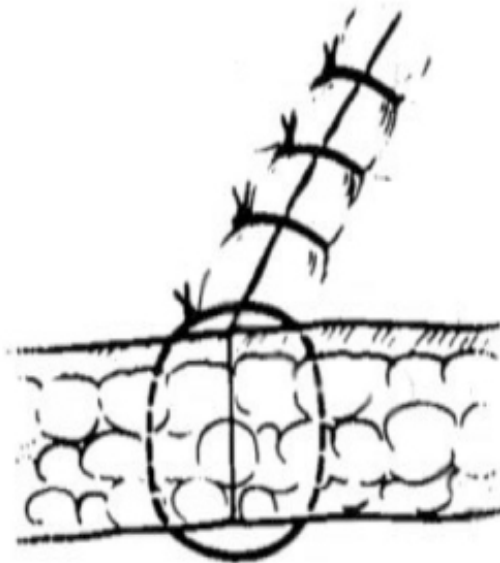
The phases of wound healing are:

- Inflammatory phase
- Proliferation phase
- Maturation phase



Simple Interrupted Sutures

This is the mainstay for simple closure of wounds in the ED. Essentially the procedure is done with a run of interrupted sutures using instruments and basic knots. Using two hands the needle is carefully inserted through the skin and knots are tied in opposite directions (e.g. 2 throws in each direction). The aim is to mildly evert the wound to allow for contraction during healing. This is done by taking adequate accurate bites of cutaneous tissue and applying moderate tension to the sutures.



Correct Grip for Simple Suturing



Alternative Methods of Closure

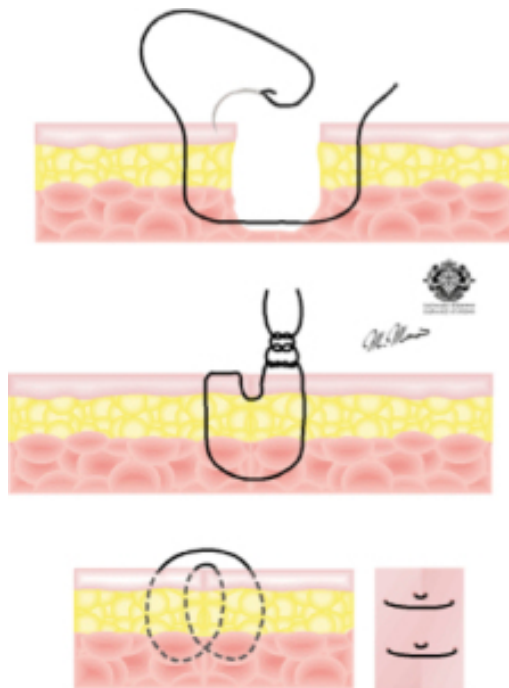
Always consider alternatives whether an alternative method may be appropriate for closure. These options are available in most EDs. Ask a senior or nursing staff about these options if you are not sure where they are kept:

- Tissue Glue
- Staples
- Steristrips

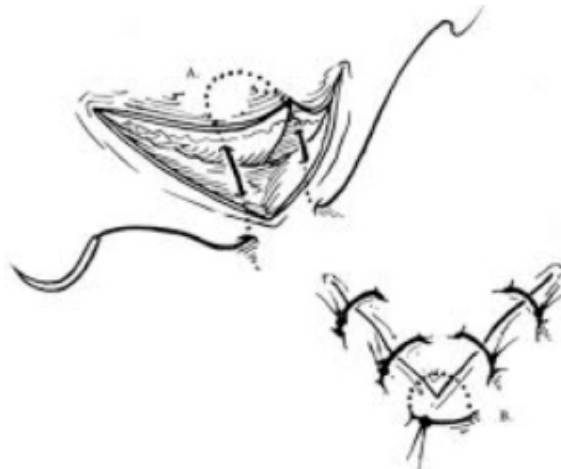
Other Suture Techniques

The technique for a **Mattress** suture is shown below. These create increased wound eversion and tensile strength which can be useful for refractory bleeding wounds and for complex wounds. The downside to this technique is the worsening of cosmetic results.

The 'horizontal mattress' is most commonly used in ED. This suture technique can be thought of as 'Out-Out-In-In':



Wound flaps and jagged edges can be closed using a horizontal mattress:



Hand Ties – Two-Handed and One-Handed

Demonstrations of these can be viewed online:

http://www.youtube.com/watch?feature=player_embedded&v=o-dkb-YX3-E

http://www.youtube.com/watch?feature=player_embedded&v=EKRhy4ygKtU

The Aftercare of Wounds

Aftercare of wounds is as important as assessment and closure.

We should consider appropriate dressings, in particular antibiotic paraffin (e.g. 'Bactigras'). Some clinicians advocate the use of Chloramphenicol ointment around the wound. The sutures should generally be taken out within 1 week, and probably between 3 and 5 days for facial and delicate wounds. Wounds should be elevated to minimise swelling and advice given about keeping the wound covered and dry.

Usually the local GP should do a wound check and remove the sutures. If there are particular concerns you can bring patients back to ED or ask them to see their GP after 2 days. One of the most important pieces of advice to give is in regard to sun protection. Exposure to sun in the first 1-2 months increases scarring. Therefore, advice the patient about sun block application.

Patients with chronic disease are at higher risk of 'poor wound healing'. Diabetics should pay special attention to optimising their blood sugar and you should have a low threshold for reviewing these patients at an early stage.

Types of Suture

There are many types of suture material available. 3.0 Non-absorbable is a good suture to practice with and use in most simple wounds.

In medicine we often talk about ideals (e.g. the drug that cures everyone with no side effects). We propose that the 'Ideal Suture' would be **Cheap**, Easy to Handle, Provide an Optimum Balance between **Tensile strength**, **Elasticity** and **Stay in Place**, have Minimal **Tissue reaction** and have a Tailored **Absorption Rate**. This suture doesn't exist so the selection of suture material depends on play off between the different types of suture material's Pros and Cons.

Points on Selecting Suture Type

- Absorbable or Non-Absorbable
Either probably ok for simple skin sutures in the ED
- Monofilament or Braided
Important in regard to strength
Braided sutures provide better knot security
Monofilament sutures provide better passage through tissue and produce less tissue reaction
- Dyed or Undyed
Important in regard to 'seeing' sutures
- Synthetic (e.g. Vicryl Polyglactin) or Non Synthetic (e.g. Silk, Cat Gut)
Most sutures today are synthetic
Fast absorbing gut is useful for oral and intestinal suturing
- Cost – may be a consideration from an ED administration point of view

Types of Needle

(1) **CUTTING** ('Reverse and Conventional)

(2) **TAPER** (these are friable: 'Non Cutting' to minimise tissue damage)

'Reverse' type sutures are the most commonly used in most EDs and give optimum control of depth of suture to the operator. Thinking about size is also a consideration. A small needle will easily bend/break but will be superior for fine work and cause less tissues reaction if handled with care.

Size of your Suture:	Very Large - - Large - - Medium - - Fine - - Micro										
Gauge:	4	3	2	1	(0)	2/0	3/0	4/0	5/0	6/0	(10/0)

Conclusion

In conclusion, wound care in the ED is a common and important task. All wounds presenting to the ED require a through assessment and consideration for the most appropriate wound care in the ED. Suturing requires practice and patience, where in doubt ask a colleague for assistance and always document your management and decision making process carefully in the medical record.

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