

Gallery of Bad Scars

- Dot Marks
- Railroad Tracks
- Continental Shelf
- Central Necrosis
- Fresh Ground Pepper

Examination of the wound

- A detailed neurovascular exam should be performed before anesthesia and closure
- 2-point discrimination should always be documented
- Wounds adjacent to joints or tendons should be examined through full excursion
- Always place patient flat! Watch for loved ones

Local anesthetics

- Lidocaine
 - Rapid onset, short acting
 - Maximum dose for infiltration of 1% Lidocaine is 4.5 mg/kg (300 mg for 70 kg pt or 30 cc total)
- Lidocaine with epinephrine
 - Useful for hemostasis in highly vascular areas
 - Maximum dose of Lidocaine 1% with epinephrine is 7 mg/kg (total of 500 mg, or 50 cc for 70 kg patient)
- Bupivacaine
 - Slower onset, longer duration of action
 - Useful for long procedures, regional blocks
 - Maximum dose of 0.25% solution is 2 mg/kg (total of 175 mg, or 40 cc in 70 kg patient)
- Topical anesthetics
 - Useful for lacerations on scalp and face
 - Useful for kids and needle-phobic adults
 - LET (Lidocaine, epinephrine, and Tetracaine) cheap and safe

Buffering anesthetics

- Local anesthetics packaged as acids to prolong shelf life: Lidocaine has pH of 3.5!
- Buffering decreases pain and makes anesthetic more bioavailable
- Recommended dilution 10cc of Lidocaine to 1cc NaHCO₃
- Can dilute Bupivacaine 30 to 50cc to 1 cc NaHCO₃

Minimizing pain of anesthetic

- Buffer anesthetic
- Use smallest needle practical to infiltrate wound
- Inject through cut margin into subcutaneous tissue; usually don't need to inject through intact skin; no need to raise a wheal!

- Inject very slowly!

Digital blocks

- Use half Lidocaine, half bupivacaine
- Goal is to deposit 2-3cc of anesthetic in the region of the neurovascular bundle
- Perform “ring block” to anesthetize dorsal branches of digital nerve
- Mandatory for nail bed injuries; recommended for crush injuries, fractures, extensive lacerations
- Blocks can last as long as 17 hours

Wound Preparation

- Shaving hair increase infection rate ten-fold compared with clipping
- Trim hair back 1 to 2mm with iris scissors
- Never shave off eyebrows!
- High pressure irrigation wound irrigation single most effective method for cleaning wound; recommended pressure is 5 to 8 psi
- Use 30-60cc syringe with 19 gauge needle and increase wound bacterial counts

Tips for effective suturing

- Grab needle 2/3rds down shaft to avoid twisting or breaking
- When actually pushing the needle through the tissue, hold the needle holder down toward tip; don't try to suture with your fingers through the rings of the needle holder
- Start at one end of the laceration rather than the “center”; you will have much better control of the skin tension on either side of the wound and will never end up with a dog-ear
- Every tied suture should be exactly perpendicular to the axis of the wound; avoid the “wallet you made a summer camp” look!

Tissue adhesives

- Appropriate for use only on low-tension wounds
- Should never be applied inside wound; it induces an intense inflammatory reaction
- If wound edges separated by more than 5 mm, use subcutaneous sutures
- Instructions to patients;
 - Adhesive will slough off in 7-10 days
 - No bandages
 - No ointments of any kind; will loosen adhesive and wound may dehisce
 - After 24 hours, may wash gently with plain water
 - Do not scrub or soak wound; blot dry

Tetanus prophylaxis

- For severe or contaminated wounds, TD should be given if more than 5 years since last booster
- For clean and minor wounds, TD should be given only if more than 10 years since last booster
- High-risk wounds:
 - Wounds older than 6 hours
 - Stellate or avulsion wounds

- Wounds over 1 cm deep
- Gunshot wounds
- Crush injuries
- Frostbite, burns
- Visible contamination with dirt or saliva

Patient education

- Every laceration leaves a scar! The degree to which it is ultimately visible depends on many factors
- It takes almost a year for a scar to mature; the final appearance will not be known for months
- There may be phase in 1-2 weeks when the healing laceration looks pink and hypertrophied
- Use sunblock (at least 25 to 30 SPF) on the maturing scar to avoid sunburn and hyperpigmentation
- Plastic surgical consultation may be considered at the end of the scar maturation period if necessary
- Timing of suture removal critical to avoid disfiguring “dot-marks” on facial lacerations; be sure to emphasize that patient should return for suture removal not later than 4 to 5 days for facial lacerations

SUTURE REPAIR OF SOFT TISSUE INJURIES

Location	Anesthetic	Suture Material†	Technique of Closure and Dressing	Suture Removal (d)	Pitfalls
Scalp	Lidocaine 1% with epinephrine	3-0 or 4-0 Nonabsorbable monofilament	Interrupted in galea; single tight layer in scalp—horizontal mattress if bleeding not well controlled by simple sutures	7-12	Failure to explore wound for fracture; hematoma formation secondary to "loose" closure
Face	Lidocaine 1% with epinephrine or use field block	4-0 or 5-0 Synthetic absorbable or 6-0 nonabsorbable monofilament	If full-thickness laceration, layered closure is desirable	3-5	Failure to recognize and examine for damage to underlying structures, i.e., facial nerve parotid duct
Pinna (ear)	Lidocaine 1% (field block)	6-0 Nonabsorbable monofilament or 5-0 synthetic absorbable	Close perichondrium with 5-0 synthetic absorbable; close skin with nonabsorbable interrupted sutures—stint dressing	4-6	Hematoma formation secondary to improper or no dressing
Eyebrow	Lidocaine 1% with epinephrine	4-0 or 5-0 Synthetic absorbable and 6-0 nonabsorbable monofilament	Layered closure	4-5	Perpendicular excision rather than one parallel to direction of hair follicles; shaving of eyebrows
Eye lid	Lidocaine 1%	6-0 Nonabsorbable monofilament	Single-layer horizontal mattress, interrupted or running	3-5	Failure to examine for globe injury or to appreciate injury to tarsal plate
Lip	Lidocaine 1% with epinephrine or use field block	4-0 or 5-0 Synthetic absorbable in mucosa, muscle, and intradermal layer; 6-0 nonabsorbable monofilament	Three layers (mucosa, muscle, and skin) if through and through; otherwise, two layers	3-5	1 mm or greater malalignment of vermilion border results in cosmetic deformity
Oral cavity	Lidocaine 1% with epinephrine or IV sedation (in children)	4-0 Synthetic absorbable	Simple interrupted or horizontal mattress; layered closure if muscularis of tongue involved	7-8 or allow to dissolve	Inadequate sedation and exposure (particularly in children) for necessary procedure
Neck	Lidocaine 1% with epinephrine	4-0 Synthetic absorbable intradermal; 5-0 nonabsorbable monofilament	Two-layered closure for best cosmetic results	4-6	Failure to appreciate implication of zone I or zone III injuries; delay in airway management
Abdomen	Lidocaine 1% with epinephrine	4-0 Synthetic absorbable; 4-0 or 5-0 nonabsorbable monofilament	Single or layered closure	6-12	Failure to use local wound exploration as an initial screen and aggressively follow up with further diagnostic procedures
Back	Lidocaine 1% with epinephrine	4-0 Synthetic absorbable; 4-0 or 5-0 nonabsorbable monofilament	Single or layered closure	6-12	Failure to appreciate possibility of renal or diaphragmatic injury
Chest	Lidocaine 1% with epinephrine	4-0 Synthetic absorbable; 4-0 or 5-0 nonabsorbable monofilament	Single or layered closure	6-12	Exploration of wound may cause hemorrhage or pneumothorax; failure to consider possibility of diaphragmatic penetration in low chest wounds and pericardial tamponade in wounds near midline
Extremity	Lidocaine 1% with epinephrine 1%	3-0 or 4-0 Synthetic absorbable (muscle fascia); 4-0 or 5-0 nonabsorbable monofilament	Single-layered closure is adequate, although layered or running SQ closure may give better cosmetic result; apply splint if wound is over a joint	6-14	Failure to do sensory examination before anesthesia; failure to explore wound visually after hemostasis; unrecognized foreign body left in wound
Hands and feet	Lidocaine 1% (if field block with 2% lidocaine or 0.25% bupivacaine)	4-0 or 5-0 Nonabsorbable monofilament	Single-layered closure only with simple or horizontal mattress interrupted suture, at least 5 mm from cut wound edges; horizontal mattress sutures should be used if much tension on wound edges; apply splint if wound over a joint	7-12	Use of subcuticular sutures; failure to explore wound visually with digit in original position at time of injury
Nailbeds	Lidocaine 2% or bupivacaine 0.25% digital nerve block	5-0 Synthetic absorbable	Gentle, meticulous placement to obtain even edges; stint dressing with original nail or aluminum foil between cuticle and nail matrix to prevent adhesions	Allow to absorb	Loss of suture by tying too tightly and having it cut through friable nailbed suture; adhesions because of failure to place stint between cuticle and matrix