

## Alex Flaxman's Suture Sheet

Irrigation <sup>1</sup>		
Pressure (lbs/in <sup>2</sup> )	Infection Rate	Irrigate with 20-50 cc/cm (I haven't found this in a source yet, I was told this by an attending).
1	100%	
5	67%	
10	21%	
15	7%	

[Soil contaminated wounds in guinea pigs]

Tetanus <sup>2</sup>		
	Percent with adequate immunization	
Age	Males	Females
< 40 yo	94%	86%
40-60 yo	87%	35%
> 60 yo	41%	29%

What Size to Use?	
Size	Use
5-0	Face & hands, incl forehead <sup>3</sup>
6-0	Face, hands, ears <sup>4</sup> , eyelids <sup>5</sup> , lips (see note to R)
3-0	Scalp (skin there is very thick)
4-0	Rest of body
4-0	Galea <sup>6</sup> , divided edges of muscle and fascia (buried, interruptible) absorbable, 4-0, (note, use absorbable mat'!!!!)

When to remove sutures?	
Face	3 – 5 days
Extremities	7 days
Joints	5 – 10 days
Abdomen	7 days

**Lips:** mucosal 5-0, reirrigate, orbicularis 5-0, then skin 6-0. T/c use silk and cut ends short

When to remove staples?	
Scalp	10 days <sup>7</sup>

Suture Material					
	Suture Material	Knot Security	Tensile Strength	> 50% strength	Tissue Reactivity
Absorbable <sup>8</sup>	Surgical gut	Poor	Fair	5-7 days	Very reactive
	Chromic gut	Fair	Fair	10-14 days	Very reactive
	Vicryl (polyglactin)	Good	Good	30 days	Minimal
	Dexon (polyglycolic acid)	Best	Good	30 days	Minimal
	PDS (polydioxane)	Fair	Very good	45-60 days	Virtually none
	Maxon (polyglyconate)	Fair	Very good	45-60 days	Virtually none
Nonabsorbable <sup>9</sup>	Ethilon (nylon)	Good	Good	A little	Good
	Prolene (polypropylene)	Not good	Very good	A little	Fair
	Silk	Very Good	Bad	A lot	Excellent

<sup>1</sup> Rodeheaver GT, Pettry D, Thacker JG, Edgerton MT, Edlich RF. Wound cleansing by high pressure irrigation. Surg Gynecol Obstet. 1975 Sep;141(3):357-62. PMID: 808870

<sup>2</sup> Crossley K, Irvine P, Warren JB, Lee BK, Mead K. Tetanus and diphtheria immunity in urban Minnesota adults. JAMA. 1979 Nov 23;242(21):2298-300. PMID: 490826

<sup>3</sup> Cline, D, O Ma, J Tintinalli, Emergency Medicine, A Comprehensive Study Guide Companion Handbook, McGraw Hill, 2000. p. 105

<sup>4</sup> Cline, D, O Ma, J Tintinalli, Emergency Medicine, A Comprehensive Study Guide Companion Handbook, McGraw Hill, 2000. p. 107

<sup>5</sup> Cline, D, O Ma, J Tintinalli, Emergency Medicine, A Comprehensive Study Guide Companion Handbook, McGraw Hill, 2000. p. 105

<sup>6</sup> Cline, D, O Ma, J Tintinalli, Emergency Medicine, A Comprehensive Study Guide Companion Handbook, McGraw Hill, 2000. p. 103

<sup>7</sup> According to Dr. Frank

<sup>8</sup> Katz AR, Mukherjee DP, Kaganov AL, Gordon S. A new synthetic monofilament absorbable suture made from polytrimethylene carbonate. Surg Gynecol Obstet. 1985 Sep;161(3):213-22. PMID: 3898441

<sup>9</sup> Sharp WV, Belden TA, King PH, Teague PC. Suture resistance to infection. Surgery. 1982 Jan;91(1):61-3. PMID: 7034260

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Local Anesthetic <sup>10</sup>						
Agent	Trade name	Type of anesthetic	Concentration (%)	Maximum safe dose (mg/kg)	Onset-minutes	Duration-hours
Procaine	Novocaine	Ester	0.5–1.0	7	2–5	0.25–0.75
Procaine with epinephrine				9		0.5–1.5
Lidocaine	Xylocaine	Amide	0.5–2.0	4.5	2–5	1–2
Lidocaine with epinephrine				7		2–4
Bupivacaine	Marcaine	Amide	0.125–0.25	2	2–5	4–8
Bupivacaine with epinephrine				3		8–16
Levobupivacaine	Chirocaine	Amide				

Hurts less if warmed and buffered. No one ever does this.<sup>11</sup>

Hurts less if injected into wound edge as opposed to into the skin around the wound.<sup>12</sup>

How long does the anesthetic last? <sup>13</sup> (in hours)				
	Face	Hand	Arm	Calf
Plain Lidocaine	1	1.6 – 3.2	1.4 – 2.8	1.6 – 2.8
Lidocaine with epinephrine	2 – 6.6	3.7 – 7.9	6.2 – 11.6	4 – 13

If allergic to lidocaine:<sup>14</sup>

- 1) skip it for small lacs
- 2) use ice instead for local anesthesia
- 3) inject NSS with 0.9% benzoyl alcohol
- 4) inject 1% Benadryl
- 5) conscious sedation or nitrous oxide
- 6) use preservation-free lidocaine from the cardiac cart- give test dose of 0.1 cc, wait 30 minutes before injection

<sup>10</sup> Ernst AA, Marvez-Valls E, Nick TG, Wahle M. Comparison trial of four injectable anesthetics for laceration repair. Acad Emerg Med. 1996 Mar;3(3):228-33. PMID: 8673778

<sup>11</sup> Mader TJ, Playe SJ, Garb JL. Reducing the pain of local anesthetic infiltration: warming and buffering have a synergistic effect. Ann Emerg Med. 1994 Mar;23(3):550-4. PMID: 8135432

<sup>12</sup> Kelly AM, Cohen M, Richards D. Minimizing the pain of local infiltration anesthesia for wounds by injection into the wound edges. J Emerg Med. 1994 Sep-Oct;12(5):593-5. PMID: 7989683

<sup>13</sup> Todd K, Berk WA, Huang R. Effect of body locale and addition of epinephrine on the duration of action of a local anesthetic agent. Ann Emerg Med. 1992 Jun;21(6):723-6. PMID: 1590615

<sup>14</sup> Ernst AA, Marvez-Valls E, Mall G, Patterson J, Xie X, Weiss SJ. 1% lidocaine versus 0.5% diphenhydramine for local anesthesia in minor laceration repair. Ann Emerg Med. 1994 Jun;23(6):1328-32. PMID: 8198309