BASIC AND ADVANCED SUTURING SKILLS WORKSHOP

BY

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DISCUSSION POINTS

• ASEPTIC VS STERILE TECHNIQUE
• SURGICAL CONSCIENCE
• COMMON SURGICAL INSTRUMENTS
• CHOICE OF ANESTHETIC
• PREPARING THE WOUND
• CORRECT KNOT TYING METHODS
• WOUND CLOSURE WITH A VARIETY OF SUTURING TECHNIQUES
• COMMON PITFALLS
• PRACTICAL TIPS ON IMPROVING YOUR TECHNIQUE
• GUIDELINES FOR CHOOSING THE CORRECT SUTURE AND NEEDLE
WOUND HEALING AND SCARS

The goal of optimal wound closure is to obtain a fine line scar that maintains both the form and appearance of the tissue.

It is important to let your patient know that any time there is an incision there is going to be a scar.

However with careful technique and close attention to tissue integrity this scar can be minimized. Know when it is a closure that you should not attempt e.g. lip, eyelid, across a joint, tendon involved, or the web space of a hand.
PREPARATION

• PLAN THE INCISION OR TYPE OF CLOSURE

• GATHER EQUIPMENT – IRRIGATION, SYRINGES, ANESTHETIC, INSTRUMENTS, SUTURE, DRAPES, DRESSING

• TIME OUT:
  • CHECK PATIENT NAME AND SIGN A CONSENT
  • CHECK WHAT PROCEDURE IS TO BE DONE

• SCRUB GLOVE AND DRAPE

• PREPARE THE SKIN – BETADINE ON THE OUTSIDE

• LOCAL ANESTHETIC – LIDOCAINE OR BUPIVACAINE

• DEBRIDEMENT OR INCISION

• UNDERMINING WHERE NECESSARY
Start in the center and swab in circles going outward
adison forcep  hemostat  metzenbaum scissors  suture scissors
INSTRUMENTS

- Needle holders
- Blade handle
- Suture removal scissors
- Bandage scissors
STERILE INSTRUMENTS

- HAVE THE INSTRUMENTS BEEN STERILIZED AND PACKED IN STERILE PACKAGES?
- HAS THE INDICATOR TAPE CHANGED COLOR?
- IS THE PACKAGE STILL SEALED AND DOUBLE WRAPPED?

STERILIZE WITH:

- AUTOCLAVE 15-20 PSI  220 TO 250 DEGREES F
- GAS
- LIQUID
ANESTHETIC

LIDOCAINE 1% OR 2% - INJECT LOCALLY OR A REGIONAL BLOCK
  • GIVES ANESTHESIA AND REDUCES MUSCLE MOVEMENT

BUPIVACAINE (MARCAINE) 0.25% OR 0.5%
  • GIVES ANESTHESIA ONLY

LIDOCAINE AND BUPIVACAINE CAN BE MIXED HALF AND HALF

EPINEPHRINE CAN BE ADDED TO INCREASE ANESTHETIC TIME AND DECREASE BLEEDING – DON’T NOT USE ON, NOSE, TOES, FINGERS, HOSE (PENIS)

MAY BE BUFFERED - 9:1 WITH SODIUM BICARBONATE, TO REDUCE PAIN ON INJECTION (E.G. REMOVE 2 ML OF 1% LIDOCAINE FROM 20 ML VIAL, AND ADD 2 ML OF SODIUM BICARBONATE SOLUTION TO VIAL)
ANESTHETIC

LOCAL LIDOCAINE (XYLOCAINE) 1% OR 2%
- ONSET: 2 MINUTES
- DURATION: 1.5 TO 2 HOURS
- ACTION: ANESTHESIA AND REDUCED MUSCLE MOVEMENT
- MAX DOSE: 4 MG/KG TO 280 MG (14 ML 2%, 28 ML 1%)

LIDOCAINE WITH EPINEPHRINE 1:100,000 OR 1:200,000
- ONSET: 2 MINUTES
- DURATION: 1 – 3 HOURS
- ACTION: ANESTHESIA AND REDUCED MUSCLE MOVEMENT
- MAX DOSE: 7 MG/KG TO 500 MG (25 ML 2%, 50 ML 1%)

BUPIVACAINE (MARCAINE) 0.25%
- ONSET: 5 MINUTES
- DURATION: 2 TO 4 HOURS
- ACTION: ANESTHESIA ONLY
- MAX DOSE: 2.5 MG/KG UP TO 175 MG (50 ML 0.25%, 25 ML 0.5%)
BASIC KNOT TYING

1 – square knot
2 – granny knot
3 -  slip knot
4 – surgeon’s knot
SURGICAL WOUND CLOSURE GUIDELINES

• ADEQUATE DEBRIDEMENT AND HEMOSTASIS
• ATRAUMATIC TECHNIQUE
• ALIGNMENT WITH THE RELAXED SKIN TENSION LINES
• ANGLE OF INCISION
  • PERPENDICULAR TO SKIN SURFACE OR SLIGHTLY UNDERMINED
  • ANGLE INCISIONS PARALLEL TO HAIR SHAFTS
• CONSIDER AREA OF THE BODY FOR VASCULARITY AND TENSION ON THE WOUND
KEY TECHNIQUES

- CLOSE DEAD SPACE UNDER THE INCISION
- CLOSE THE TISSUE IN LAYERS
- CAREFULLY ALIGN THE WOUND EDGES
- CAREFUL CHOICE OF THE AXIS OF INCISION OR AXIS OF CLOSURE OF THE DONOR SKIN FLAPS
- CORRECT CHOICE OF DEEP AND CUTANEOUS SUTURES
Undermining
BLEEDING

• CONTROL WITH PRESSURE DIRECTLY OVER THE WOUND IMMEDIATELY

• LOCATE THE NEAREST ARTERY AND PUT PRESSURE THERE TO GIVE YOURSELF ROOM TO WORK

• IF NECESSARY, TIE OFF THE BLEEDING VESSEL

• USE A PRESSURE BANDAGE
Tension lines
All about needles
SIMPLE INTERRUPTED SUTURES

• This suture is used for simple laceration closures or closure of office procedures like biopsies or lesion removals.

• It is also the basic suture used inside the wound to close deep sutures.

• It is useful in that a few sutures can be removed at a time instead of all at once to allow for slower sound healing.
SIMPLE INTERRUPTED SUTURES
CONTINUOUS SUTURES

- The continuous suture as its name suggests, only has a knot at the beginning and the end.
- There are several methods of continuous suture – locking and non-locking.
- The knots must be very secure and minimal tension on the wound or the wound will come apart if one loop or knot gives way.
- The advantage is that it is very quick and the wound tension is even across the wound.
Continuous Sutures
HORIZONTAL MATTRESS SUTURE

• USED WITH WOUNDS WITH POOR CIRCULATION
• HELPS ELIMINATE TENSION ON WOUND EDGES
• REQUIRES FEWER SUTURES TO CLOSE A WOUND
• CAN BE PLACED QUITE QUICKLY
• CAN BE DONE AS A CONTINUOUS SUTURE
HORIZONTAL MATTRESS SUTURE
VERTICAL MATTRESS SUTURES

• DEEP AND SHALLOW APPROXIMATION OF THE TISSUE

• CAN BE USED FOR WOUNDS UNDER TENSION

• CAN BE USEFUL WITH LAX TISSUE E.G. ELBOW AND KNEE

• SHOULD NOT BE USED ON VOLAR SURFACE OF HANDS OR FEET OR ON THE FACE BECAUSE OF BLIND PLACEMENT OF THE DEEP PART OF THE SUTURE
Vertical Mattress Sutures
SUB-CUTICULAR CLOSURE

• USED FOR COSMETIC CLOSURES
• USE AN ABSORBABLE SUTURE IF YOU PLAN TO LEAVE THE SUTURES IN AND BURY THE KNOTS
• USE EITHER NYLON OR PROLENE (BEST) AND KEEP THE SUTURE SLIDING WHILE YOU ARE CLOSING. THE SUTURE THEN CAN BE EASILY REMOVED WITH NO EXTERIOR MARKS. THE ENDS CAN BE TAPED OR A KNOT ON THE SKIN
• AT EACH ENTRY POINT, ENTER ACROSS FORM THE LAST EXIT WITH SLIGHT OVERLAP
SUB-CUTICULAR CLOSURE
ELLiptical incision

The ellipse should be three times as long as it is wide. This will make closure of the wound much easier. If the lesion you are removing is likely to be cancerous, make sure that you leave wide margins of clear skin around the lesion.
MODIFIED ELLIPSE
3 CORNERED SUTURE

• USED TO CLOSE A SKIN FLAP WHICH COMES TO A POINT

• HELPS CLOSE THE WOUND, BUT MAINTAIN CIRCULATION TO THE TISSUE

• PLACES MINIMAL TENSION ON THE WOUND EDGES
# Suture Materials

<table>
<thead>
<tr>
<th>Suture material</th>
<th>filament</th>
<th>Absorbing properties</th>
<th>Tissue reaction</th>
<th>Tensile strength</th>
<th>Tensile strength retention</th>
<th>cost</th>
<th>Uses</th>
</tr>
</thead>
<tbody>
<tr>
<td>plain gut</td>
<td>collagen</td>
<td>absorbable</td>
<td>moderate</td>
<td>poor</td>
<td>2-4 days</td>
<td>low</td>
<td>Inside the wound where it absorbs and wound healing is quick</td>
</tr>
<tr>
<td>chromic gut</td>
<td>collagen</td>
<td>absorbable</td>
<td>moderate</td>
<td>poor</td>
<td>7-10 days</td>
<td>low</td>
<td>Inside the wound where it absorbs and wound healing time is average length</td>
</tr>
<tr>
<td>polygalactic acid</td>
<td>braided</td>
<td>absorbable</td>
<td>mild</td>
<td>poor</td>
<td>2-3 weeks</td>
<td>moderate</td>
<td>Inside the wound where it absorbs and longer wound healing time is required, such as tendons. Skin closure or fascia</td>
</tr>
<tr>
<td>acid (Vicryl)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Skin closure or fascia or where long term strength is needed</td>
</tr>
<tr>
<td>silk</td>
<td>braided</td>
<td>Non-absorbable</td>
<td>high</td>
<td>poor</td>
<td>1 year</td>
<td>low</td>
<td>Skin closure or fascia or where long term strength is needed</td>
</tr>
<tr>
<td>nylon</td>
<td>monofilament</td>
<td>Non-absorbable</td>
<td>Very low</td>
<td>good</td>
<td>Loses 20%/yr</td>
<td>low</td>
<td>Skin closure or fascia or where permanent strength is needed</td>
</tr>
<tr>
<td>Polypropylene</td>
<td>monofilament</td>
<td>Non-absorbable</td>
<td>minimal</td>
<td>excellent</td>
<td>indefinite</td>
<td>high</td>
<td>Sub-cuticular skin closure or fascia or where permanent strength is needed. Internally where low reaction braided suture is required to allow tissue to adhere to it. Bone, tendons, strong connective tissue where permanent strength is required</td>
</tr>
<tr>
<td>(Prolene)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Polyester</td>
<td>braided</td>
<td>Non-absorbable</td>
<td>minimal</td>
<td>good</td>
<td>indefinite</td>
<td>high</td>
<td></td>
</tr>
<tr>
<td>(Mersilene)</td>
<td></td>
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<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>stainless steel</td>
<td>monofilament</td>
<td>Non-absorbable</td>
<td>low</td>
<td>excellent</td>
<td>indefinite</td>
<td>moderate</td>
<td>Bone, tendons, strong connective tissue where permanent strength is required</td>
</tr>
</tbody>
</table>
CARE OF THE PATIENT

HOW WILL YOU CARE FOR YOUR PATIENT AND MAINTAIN A SAFE ENVIRONMENT?
LIP LACERATION

First suture here.
NAIL LACERATION
THREE CORNER TEAR
MATTRESS SUTURES
IRREGULAR BORDER
CONTINUOUS SUTURES
SKIN TEAR REPAIR
DOG BITE
### Wound Description

**Location:**

**Depth:**
- [ ] Superficial
- [ ] Subcutaneous
- [ ] Full-thickness
- [ ] Muscle involvement
- [ ] Tendon

**Type:**
- [ ] Linear
- [ ] Irregular
- [ ] Flap
- [ ] Curved
- [ ] Y-shaped

**Length:** _______ cm

### Wound Preparation

- [ ] Wound irrigated with: large volume/approx _______ cc normal saline
- [ ] Wound preparation with: Betadine
- [ ] Wound cleanser

### Procedural Analgesia

**Sedation / Analgesia with:**
- [ ] Versed _______ mg IV/ IM/ PO/ PR
- [ ] Ketamine _______ mg IV/ IM
- [ ] Methadone _______ mg IV/ IM

**Anesthetic:**
- [ ] Lidocaine _______ % plain
- [ ] Marcaine _______ % plain
- [ ] Lidocaine _______ % with epinephrine
- [ ] Marcaine _______ % with epinephrine

**Sterile prep & drape:**
- [ ] Wound explored: foreign material _______ absent
- [ ] Wound explored: glass/dirt/wood/pebbles/mold _______ present

**Skin repaired with:**
- [ ] "# 2-0 3-0 4-0 5-0 6-0 silk/nylon/prolene simple interrupted mattress H/V running"
- [ ] "# 5-0 6-0 7-0 vycril/chronic gut"

**Sub-Q repaired with:**
- [ ] "# 2-0 3-0 4-0 5-0 6-0 vycril/chronic gut"
- [ ] "# 5-0 6-0 7-0 vycril/chronic gut"

**Muscle repaired with:**
- [ ] "# 2-0 3-0 4-0 5-0 6-0 vycril/chronic gut"
- [ ] "# 5-0 6-0 7-0 vycril/chronic gut"

**Nail bed repaired with:**
- [ ] "# 2-0 3-0 4-0 5-0 6-0 vycril/chronic gut"
- [ ] "# 5-0 6-0 7-0 vycril/chronic gut"

**Wound edge approximation:**
- [ ] Good
- [ ] Acceptable

**Wound edge eversion:**
- [ ] Good
- [ ] Acceptable

**Wound hemostasis:**
- [ ] Good
- [ ] Acceptable

**Antibiotic ointment & dressing placed:**
- [ ] Applied

**Patient counseled regarding:**
- [ ] Wound care instructions
- [ ] Infection risk
- [ ] Foreign body

**Patient tolerated procedure:**
- [ ] Well
- [ ] Adequately
- [ ] Poorly

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Practitioner Signature: ___________________________
DISCHARGE INSTRUCTIONS

• ANTIBIOTIC THERAPY AND FOR HOW LONG
• WOUND CARE
• RETURN VISITS
• SUTURE REMOVAL
• POST SUTURE REMOVAL CARE