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Suturing

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Clinical Skills Title: Suturing

Overview

The first goal of suturing a wound closed is to prevent infection by minimizing bacterial contamination. Irrigating the wound with large amounts of saline under moderate pressure is an important step in the process. If a wound is grossly contaminated or "dirty," healing by secondary or tertiary intention can be employed to prevent abscess formation.

The second goal of suturing is to encourage wound healing. To do this, it is important to handle the tissues gently and to remove any devitalized tissue from the wound prior to suturing. Smooth forceps can crush tissue, since they require a large amount of pressure to grasp it. Using fine-toothed forceps is encouraged, since they handle tissue more gently. The final thing to do is to ensure that the edges have been reapproximated with the appropriate amount of tension in the suture. If the suture is pulled too tight, ischemia can develop at the wound edges, and this both decreases wound healing and increases the risk of infection.

The optimal cosmetic results are achieved with proper suturing technique and are more likely if infection is minimized and wound healing is optimized.

Procedure

1. Preparation

1.1 Obtain written informed consent from the patient. Go over the risks of the procedure and the steps taken to minimize that risk with the patient.

1.2 Before starting the procedure, gather the supplies needed for suturing. This includes: lidocaine or a topical numbing agent, a needle to deliver the lidocaine, sutures, a needle driver, forceps, and normal saline.

1.3 Put on protective gear, such as sterile gloves, a mask, and a scrub cap, prior to the procedure.

1.4 Using normal saline, clean the wound thoroughly. This is done to minimize the risk of infection.

1.5 Remove any foreign bodies from the wound. This can be done with pressurized normal saline or with forceps.

1.6 Using scissors or a scalpel, remove any devitalized tissue from the wound. This tissue can become necrotic and increases the likelihood of developing infection.

1.7 If the wound is bleeding, hold pressure on it to achieve hemostasis.

1.8 Using a syringe, inject lidocaine into the wound to numb it and the surrounding area. This should be done 5-10 min prior to suturing to allow the lidocaine to take effect.

2. Suturing (Simple Interrupted Stitch)

2.1 To achieve the best cosmetic result, start by placing the first stitch in the middle of the wound. Continue to divide the wound into quarters and eighths until the skin edges are reapproximated.

2.2 There are multiple ways to hold the needle driver. Partially insert your thumb and index finger into the loops for control and dexterity.

2.3 Pick up the needle using the needle driver. The needle should be grasped at the tip of the needle driver at either the center or 60% back from the pointed end.

2.4 Using the toothed forceps, pick up the edge of the skin and slightly evert it.

2.5 Pronate your hand to pass the needle through the skin at a 90° angle. Once the needle has broken through the skin, supinate your wrist to allow the needle to exit out into the wound.

2.6 Using the forceps, pick up the needle and pull it out of the skin. The suture should follow through. Make sure to leave a 2-3 cm tail of suture to tie a knot with.

2.7 Transfer the needle back to the needle driver, pronate the wrist to drive the needle into the other side of the wound at a 90° angle, and supinate your wrist to allow the needle to exit through the skin.

2.8 Use the forceps to pick up the needle and pull it out of the skin. The suture should follow behind it. At this point, there should be two strings of suture of unequal length on either side of the wound.

3. Instrument Tie

3.1 Position the needle holder between the two strands of suture. Hold the longer strand of suture in your hand.

3.2 Wrap the long strand of suture over and around the needle holder twice.

3.3 Using the needle holder, grab the short strand of suture and pull the short strand through the loop, toward yourself.

3.4 Pull the two strands in opposite directions to secure the square knot. Pull the knot tight enough to reapproximate the skin, but do not strangulate the edges.

3.5 After the first throw, the long strand should now be on the opposite side of where it started. Place the needle holder between the two strands again.

3.6 Wrap the long strand over and around the needle holder once. Since the long strand was on the opposite side, it's possible to loop it in the opposite direction.

3.7 Use the forceps to grasp the short end of the suture and pull it through the loop toward yourself. Tighten to secure the square knot.

3.8 For the third throw, repeat steps 3.1-3.4. If using a braided suture material, such as silk, three throws is sufficient to lock the knot. For monofilament suture material, such as nylon, 5-6 alternating throws should prevent knot slippage.

3.9 Once the knot is secured, cut both sutures to about half a centimeter in length. This should free the needle on the long suture, which can now be used to continue suturing.

4. Completion

4.1 Check to make sure the sutures are spaced approximately half a centimeter apart.

4.2 Once suturing is completed, cover the wound with the appropriate ointment and dressing.

Commented [AS1]: This is covered in more detail in a separate manuscript on wound dressing. AS

4.3 Dispose of the syringe, scissors, needles, sutures, and forceps in the appropriate bins.

5. Suture Removal
Non-absorbable sutures need to be removed once the wound is closed. Optimal time for suture removal depends on the location of the wound, but it is usually around 7-10 days.

5.1 To remove a suture, grab the knot with the forceps, and cut beside it using scissors.

5.2 Once cut, pull on the knot to remove the entire length of the suture.

5.3 Dispose of sutures, scissors, and forceps in a hazardous waste container.

Summary

The goal of suturing is to obtain optimal wound closure while minimizing complications, such as infection or scarring. Proper suturing technique, correct selection of suturing materials, and knowledge of wound physiology are essential for achieving better results.

The suturing is contraindicated in cases where the wounds are grossly contaminated or are considered “dirty” (those contacting devitalized or infected tissue). In these instances, the wound should be left open and allowed to heal by secondary or tertiary intention to prevent abscess formation. Every patient with a laceration should receive a tetanus vaccine, or have received one within the last 10 years.