

Suturing

Original by
Rance Redhouse
Lane Atene
Kyle John

Compiled by
Craig Kohn

Materials from Boston School of Medicine and other
sources

Sutures

- ◎ **Sutures are used to repair cuts in the body and keep the edges of the wound closed.**
 - > While small wounds can usually keep themselves closed, large wounds require additional assistance or they will re-open and delay healing.
- ◎ **Sutures can be made of absorbable material, wire, nylon, and other sources.**
 - > In lieu of suturing, a vet could also use metal staples or glue to close a wound.

Aseptic Technique

- Use an **aseptic technique** whenever suturing is necessary.
 - > **Aseptic technique** encompasses all procedures designed to prevent the introduction of bacterial contamination into the surgical wound.
- **Aseptic technique includes:**
 - > The use of sterile instruments
 - > Appropriate surgical preparation of the patient
 - > The use of sterile gloves and appropriate attire
 - > Appropriate location for conducting the surgery
 - > Maintenance of sterility throughout the surgical procedure

• Taken from: "General Principles of Surgery". 2013. Penn State University Animal Resource Program.

Preparing the Wound

- **First, trim or shave the area surrounding the wound to avoid contamination and to ensure proper airflow.**
 - > The wound edges should be exposed and clearly visible.
 - > Ideally, there should be a **half-inch** diameter of hair-free skin surrounding the wound.
- **Washing and rinsing the wound will remove bacteria and debris.**
 - > Use soap to gently wash the skin wound and surrounding tissue.
 - > Allow warm water to flow over and into the wound for a period of two full minutes.



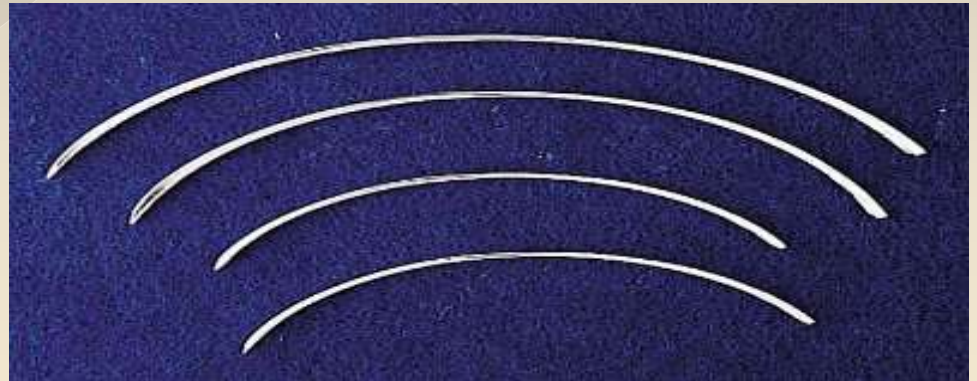
Preparing the Wound (cont.)

- **Following wound irrigation, pat the wound dry using a sterile gauze pad.**
 - > A clean paper towel can also be utilized to dry the surrounding area.
 - > Avoid using cloth towels, as this can simply transfer additional bacteria to the clean wound.



Supplies

Materials Needed for Suturing



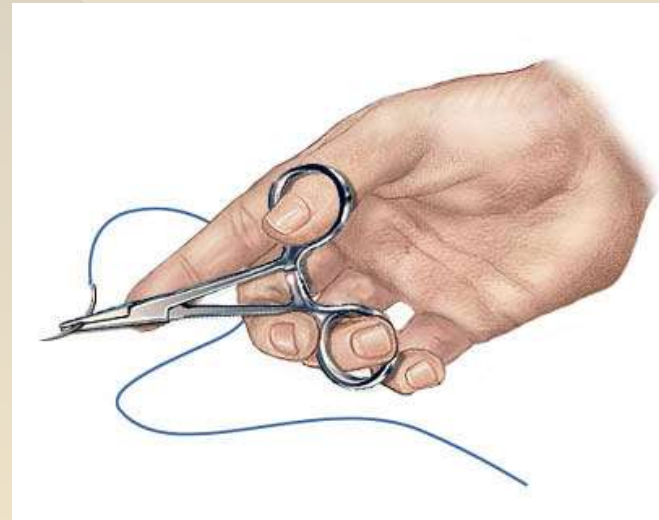
Curved Needle

- **Curved needles** are used most often in the suturing process.
 - > The curved needles are shaped like an arc to make the job easier and faster.
 - > This needle can be used for any type of suture.
- The size of the needle depends on the tissue to be sutured.
 - > Thinner tissue requires a smaller needle.



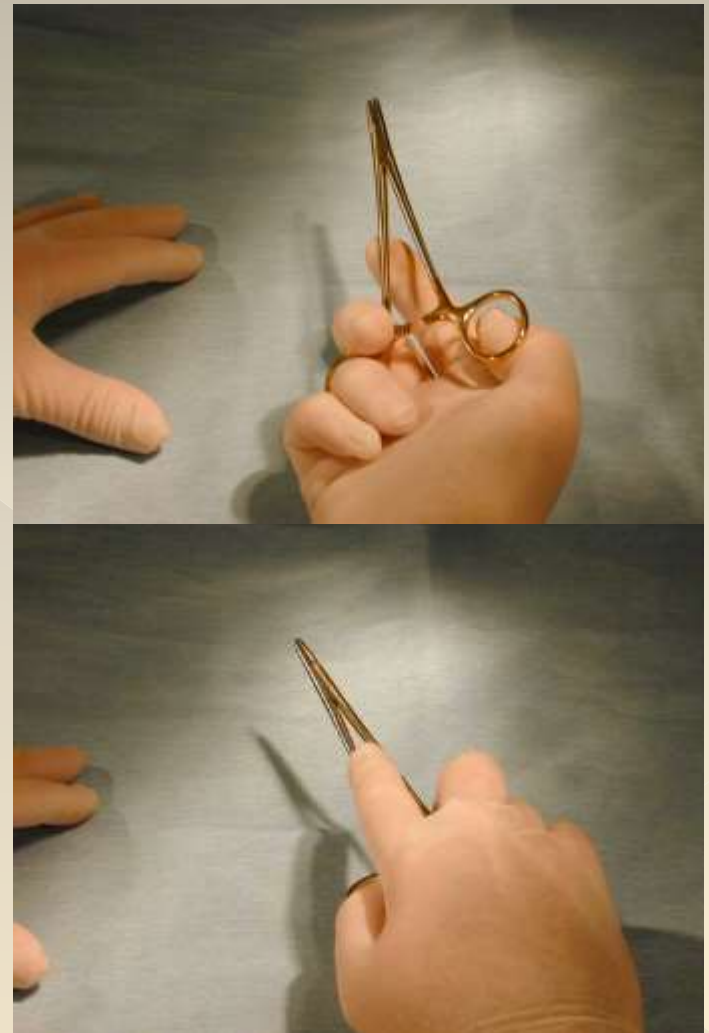
Needle Holders

- A **needle holder** is a surgical instrument used to hold a suturing needle for closing wounds during suturing and surgical procedures
 - > It may have both a serrated portion and a cutting portion (for holding the needle and cutting the stitching material).



Needle Holding Techniques

- ◉ There are several techniques for holding the needle holder.
- ◉ The most common method is to place the thumb and middle or ring finger slightly into the instrument's rings.
 - > Avoid inserting your fingers far into the rings of the instrument, since this will tie up your fingers and impede your mobility.
 - > Some surgeons do not put their fingers into the rings at all and simply grasp the rings and body of the needle holder in the palm of their hand.
- ◉ *Source: Boston University Medical Campus*



Suture Materials

- Suture materials can be divided into two categories: absorbable and non-absorbable.
 - > Absorbable materials have the advantage in that they are less likely to cause an immune response by the body
 - > Non-absorbable materials can be left in the body permanently if needed.

Absorbable Suture Materials

- **Absorbable suture materials** are broken down by the patient's body.
 - > The original absorbable material was chromic catgut (still used today).
 - > This is made from animal intestines and breaks down after 7 days.
- Because absorbable materials break down, there is less of a likelihood of an severe immune reaction.



Non-absorbable Suture Materials

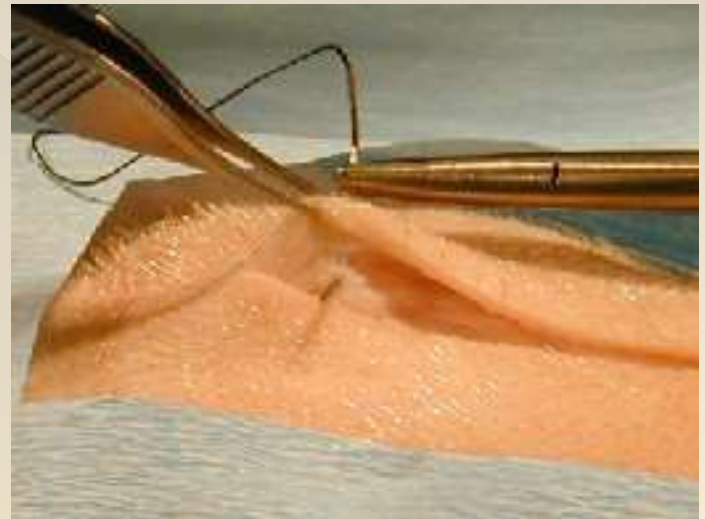
- **Non-absorbable sutures** are made of materials that are not readily broken down by the body's enzymes or by hydrolysis.
 - > Non-absorbable materials can be removed or left in place permanently
- *Source: Boston University Medical Campus*



Forceps

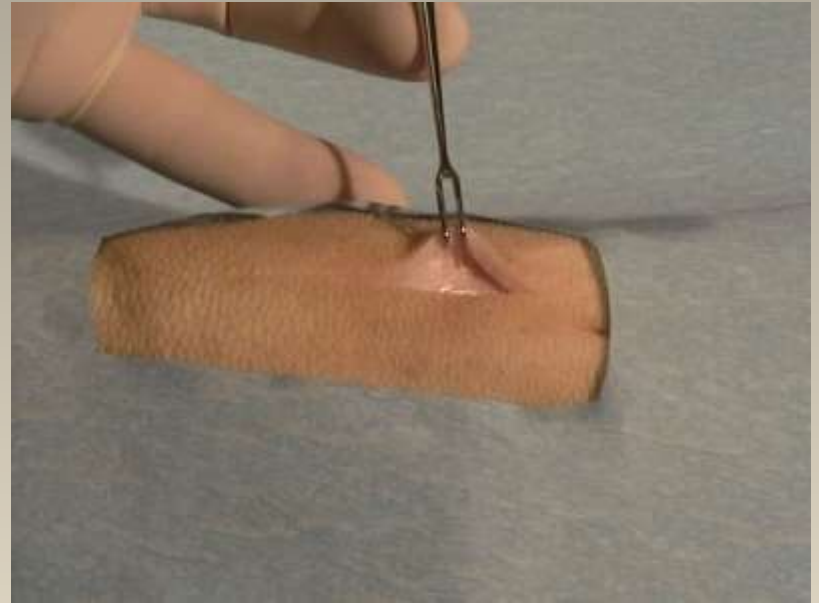
- **Forceps** allow you to control the position of the skin to make it easier to pass the needle and suture material through the skin.

- *Source: Boston University Medical Campus*



Skin hooks

- Instead of using forceps, the skin edges can also be controlled using **skin hooks**
 - These have the advantage that they do not crush the skin edge.
- A **curved forceps** combine the function of both the skin hooks and the forceps.



Types of Sutures

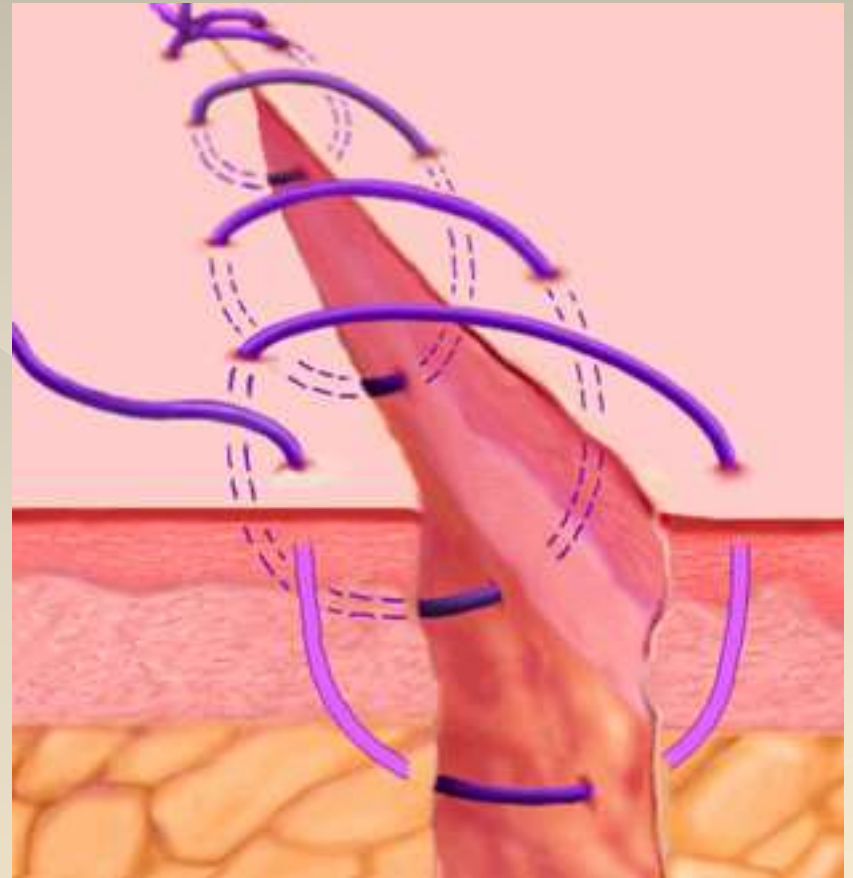
Continuous Sutures

Non-continuous Sutures

Purse-String Suture

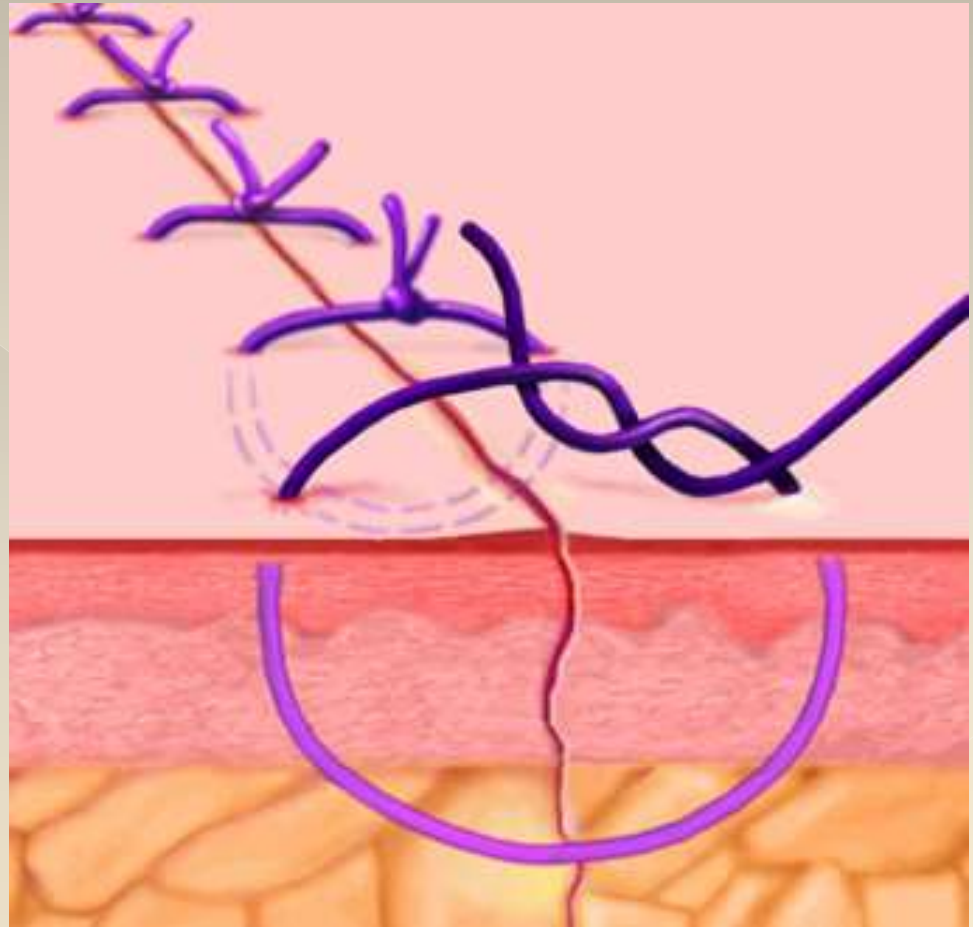
Continuous Suture

- A **continuous suture**, also called ***uninterrupted suture***, is made from an uninterrupted series of stitches that are fastened at each end by a knot.
 - > A.k.a. **Running Stitch**
- This suture is fast and lessens the risk of infection.



Non-Continuous Suture

- A **non-continuous suture**, also called an **interrupted stitch**, is where each stitch is tied separately.
- This stitch has the benefit of creating a more accurate fit for the edges of the wound.



Pro's and Con's

○ **Continuous Sutures**

- + It is faster.
- + It brings less foreign material in wound.
- + It is potentially more airtight/watertight.
- If one knot fails, it is a big deal.
- Less control over tension.

○ **Non-continuous Sutures**

- + This allows for adjustment of tension.
- + If one knot fails, it is not a big deal.
- More time is needed.
- Costs more.
- Increased amount of foreign material in wound.

Purse-string Suture

- A purse-string suture is a continuous stitch paralleling the edges of a circular wound.
 - > This is commonly used to close circular wounds, such as hernia or an appendiceal stump



Suturing Techniques

Angles of Insertion

Coordinating forceps and
needle

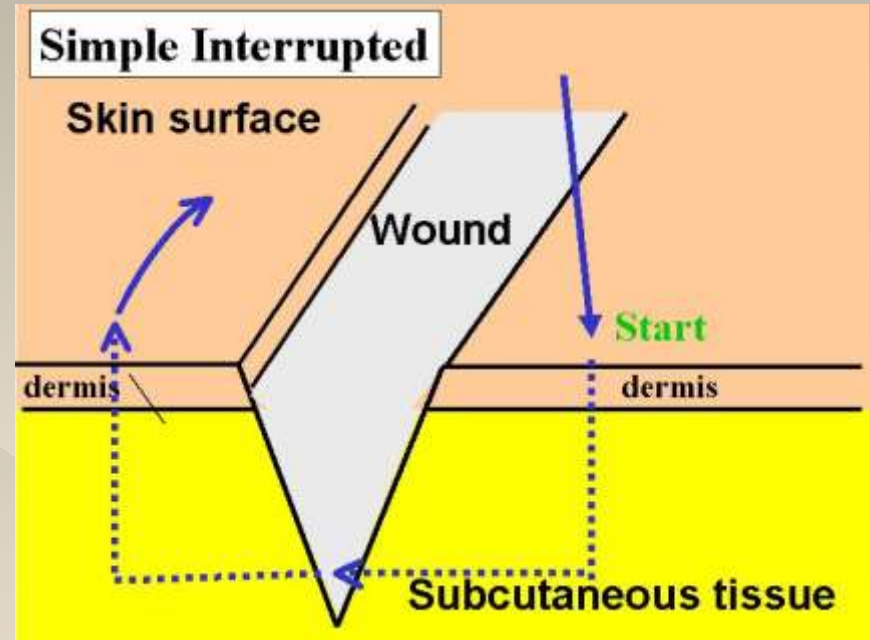
Key Maneuvers

Knots

Suture Removal

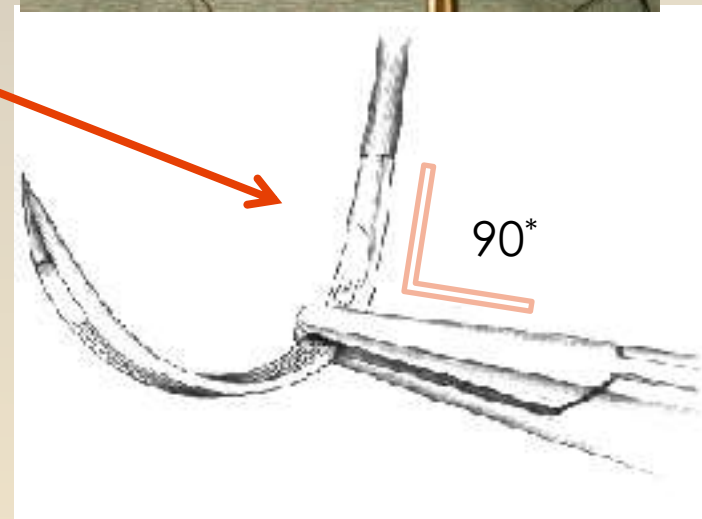
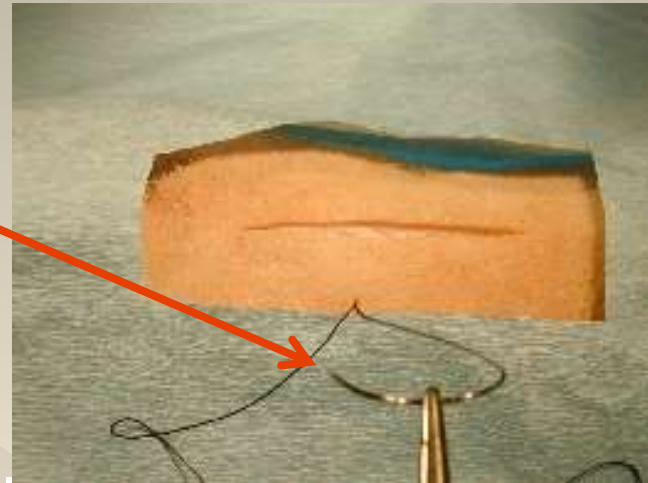
Remember to create right angles

- The ideal skin suture should form a rectangle.
 - > It should penetrate the epidermis and dermis perpendicular to the skin surface
- After penetration, turn at a right angle, at the depth of the wound, move parallel to the skin surface, and then move straight to the surface.



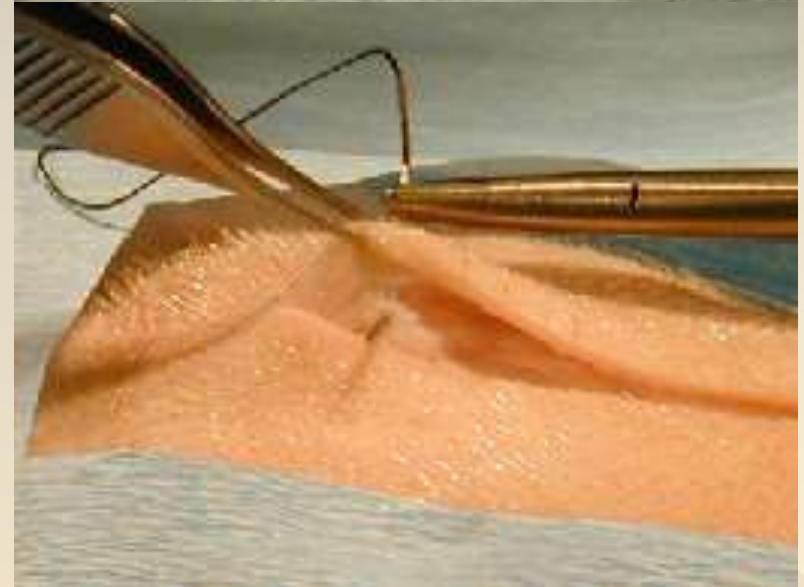
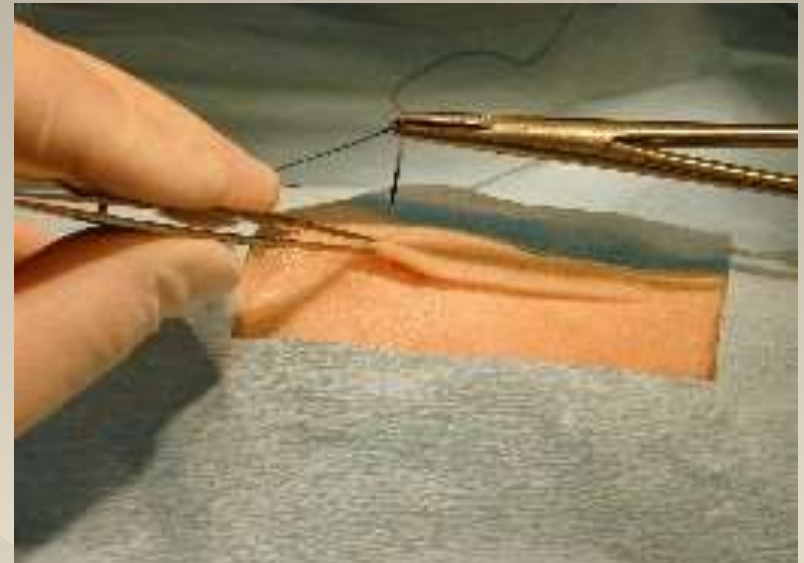
Coordinated Use of the Forceps and Needle Holder

- The tip of the needle holder should grasp the needle about 2/3 of the way back from the point.
 - > The needle holder and needle should be perpendicular to each other.
- The tip of the needle should penetrate the skin perpendicularly about 5-10 mm from the wound edge.
 - > Elevate the skin with the forceps while penetrating the skin.



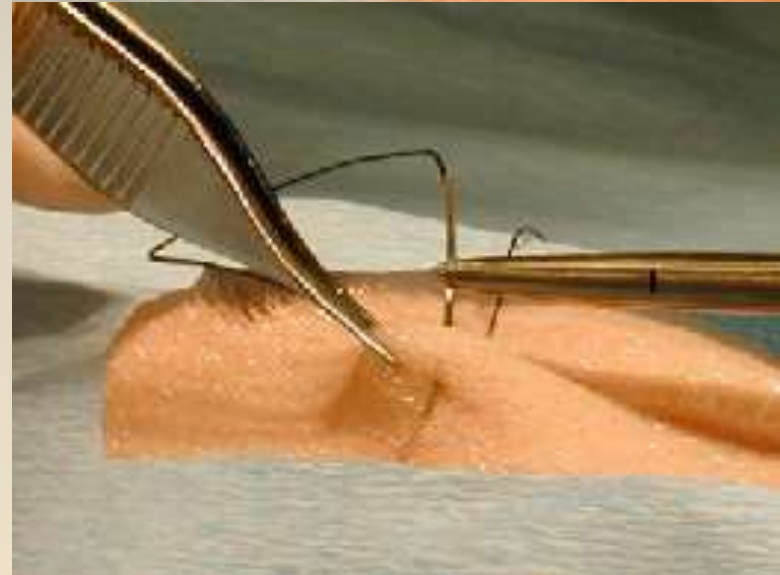
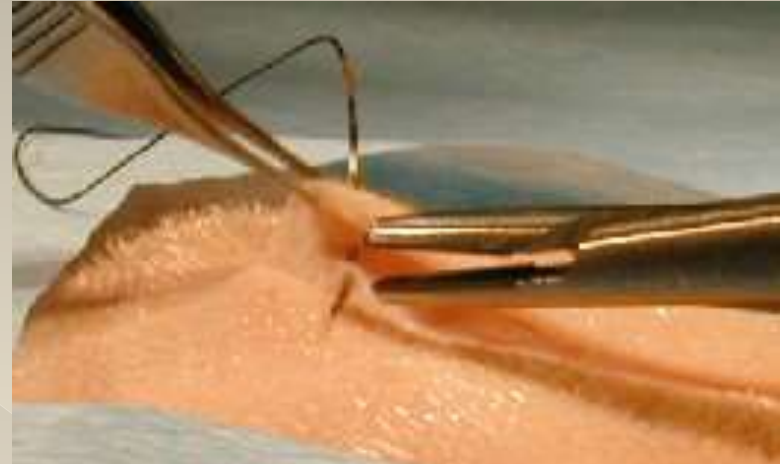
Forceps & Needle (Cont)

- The tip of the needle should now be seen protruding into the wound
 - > At this point, continue to hold the skin w/ the forceps.
- A common error here is to release the forceps from the skin edge
 - > This would cause the skin to retract, and the needle may move and retract beneath the skin edge



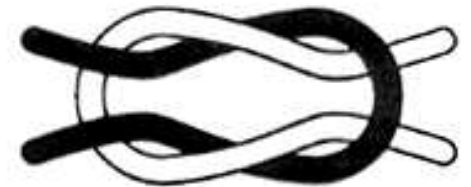
Forceps and Needle (cont)

- The key is to hold the position of the skin edge while releasing the needle from the needle holder.
 - > Pull the needle from the other side of the elevated skin.
 - > Elevate the other skin edge and penetrate it with the needle.



Knot Tying Principles

- Simpler knots are better than complicated knots.
- Smaller knots are better than bigger knots.
- Excessive tension will cause tissue damage.
- Tension should be as horizontal as possible (minimize lifting).
- Minimal ties per knot should be used; extra ties add bulk.
- If the two ends of the suture are pulled in opposite directions with uniform rate and tension, the knot may be tied more securely.



SQUARE KNOT

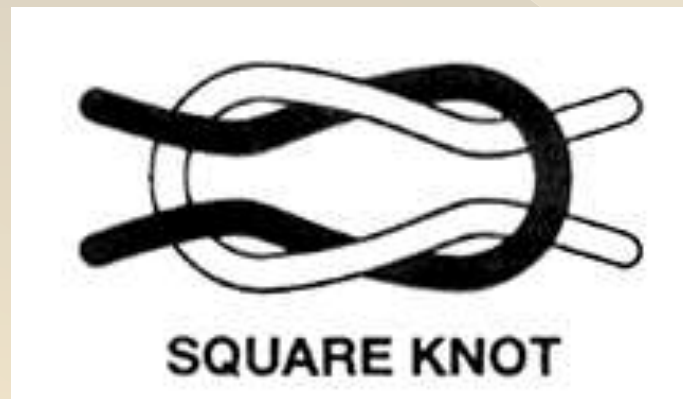


SURGEON'S KNOT

Source: ruralareavet.org

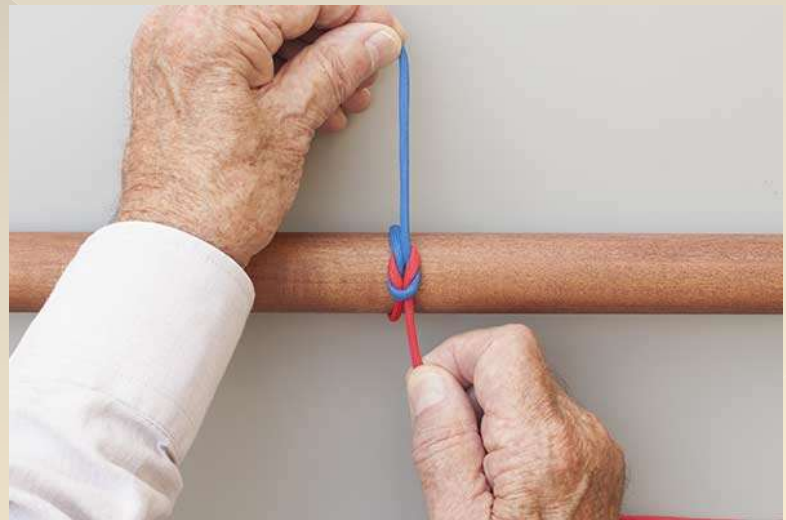
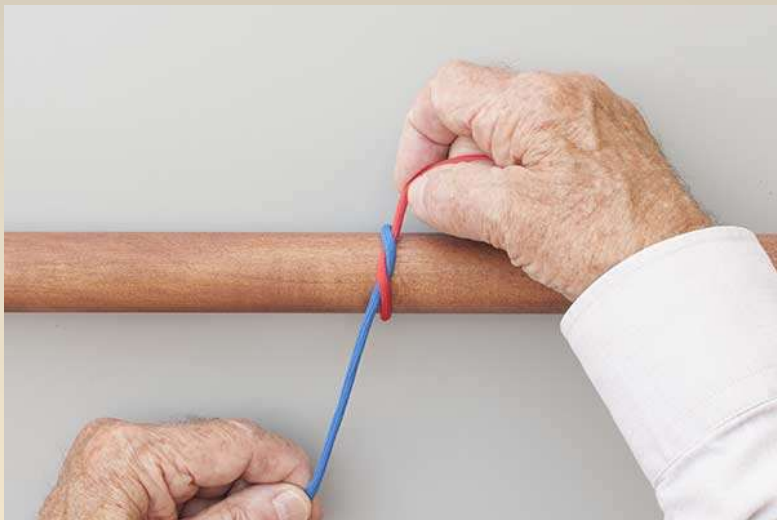
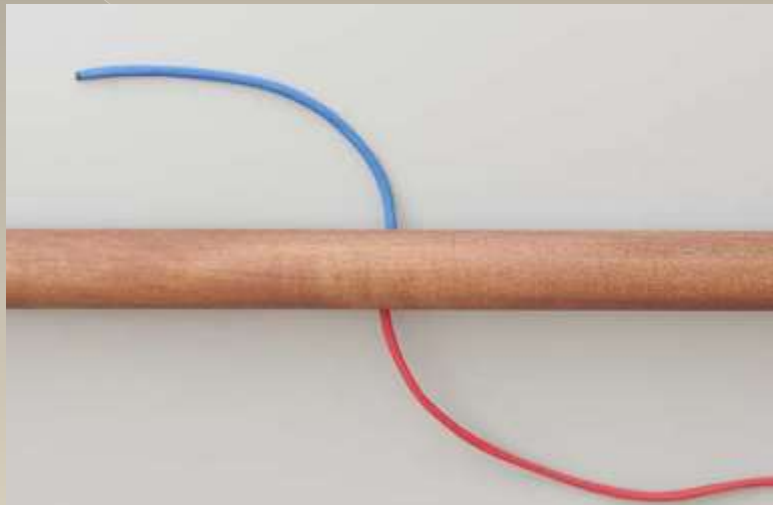
Two-handed square knot

- **The two-hand square knot is the easiest and most reliable for tying most suture materials.**
 - > It may be used to tie surgical gut, virgin silk, surgical cotton, and surgical stainless steel.



Source: ruralareavet.org

Two Handed Square Knot Steps

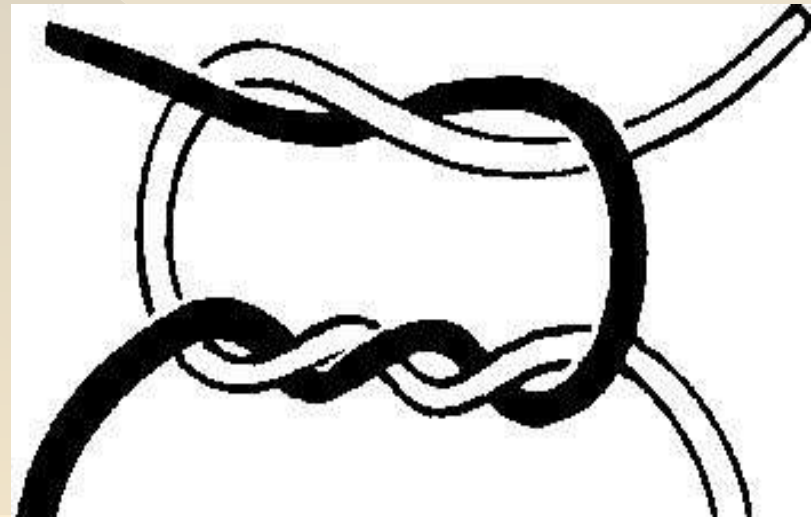
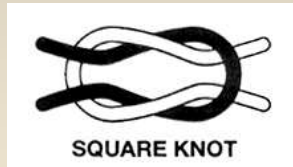


Visit this page to see all steps:

<http://www.animatedknots.com/surgtwohand/index.php?LogoImage=LogoGrog.jpg&Website=www.animatedknots.com>

Surgeon's Knot (Friction Knot)

- **The Surgeon's Knot is recommended for synthetic materials or materials that do not easily hold their own shape.**
 - > The Surgeon's Knot is similar to a Square Knot
 - > The difference is that the first loop of the knot is double wrapped.
- **The left strand is wrapped twice around the right strand.**
- **The knot is finished just like a square knot**



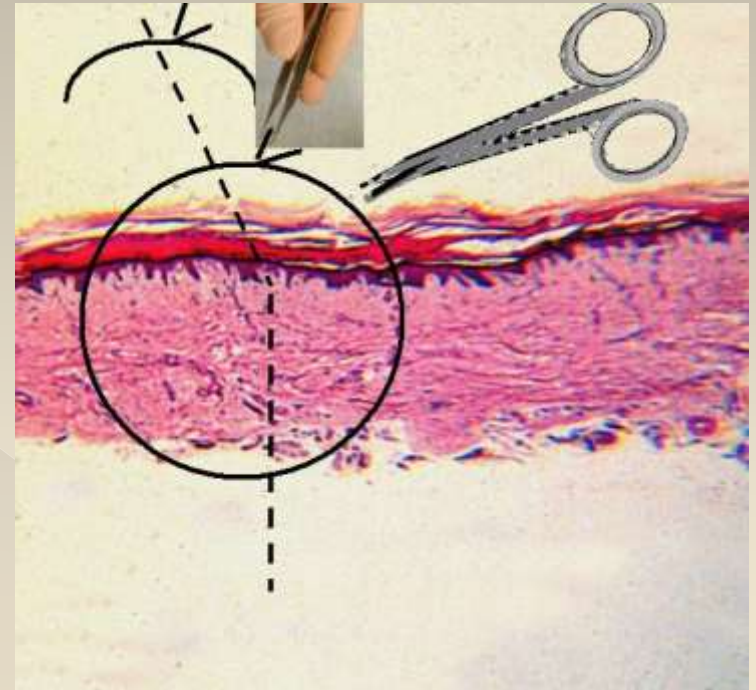
Suture Removal

- ◎ **Sutures should be removed from the...**

- > Face: 3-4 days
- > Scalp: 5 days
- > Trunk: 7 days
- > Arm or leg: 7-10 days
- > Foot 10-14 days

Suture Removal Steps

- **The first step in suture removal is that the skin should be cleansed.**
 - > Hydrogen peroxide is a good choice for gently removing dried blood and exudate.
- **Grasp one of the “ears” of the suture with a forceps to elevate the suture just enough to slip the tip of a small scissor under the suture in order to cut it.**



Source: Boston
University Medical
Campus

Suture Removal Steps

- **With the suture gently elevated, snip the suture with a scissors.**
 - > The suture is then gently removed by pulling with the forceps.
- **It is frequently a good idea to reinforce the wound with adhesive strips or tape to prevent it from re-opening.**