INTRACACIES OF SUTURING

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During my recent clinical rotation in Plastic Surgery, a medical student approached me and wanted to know the differences between the various suture materials and in what anatomical location they are commonly used. Often, there is limited training and not much time spent on suturing during medical school or PA school. Therefore, I thought an article regarding the intricacies of suturing would be beneficial, especially to the aspiring surgical student or Surgical PA.

Need to know

A suture is composed of three important parts: **a suture type**, **suture needle** and **suture size**.

Suture Type

The type of suture used during surgery varies on the operation, location, and environment. Although there are many different types of sutures, the most common and frequently used types are **Absorbable** vs. **Non-Absorbable** and **Braided** vs. **Monofilament** [2] (Refer to Figure [1]).

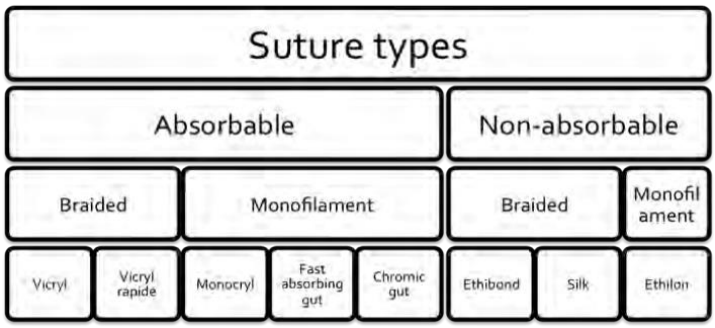


Figure [1.]

Absorbable sutures are often used to close the most internal tissue and deepest incisions but are also used on the surface of the skin. Although absorbable sutures vary in strength and composure, they are made to stay in the body over an extended duration of time and eventually dissolve within a period of two to eight weeks. [2] They do not need to be removed once placed, as they disappear over time. The majority of absorbable sutures are composed of synthetic polymer fibers (braided vs. monofilament) which consist of Polygactin 90, Poliglecaprone 25 and Plydioxanone. [2] The natural absorbable sutures used in surgery prior to the use of synthetic absorbable sutures consisted of **Plain and Chromic surgical gut (catgut).** [3]

Non-Absorbable sutures are often used on lacerations and wound closures on the superficial surface of the skin or internal tissue in which absorbable sutures are not adequate. [2] Non-absorbable sutures are typically removed after a couple of weeks of placement. The most commonly used non-absorbable sutures include: **Silk, Polypropylene, Polyamide (nylon)** and **Polyester**. [3]

Braided sutures are composed of multiple strands woven together including **Silk, Polygactin 90** (most commonly used) and **Polyester.** [3] Although fewer ties are needed to maintain the integrity of the knot, an adverse inflammatory response is more commonly seen in **Braided** vs. **Monofilament** sutures. [3]

Monofilament sutures are composed of a single strand such as **Polyamide (nylon), Plydioxanone,** and **Poliglecaprone 25** (most commonly used). Monofilament (non-braided) sutures have a greater tendency to loosen, requiring more ties, but are not as easily prone to becoming infected, therefore causing less reactivity vs. braided sutures. [2]

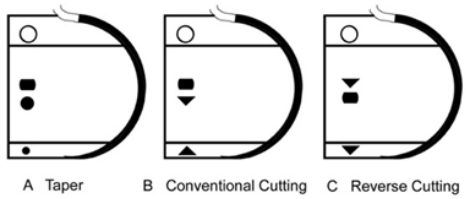
Suture Needles

When selecting a suture needle, one needs to consider the needle type and diameter. Although there is a variety of needles to choose from, two of the most common curved needle types are **Cutting** and **Tapered**.

Cutting needles are used for closure of skin lacerations/subcutaneous tissue and for very tough bone and tissue. There are two different types of cutting needles:

Conventional – cutting edge is on the inner curvature, and mostly used for tough tissue
Reverse – cutting edge is on outer curvature of the needle and most preferred cutting needle except when suturing tough tissue

Tapered (round bodied) needles do not possess a cutting edge and are often used on soft tissue/tissue fibers, gastrointestinal, subcutaneous tissue or fascia due to their blunt point. [1] The wiring diameter of a tapered needle ranges from fine to heavy.



Suture Size

The size of the suture denotes the width and/or diameter of the suture material. Most surgeons commonly use the smallest diameter for wound closure due to the smaller the size/smaller diameter, less tensile strength the suture will have, less foreign material dispersed at the site of the wound and less damage produced to the tissues. [3]

Refer to Figure [2] for suture size and location).

Size (smallest à largest)	Location
10-0, 9-0, 8-0	Eye, nerves, hands
7-0, 6-0	Small vessels, small arteries, face, vascular graft
5-0, 4-0	Skin, scalp, upper & lower extremities, neck, mucosa
3-0, 2-0	Skin, muscle, bowel, abdomen
0,1 & larger	Fascia, abdomen, joint capsule, tendons

Disclosure: Please note each Physician and/or PA has a specific preference as to what sutures they use during certain procedures and wound closures; therefore, although there is a plethora of options, the surgeon's preference remains singular.

REFERENCES

[1] A Comparison of the Different Suturing Needles. (2014). Retrieved August 14, 2016, from http://www.theapprenticedoctor.com/comparison-different-suturing-needles- available-today/

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