

Sutures in Dermatology: An Overview for Patients and Caregivers

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Introduction

In dermatology, the choice of suture material plays a crucial role in wound closure and healing. The appropriate suture should be selected based on the type of procedure, location of the wound, patient's skin type, and the desired functional and cosmetic outcomes. Usually, a combination of deep and surface sutures are used. Deep sutures are used to bring deeper tissue layers together, providing wound support and reducing tension on the skin surface. On the other hand, surface sutures are used to precisely approximate the edges of the outermost layer of the skin for optimal cosmetic outcomes.

Here is an overview of the common types of sutures used in dermatology.

Suture Characteristics

There are multiple characteristics of sutures that need to be considered when choosing an appropriate suture for a procedure.

1. Absorbable vs Non-Absorbable
 - Sutures are considered absorbable when they lose most of their tensile strength within 60 days after placement.
 - Absorbable sutures are used mainly as deep sutures to close deeper tissue layers and reduce wound tension, due to its sub-optimal cosmetic outcomes. They do not need to be removed after surgery since they should be absorbed by the body.
 - Non-absorbable sutures are primarily used as surface sutures, and do need to be removed post-operatively.
2. Monofilament vs Multifilament
 - Monofilament Sutures:
 - Advantages: Lower infection risk, minimal tissue reaction, and less friction.
 - Disadvantages: Harder to handle, worse knot security.
 - Multifilament (Braided) Sutures:
 - Advantages: Easier to handle, better knot security.
 - Disadvantages: Higher infection risk (should not be used in contaminated wounds), more tissue reaction, more tissue drag.
3. Suture Size and Tensile Strength
 - Tensile strength depends on suture size/thickness. Larger numbers indicate a smaller suture and increased strength (ex: 3-0 is a strong, thick suture, while 7-0 is a thin, weaker suture).
 - The smallest size that will provide enough strength is preferred.
 - Common sizes in dermatology range from 5-0 to 7-0 for facial closures and 3-0 to 4-0 for trunk and extremity closures.
4. Tissue Reactivity

- Tissue reactivity refers to the level of inflammation a suture causes. Natural materials like silk tend to cause greater tissue reactivity, while synthetic fibers like nylon typically result in lower reactivity.
5. Other Characteristics
- Plasticity and elasticity
 - Ease of handling and knot security

Absorbable Sutures

1. Surgical Gut
 - Monofilament and the only natural absorbable suture
 - Plain gut has poor tensile strength in 7-10 days, fair ease of handling, and poor knot security. It is rarely used because of its poor strength and moderate tissue reactivity.
 - Chromic gut has poor strength at 3-4 weeks poor ease of handling, poor knot security, and less tissue reactivity than plain gut. It is useful for mucosal closures and skin grafts.
 - Fast-absorbing gut maintains tensile strength for 3-5 days, has fair ease of handling, poor knot security, and low tissue reactivity. It is used for skin grafts, surface sutures, and where suture removal is difficult.
2. Polyglycolic Acid (Dexon®)
 - Braided multifilament suture that has 20% tensile strength at 3 weeks, good ease of handling, good knot security, and low tissue reactivity.
 - Uses: deep dermal closures, subcutaneous tissue.
 - Complete absorption time: 3-4 months.
3. Polyglactin 910 (Vicryl®, Polysorb®)
 - Braided multifilament that maintains 75% tensile strength at 2 weeks and 50% at 3, good ease of handling, fair knot security, and low tissue reactivity.
 - Uses: deep dermal closures, subcutaneous tissue.
 - Complete absorption time: 3 months.
4. Polydioxanone (PDS II®)
 - Monofilament with 70% tensile strength at 2 weeks and 50% at 4 weeks. Poor ease of handling and knot security, and low tissue reactivity.
 - Uses: contaminated and high-tension areas (ex: subcutaneous tissue).
 - Complete absorption time: 4 months.
5. Poliglecaprone 25 (Monocryl®)
 - Monofilament with 50-60% tensile strength at 1 week, good ease of handling and knot security, and minimal tissue reactivity.
 - Uses: when minimal tissue reactivity is crucial.
 - Complete absorption time: 4 months.
6. Glycolide and trimethylene carbonate (Maxon®)
 - Monofilament with 80% tensile strength at 2 weeks and 60% at 4 weeks, fair ease of handling, good knot security, and low tissue reactivity.
 - Uses: high-tension areas (ex: subcutaneous tissue).
 - Complete absorption time: 6 months.

7. Glycomer 631 (Biosyn®)

- Monofilament that has 75% strength at 2 weeks and 40% at 3, good ease of handling, poor knot security, and minimal tissue reactivity.
- Uses: high-tension areas (ex: subcutaneous tissue).
- Complete absorption time: 4-6 months.

Non-Absorbable Sutures

1. Nylon (ex: Dermalon® and Surgilon®)

- Monofilament and multifilament, synthetic, inexpensive, good tensile strength, good to fair ease of handling, poor to fair knot security, minimal tissue reactivity
- One of the most popular non-absorbable sutures in dermatological surgery.

2. Silk (Dysilk®)

- Braided natural suture with no tensile strength at 1 year, gold standard ease of handling, good knot security, and moderate tissue reactivity.
- Uses: mucosal surfaces and intertriginous areas

3. Polypropylene (Prolene®, Surgilene®, Surgipro®)

- Monofilament, synthetic, relatively expensive, extended tensile strength, good to fair ease of handling, poor knot security, and minimal tissue reactivity.
- Uses: running subcuticular stitches.

4. Polyester (Dacron®, Ethibond®, Mersilene®)

- Braided, multifilament, indefinite tensile strength, very good ease of handling, good knot security, and minimal tissue reactivity.
- Uses: mucosal surfaces.

5. Polybutester (Novafil®)

- Monofilament, extended tensile strength, good to fair ease of handling, poor knot security, low tissue reactivity.
- Uses: subcuticular running sutures.

Conclusion

The selection of appropriate sutures in dermatology is critical for wound healing and cosmetic outcomes. Understanding the properties of different sutures helps dermatologists make informed decisions to optimize patient care, and helps patients have informed expectations.

References

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