

Sutures in dermatosurgery

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Sir,

Sutures are a very important component of dermatosurgery. During the three years post graduate curriculum in dermatology, hardly any kind of dermatosurgery or aesthetic dermatology is taught. Aesthetic dermatology is usually not practiced in the medical colleges. But there are some basic surgical techniques, which every dermatologist ought to know. The technique of closing wounds by means of needle and thread is several thousand years old [1]. The history of surgical sutures can be traced back to ancient Egypt where a number of surgical techniques involving sutures were used. There are two types of sutures: Absorbable and Non absorbable. The absorbable sutures include: Polyglactin, Polydioxanone, PGA and Catgut. The nonabsorbable sutures include nylon, silk and polypropylene [2]. The size of the suture refers to the diameter of the suture strand. The more the zeroes characterizing the suture size, the smaller the resultant strand diameter. The smaller the suture, the lesser the tensile strength of the strand [3]. The suture size ranges from 7 to 11-0.

- Size 7 is largest
- Size 11-0 is smallest
- Size 7-0 approximately corresponds to the thickness of human hair.

The classification of the sutures is as follows:

- Absorbable/Non-Absorbable - Absorbable Sutures are those which undergo degradation in tissues, losing their tensile strength within 60 days. Non-Absorbable Sutures are those which are not digested by body enzymes or hydrolyzed in body tissue.
- Natural/Synthetic – Natural sutures includes gut, chromic gut, silk and collagen. Synthetic sutures includes nylon, polypropylene and stainless steel sutures.

- Braided/Monofilament- Monofilament is a single strand of material [4]. It has less resistance as it passes through the tissues. It causes less tissue reaction and less tissue drag but it has less knot security. It also resists bacterial harboring compared to braided suture. One should avoid using multifilament on the skin as it can harbor bacteria. Braided sutures are multifilament sutures that consist of several filaments or strands, twisted or braided together [5]. They have greater tensile strength and more pliability and flexibility. It causes more tissue reaction and more tissue drag but it has more knot security.
- Antibacterial Sutures: These are effective against *S. aureus* and *S. epidermidis* which are most common for device infections. They have ability to withstand manufacturing process. These do not negatively alter suture properties and have the ability to maintain antibacterial activity on the suture for a clinically relevant duration [6,7]. Coated polyglactin 910 (available as vicryl rapide) sutures with triclosan exhibit antibacterial activity on the suture in vitro against methicillin-sensitive and resistant *S. aureus* and *S. epidermidis*.

The various absorbable sutures are: Catgut, chromic catgut, vicryl and dextron.

Non absorbable sutures includes: Silk, prolene, nylon and Dacron.

DISCUSSION

Catgut has been used as a surgical suture since the 19th century. These days catgut is used as an absorbable suture world wide. Catgut is prepared from animal connective tissue and continues to play a major role in wound closure world wide [8].

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Suturing technique, the type of diameter of suture material, the type of surgical needle, the design of the surgical knot are essential factors for achieving optimizing wound healing. Tensile strength is an important quality when determining which suture materials are appropriate for specific situations. Therefore selection of suture materials should be based on the goals of the surgical procedure. There are two types of sutures, absorbable and non absorbable sutures. Sutures of biological origin like plain and chromic catgut are gradually digested by enzymes in the tissue, whereas absorbable sutures fabricated from synthetic materials like polyglycolic acid are hydrolyzed via the kreb's cycle. When using gut (plain or chromic) sutures, it is recommended to soak the package in warm water. This will remove the kinks and straighten the suture. Vicryl is an absorbable suture and is most commonly used while suturing in layers. Non absorbable sutures are made from natural or synthetic material. Silk has been the most commonly used material for skin suturing [9]. Silk is easy to handle but it has some disadvantages as it is a multifilament thread and it demonstrates wick effect which pulls bacteria and fluids into the wound site. Other nonabsorbable sutures include nylon, polyester, polyethylene.

The ideal suture should have the following characteristics:

- Sterile
- Easy to handle
- Resistant to infection
- High tensile strength
- Favorable absorption profile
- Uniform diameter and size

There are various types of natural and synthetic sutures:

- Catgut/chromic catgut – It is made of submucosa of small intestines. It is a multifilament and it breaks down by phagocytosis. Inflammatory reaction is common with this suture. The plain catgut dissolves within 3 – 5 days and chromic catgut dissolves within 10-15 days.
- Vicryl (Polyglactin 910)– It is a braided synthetic absorbable suture which is stronger than catgut and retains strength for 3 weeks. It is broken down by enzymes and not by phagocytosis and the breakdown products inhibit bacterial growth. Its main advantage is that it can be used in contaminated wounds unlike other multifilaments.
- PDS (Polydioxine)- It is a synthetic absorbable suture with very good tensile strength which lasts

months [10]. It is a monofilament which is absorbed completely by 182 days.

- Nylon – It is a synthetic suture. It can be mono or multifilament. It has a very less tissue reaction but poor knot security.
Polypropylene – Also called prolene, it is a monofilament which is synthetic and does not lose strength over time. It has a good knot security and very little tissue reaction.
- Stainless steel suture – It is a monofilament and is the strongest of all the sutures. It has great knot security, very little tissue reaction and it does not harbor bacteria. Its main disadvantage is that it is difficult to handle and it can cut through the tissues.
- Skin staples – These are expensive but easy to put and have very little tissue reaction. The only disadvantage with the staples is that a special tool is required to remove it.

Regarding the knot strength, generally four throws are given for more than 90% knot security. If less throws are put, they are more likely to untie itself. Stainless steel sutures are an exception which require only two throws. The completed knot must be tight, firm, and tied so that slippage will not occur. To avoid wicking of bacteria, knot should not be placed in incision lines. Knots should be small and the ends cut short (2-3 mm). Excessive tension to finer gauge materials should be avoided as breakage may occur. Jerking motion should be avoided as it may break the suture. Crushing or crimping of suture materials should be avoided by not using hemostats or needle holders on them except on the free end for tying. Suture should not be tied too tightly as tissue necrosis may occur. Sutures should be removed in 7 to 10 days to prevent epithelialization or wicking about the suture.

CONCLUSIONS

To conclude, suturing is a surgical technique and is governed by the basic principles of aseptic techniques. Adequate knowledge about the size and type of sutures is very important for doing any type of dermatosurgery procedure.

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