

Role of Textile Materials in Surgery

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Textile materials over the past 2 decades have gained wide acceptance in the field of medicine in many and varied applications and surgical sutures play a prominent role in the area of medical textiles. A number of aspects have to be considered in the use of textile materials as surgical sutures and these have been discussed herein.

Biocompatibility is of prime importance, if the textile materials are to be accepted by the body and following four key factors will determine how the body reacts to the implants:

The most important factor is porosity which determines the rate at which human tissue will grow and encapsulate the

- Small circular fibers are better encapsulated with human tissue than larger fibers with irregular cross.
- Toxic substances must not be released by the fiber polymers and the fibers should be free from surface contamination like lubricants and sizing.
- The property will influence the success of the implantation in terms of its.

Types of sutures

The different types of sutures can be classified in many ways. First, suture material can be classified as either absorbable or non-absorbable. Absorbable sutures do not require a doctor to remove them. This is because enzymes found in the tissues of a human body naturally digest them.

Non-absorbable sutures will need to be removed by a doctor at a later date or in some cases left in permanently.

Second, the suture material can be classified according to the actual structure of the material. Monofilament sutures consist of a single thread. This allows the suture to more easily pass through tissues.

Braided sutures consist of several small threads braided together. This can lead to better security, but at the cost of the increased potential for infection.

Third, sutures can be classified as either being made from natural or synthetic material. However, since all suture material is sterilized, this distinction is not particularly useful.

Types of absorbable sutures

- **Gut:** This natural monofilament suture is used for repairing internal soft tissue wounds or lacerations. The gut should not be used for cardiovascular or neurological. The body has the strongest reaction to this suture and will often scar over. It is not commonly used outside of gynecological surgery.
- **Polydioxanone (PDS):** This synthetic monofilament suture can be used for many types of soft tissue wound repair (such as ab-

dominal closures) as well as for pediatric cardiac procedures.

- **Poliglecaprone (MONOCRYL):** This synthetic monofilament suture is used for general use in soft tissue. This material should not be used for cardiovascular or neurological procedures. This suture is most commonly used to close the skin in an invisible manner.
- **Polyglactin (Vicryl):** This synthetic braided suture is good for repairing hand or facial lacerations. It should not be used for cardiovascular or neurological procedures.

Types of non-absorbable sutures

Some examples of non-absorbable sutures can be found below. These types of sutures can all be used generally for soft tissue repair, including for both cardiovascular and neurological procedures.

- **Nylon** - a natural monofilament.
- **Polypropylene (Prolene)** - a synthetic monofilament.
- **Silk** - a braided natural.
- **Polyester (Ethibond)** - a braided synthetic.

Suture selection and techniques

There are many different suture techniques. Some of them are:

Continuous sutures: This technique involves a series of stitches that use a single strand of suture material. This type of suture can be placed rapidly and is also strong, since tension is distributed evenly throughout the continuous suture strand.

Interrupted sutures: This suture technique uses several strands of suture material to close the wound. After a stitch is made, the material is cut and tied off. This technique leads to a securely closed wound. If one of the stitches breaks, the remainder of the stitches will still hold the wound together.

Deep sutures: This type of suture is placed under the layers of tissue below (deep) the skin. They may either be continuous or interrupted. This stitch is often used to close fascial layers.

Buried sutures: This type of suture is applied so that the suture knot is found inside (that is, under or within the area that is to be closed off). This type of suture is typically not removed and is useful when large sutures are used deep into the body.

Purse-string sutures: This is a type of continuous suture that is placed around an area and tightened much like the drawstring on a bag. For example, this type of suture would be used in your intestines in order to secure an intestinal stapling device.

Subcutaneous sutures: These sutures are placed in the dermis, the layer of tissue that lies below the upper layer of human skin. Short stitches are placed in a line that is parallel to a wound. The stitches are then anchored at either end of the wound.

Raw materials

Natural sutures are made of catgut or reconstituted collagen, or from cotton, silk, or linen. Synthetic absorbable sutures may be made of polyglycolic acid, a glycolide-lactide copolymer; or polydioxanone, a copolymer of glycolide and trimethylene carbonate. These different polymers are marketed under specific trade names.

Synthetic nonabsorbable sutures may be made of polypropylene, polyester, polyethylene terephthalate, polybutylene terephthalate, polyamide, different proprietary nylons, or Goretex. Some sutures are also made of stainless steel.

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