REVIEW ARTICLE

# Sutures: Master to be Saluted

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## ABSTRACT

Wound is the Injury caused to tissue or body organ mainly by physical mean and the process towards its normal state is known as healing. Wound healing is a natural and spontaneous phenomenon. When there is injury or surgery where tissue seems not to have sufficient strength to withstand stress without mechanical support, then it has to be approximated with sutures, staples, clips, skin closure strips, or topical adhesives. Both the material and there property plays an important role in wound healing and its closure. For both in humans and animals, there are wide variety of sutures been available and been used as wound closure material and the techniques of using them are prime factors in the restoration of continuity and tensile strength to the injured tissues during the healing process so, each and every aspect of the sutures should be taken care off.

**KEYWORDS: Injury, Wound, Healing**

## INTRODUCTION

The use of suture and needle for wound closure is thousand years old. Suture is the term used material used to keep tissue in approx position and providing a better healing. Suturing is the closure of wound and is also the final and important procedure of almost all surgical process.[1] Proper suturing leads to early wound closure and its healing leaving behind minimal scar which is cosmetically very important issue. Suture materials vary on different aspects such as its absorption, tensile strength, viability and so on. Plant and animals were the sources of the suture in our ancient time and from there we have moved to various synthetically processed materials. However, the modern technique and the ancient discoveries are playing wonderfully leading to early wound closure with minimal or no scar formation.

## CLASSIFICATION

The classification been given depends on the disintegration and source of material. The situation and the position of the tissue leads a clinician to decide whether to go for a synthetic or a natural thread, a single or a multiple filament, a resorbable or a non-resorbable suture. It is a differentiating characteristic of suture material to get absorb by human tissue.(Fig 1)

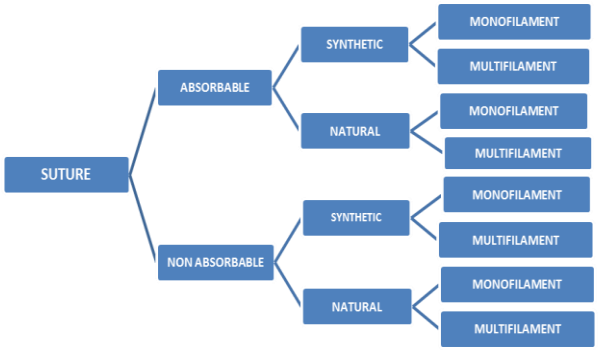


Fig 1: Classification of Suture

**ABSORBABLE SUTURE:**These suture gets dissolved by various processes including hydrolysis and proteolytic enzymatic degradation. Depending on the material, the absorbtion took around ten days to eight weeks hence removal of these suture is not required. They are used for subcutaneous tissue for there wound approximation and avoid tension during wound healing.[2] These suture must be placed appropriately into dermis and subcutaneous tissue so as to increase subsequent absorption without interfering with the steps of healing and should facilitate proper inflammation, enzymatic degradation or hydrolysis. If absorbable sutures are placed too superficially, they may take longer period of time, and absorbable sutures can cause inflammation and be rejected by the body rather than been absorbed. Absorbable sutures provide temporary wound support until the wound heals well enough to withstand normal stress so, it cannot be used where there are chances of delayed wound healing. Absorption of the suture depends on various factors. The absorption gets accelerated if the suture comes in contact with a wet filed before its placement. Examples: Catgut, Chromic, Vicryl.[3]

**NON ABSORBABLE SUTURE:** Non-absorbable sutures are made up of materials which are not metabolized by the human body like silk or synthetics polypropylene, polyester or nylon. Non-absorbable sutures are used in different placed in stressful tissue condition where absorbable sutures will not be able to withstand the force. Non-absorbable sutures often cause less scarring as they provoke less immune response, and

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either to be left in the body or are been removed after wound healing. Examples: Nylon (Ethicon), Prolene, silk.

**THREAD STRUCTURE**

**MONOFILAMENT:** These suture are made up of a single strand and are more resistant to microorganisms. These sutures should be taken care while using as premature suture failure can occur if not properly handled. As the monofilament structure is used mostly for thinner threads, these suture are stiff and creates problem during knotting.

**MULTIFILAMENT:** Multifilament suture are made up of several individual filaments twisted or braided together and are mostly rough. As these suture have greater tensile strength and better handling than monofilament suture various study and research are been carried out in the last decade in development of multifilament suture because of these properties.[4]

**BASIC MATERIAL OF THE THREAD**

- Polyamide
- Polydioxanone
- Polyester
- Polyglycolic acid,
- Polypropylene,
- Polyvinylidene fluoride
- Silk
- Steel

**OTHER MATERIALS THAT ARE ALSO IN DEMAND NOW A DAYS IN PLACE OF CONVENTIONAL SUTURES MATERIALS**

- Staples – Used to close the wound under high tension, like scalp, trunk and extremeties.
- Strips and tapes – These are basically used to close superficial laceration.
- Clips - Used in orthopaedic surgery.
- Topical adhesives – These are liquid based material where cosmetic is concerned and are best suited for small & superficial lacerations, and may be also used for the large wound where subcutaneous suture are given.

## PROPERTIES OF IDEAL SUTURE MATERIAL

The surgeon has a wide range of suture material to choose from. The selection of suture depends on the site and type of tissue to be sutured. Proper strength of suture must be taken care off so as to avoid its breakage. One should be knowing the properties of the suture and being a foreign body the interaction with tissue should be taken care off. Still the idle suture should have the following properties

- Its should be non irritating to the tissue.[2]
- Have adequate tensile strength.[2]
- Cosmetically it should be taken care off so that it leave behind minimal or no scar.
- Proper sterilization should be taken care off.
- Ease of handling and knot security.[2]
- Non electrolytic.
- Non expensive.

Till now none of the sutures have been identified which fulfils all the mentioned properties. The use totally depends on the need of the wound closure and the type of tissue to be handled.

## SURGICAL NEEDLE

The surgical needle are commonly made up of stainless steel alloys containing nickel. Steel and nickel together make the surgical needle resistance to corrosion and avoid breakage and bending during the suturing process. Regardless of its use, each needle have eye, body & the point. Surgical needle are broadly classified as conventional cutting or reverse cutting. In dentistry, we mainly go for reverse cutting as it gives minimal trauma and also prevent the tissue from tearing.

The best surgical needles are:

- Contains high quality stainless steel.
- Needle should be of lesser diameter and slim as possible without compromising strength.
- Stable in the grasp of a needle holder.
- Suture material should pass through tissue without giving much trauma.
- Penetration to tissue with minimal resistance only possible with sharp edges.
- Ductility should be enough to resist breaking during surgery and the needle should be rigid enough to resist bending,
- Sterilization should be the prime concern and corrosion-resistant to prevent introduction of microorganisms or foreign materials into the wound.[6]

## CONCLUSION

Being the master for wound closure and surgery, sutures have to be perfectly known well and it has to be used appropriately. One must be mastered in soft tissue management as patients esthetic & functional result are most commonly desired now. Research focuses now on the drug delivery surgical suture materials.[5] Over years we have come across different suture types and their properties. Many different types got abandoned because of availability of better options. Sutures and various similar materials are available according to need, but Still a lot of pre-clinical and clinical studies have to be carried out to explore new expertise in the field of medical science which is going to serve as a perfect option.

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