

Suturing Materials & Techniques in Dentistry

Dr. Mohd Rehan¹, Dr. Manish Khatri², Dr. Mohd. Faizi³

Senior Lecturer¹, Professor & HOD², Department of Periodontology, Institute of Dental Studies & Technologies, Modinagar, Ghaziabad

Abstracts

The last phase of a surgical procedure is represented by the tissue suturing that allows approximation of incised edges, stabilization which is followed by healing by first intention. An ideal suture stabilizes the muscular forces generated by functional movements.

How to cite this Article: Rehan M, Khatri M, Faizi M. Suturing Materials & Techniques in Dentistry. HTAJ OCD. 2019

Introduction

In dental surgical procedures, various methods and materials can be used for precise flap placement. The word suture is derived from Latin word "sutura" meaning a seam or stitch or a material used in closing a surgical or traumatic wound with stitches. The basic purpose of a suture is to hold severed tissue in close approximation until the healing process provides the wound with sufficient strength to withstand stress without the need for mechanical support. The suture indicates the repairing surgical act that allows to approximate the wound edges, keeping them united until the healing process will confer to the same wound.¹

Goals¹

- Provide an adequate tension of wound closure without dead space but loose enough.
- Hemostasis.
- Permit primary intention healing.
- Provide support for tissue margins until they have healed and the support is no longer needed.
- Reduce postoperative pain.
- Prevent bone exposure resulting in delayed healing and unnecessary resorption.

Ideal Suture

- It can be utilized in any operation
- It can be handled easily and comfortably.
- Minimal tissue reaction.
- High breaking strength.
- High knot security.
- It does not cut, tear or shrink the tissue.
- It is non-allergenic, non-carcinogenic
- Reasonable cost.

Classification¹

I. Based on Number of Filaments

- Monofilament- E.g. steel, nylon
- Multifilament- E.g. silk, cotton.

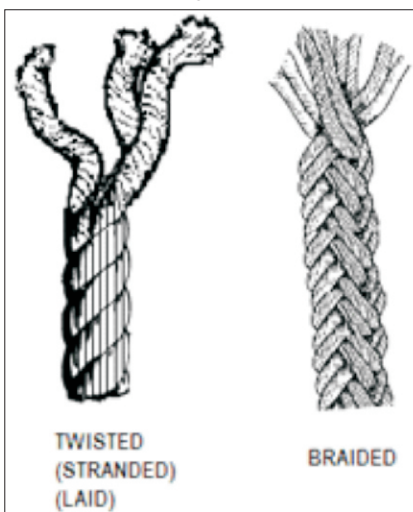


Figure No.1

II. Based on the Suture Diameter

Suture diameter designations are specified by the US Pharmacopoeia in a descending

order from size 5,4,3,2,1,0,1-0 through 11-0.

III. Based on the Source

- Natural- E.g. catgut, silk, cotton
- Synthetic- E.g. polyglycolic acid, dacron.

IV. Based on Physical Characteristic

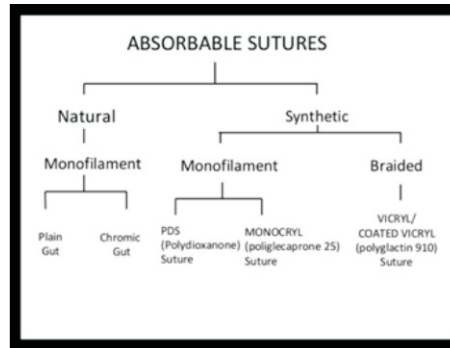


Figure No.2

Wicking

It is the phenomenon of bacteria moving along or within multistranded suture materials into the wound. This can be minimized by using mattress suture that keep the suture materials on the surface of the flaps as much as possible.

Suture Needles

Surgical needles are designed to lead suture material through tissue with minimal injury. Needles can be:

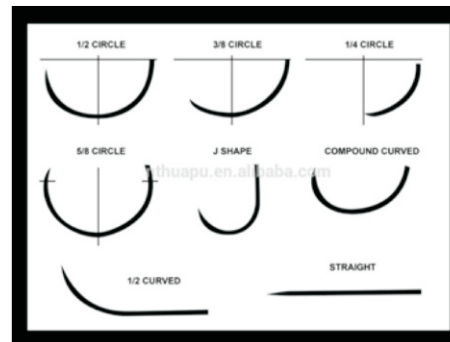


Figure No.3

- Straight or curved
- Swayed or eyed

Classification of Surgical Needles

- According to eye: Eye less needles. - Needles with eye.
- According to shape: Straight needles. - Curved needles.
- According to cutting edge: Round body. Cutting: a-conventional. b-reverse cutting.

Anatomy of Suturing Needles Three Basic Components

- Press - fitted end (swage)
- Needle body
- Needle point

1. Techniques of Suturing²

a. Interrupted Sutures/Interdental Ligation:

- Direct/ loop/simple interrupted suture

- Figure of eight suture
- Sling suture
- Anchor suture
- Horizontal mattress
- Vertical mattress
- Periosteal suture
- b. Continuous Sutures:**
 - Continuous through & through suture
 - Continuous locking suture
 - Continuous mattress

General Principles of Suturing:

- Do not take too-small bites of tissues so that the suture tears through the wound edges. The needle should enter the tissue approximately 2-3 mm from the wound edge or papillae tip.
- It is not advisable to pass the suture through the facial and lingual papillae in one pass.
- Suture needles are grasped in the center (or about 1/3 the distance from the swaged area to the tapered point of the needle)

Suturing Instruments:

It is important to have good quality instruments that are the correct size for the location and nature of the wounds being closed. The instruments also need to be correctly sterilized and handled carefully.



Figure No.4

11'' Types of Knots:

Square Knot



Figure No.5

This suture knot is made by tying two over hand knots, each done in opposite directions. For example, the first loop is made by making a loop over the jaws of the needle holder, and the second knot is subsequently made by forming a loop under the jaws of the needle holder.

Granny Knot



Figure No.6

The slipknot is similar to a square knot in that it is made with two overhand knots, but both knots are made in the same direction. With a needle holder, one overhand knot is made so that the loop forms over the jaws of the needle holder and is then tightened. A second overhand knot is then made so that the loop goes in the same direction over the needle holder and is tightened.

Surgeon Knot

The surgeon's knot is a modified square knot in which the first overhand knot is doubled; therefore, two loops of the suture are formed over the jaws of the needle holder and tightened. The last loop is formed under the jaws of the needle holder in a direction opposite from the first loops. This is the standard suture knot used in conjunction with the mattress technique of suturing. Note: When synthetic or natural resorbablesutures are used, one additional overhandknot may be added to the surgeons knot to prevent unravelling.

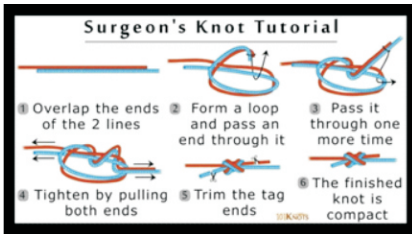


Figure No.7

Suturing Techniques

I. Interrupted Simple Suture

- a. Strong and can be used in areas of stress.
- b. Placed 4-8 mm apart to close large wounds, so that tension is shared.
- c. Each is independent and loosening one will not produce loosening of the other.
- d. Degree of eversion produced.
- e. In infection or hematoma, removal of few sutures.
- f. Free of interferences between each stitch and easy to clean.

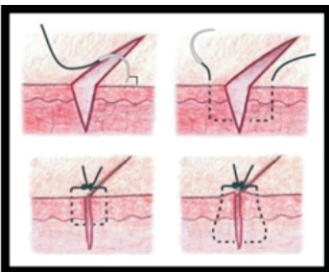


Figure No.8

2. Simple Continuous/Running Suture

- a. Rapid technique and distributes tension uniformly.
- b. More water tight closure.
- c. Only 2 knots with associated tags.

- d. If cut at one point, suture slackens along the whole length of wound, which will gape open.

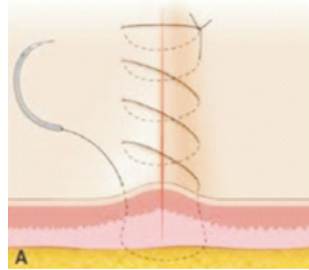


Figure No.9

D) Vertical Mattress

It passes at two levels, one deep to provide support and adduction of wound surfaces at a depth and one superficial to draw the edges together and Evert them. Used for closing deep wounds. Needle passed from one edge to the other and again from latter edge to the fist and knot tied. When needle is brought back from secondflap to the first, depth of penetration is more superficial.

Advantages

- For better adaptation and maximum tissue approximation.
- To get eversion of wound margins slightly.
- Where healing is expected to be delayed for any reason, it is better to give wound added support.

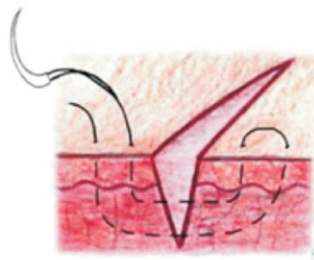


Figure No.10

II. Horizontal Mattress

It everts mucosal margins, bringing greater areas of raw tissue into contact. So used for closing bony deficiencies.

- a. Will evert mucosal margins, bringing greater areas of raw tissue into contact. -So used for closing bony deficiencies such as oro-antral fistula or cystic cavities, extraction socket wounds.
- b. Prevents the flap from being inverted into the cavity.
- c. To control post-operative hemorrhage from gingiva around the tooth socket to tense the mucoperiosteum over the underlying bone.
- d. It does not cut through the tissue, so used in case of tissue undertension.

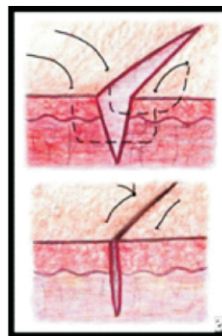


Figure No.11

III. Sling Suture

The 3/8 circle reverse cutting needle is first passed under the distal contact point of the most distal interdental papilla. Then the suture needle pierces through the inner side of the elevated surgical flap 3mm from the tip of papilla, passage of the needle back under the contact point.

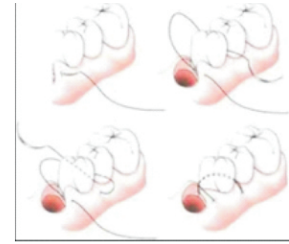


Figure No.12

IV. Figure of Eight Suture

This suture is used for edentulous spaces. When beginning this technique, a 3/8 circle needle penetrates at the level of the mucogingival junction at the mesiobuccal line, travels horizontally under the flap, and emerges at the distobuccal line angle, the procedure is done on the lingual aspect, the suture material crosses over the surgical field, tying of suture knot on buccal aspect forming a cross on the flap.

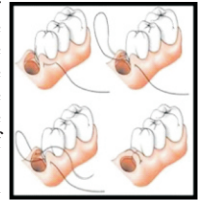


Figure No.13

Suture Removal

As described earlier, to prevent epithelial downgrowth of cells and to reduce the chances of infection, sutures are to be removed within a span of 7 to 10 days.

Preparation of the Patient

- Debride the area by rinsing the area and removing debris particles using a cotton tipped applicator or cotton pellet dipped in 3% peroxide. Follow with another rinse or wipe gently with a gauge sponge.
- Retract the area with gauge to remove the surface moisture, swab area with topical antiseptic and apply topical anesthetic.
- Grasp the suture knot with cotton plier held in nondominant hand. Gently draw the suture up about 2 mm and hold with slight tension with a finger rest needed for control.
- Insert tip of a sharp scissors under the suture, slightly depress the tissue with back of the scissors blade and cut the suture in that part which was previously burried in the tissue.
- Hold knot end up with the cotton pliers and pull gently to allow suture to come out through the side opposite where it was cut. This prevents any part of the external segment of suture from passing through the tissue and introducing infectious material. Withdraw gently and steadily.
- Place each suture on a sponge for final counting and proceed to remove the next suture.
- Count the total sutures removed and confirm with the entry made in the patients record.
- Inspect the area for proper healing.

Conclusion

Knowledge of the suture, needles (type, size, shape), instruments, and techniques are absolutely necessary in order to have a successful surgery. The differences in terms of tissue reaction and bacterial adhesion between sutures should be always considered in the selection of the appropriate suturing material.

References

1. Laskin. D.M oral maxillofacial surgery. Vol I. St.louis: C.V.Mosby 1980
2. CohenE. S.: Atlas of Cosmetic & Reconstructive Periodontal Surgery. 2 ed. Philadelphia: Lea & Febiger 1994.
3. Goldman H.M., Cohen D.W.: Periodontal Therapy. 6th ed. St. Louis : C.V. Mosby 1980.
4. Levin M.P. : Periodontal Suture materials and surgical dressings. Dent Clin North Am 1980; 24 : 767.
5. Myer R.D., Antonini C.J. : A review of suture materials (II). Comp Cont Edn Dent 1989; 10: 360-367.