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Sewing your gingiva - A Review on periodontal suturing techniques

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Introduction

Wound Healing is an important factor that needs to be achieved after any surgical procedure. It helps to stabilize and sleeve the tissues in their desired location and thereby helping in wound healing. In dental and medical surgical specialties they have a unique method for wound closure. Suturing is considered as a tedious process of surgical procedure. So the operators have proposed various techniques to eliminate suturing altogether.(1) Some basic principles and techniques of suturing is applied to make the suture more efficient and improves surgical result. This review article deals the principles and various techniques for applying suture in surgical procedure.

Suture

Sutures are materials used to approximate the wound edges with stitches. They are made up of either natural or synthetic material. Compared to synthetic suture materials, natural materials have higher inflammatory reaction and more uneven distribution of strength.(2)Sutures are best described by their physical properties which include their configuration, composition, color, coating, surface and ability to degenerate over time.(3)

Parts of a Suture

It is composed of three components:

1. Loop
2. Knot

3. Ears

Loop: It secure the opposition of the wounded edges

Knot: It is composed of the tight throwing to secure the loop in its place. A weave of two strands represents each throw.

Ears: They are the cut ends of the suture [4]

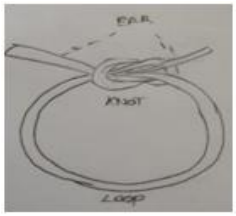

Figure 1

Suturing knots

1. Square knot
2. Surgical knot
3. Granny knot

Square knot

This knot is made by tying the two overhand knots in opposite direction. First loop is made over the jaws of the needle holder and second is subsequently made by forming a loop under the jaws of needle holder. It is tied easily but may loosen up when synthetic material is used for the placement of the suture.

Surgical knot

It is the modification of square knot. In this the first knot overhand is doubled. So the loop formed over the jaw of needle holder in a opposite direction of the first loop. It is used in both natural and synthetic material.

Granny Knot

It is also similar to the square knot. In this two overhand knots are made in the same direction.[5]

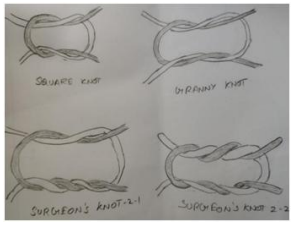

Figure 2

Suture Needle

In various shapes and sizes modern surgical needles are available. They are swaged to the suture material.[6]

Parts of a needle

- Needle eye
- Needle body
- Needle point

Needle eye

They are classified as eye less needles and needle with eye.

Needle body

It is the widest portion of the needle and it is the grasping area. [7]

Needle point

It is the point from the tip to the maximum cross sectional area of the body. [8]

Principles of Suturing

- Needle is held with needle holder
- Needle should enter the tissues that is 2-3mm away from incision
- Needle should be carried along the curvature of the needle
- Knot should not be kept over incised area
- The periodontal flaps can be closed either by independent suture or by continuous
- Suture that is placed in interdental papilla must enter and exit the tissues to the point that is below the imaginary line forms the base of the triangle of interdental papilla.
- The suture may be placed in the quadrant closest to the teeth when the elevation of flap is slight or moderate [9]
- The suture may be placed in the central quadrants of the palate when the flap elevation is substantial [10]

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Different types of suturing techniques in Periodontics

Simple interrupted suturing technique

It is the basic single suture. It will be placed in each flap and tied with surgeon's knot. It is passed through each one of the flap.[12]

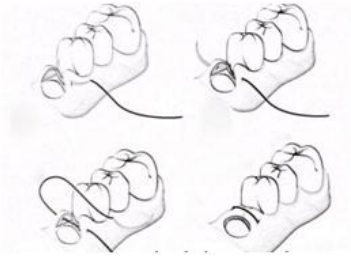

Figure 3

Advantages

1. Strong.
2. Used in pressured areas.
3. The tension is shared by the placement of each suture 4-8mm apart from each other.
4. Sutures don't interfere with each other.
5. Can be cleaned easily.

Figure of eight suturing technique

The figure-of-eight suturing technique involves placing sutures in a pattern resembling the number eight, crossing over the wound.

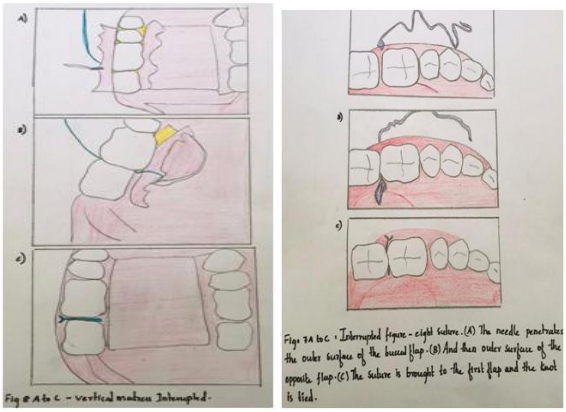

Figure 4

Advantages

1. Provides excellent wound approximation, especially for irregular or gaping wounds.
2. Distributes tension evenly along the wound edges, reducing the risk of tissue ischemia or necrosis.
3. Enhances hemostasis by effectively closing off blood vessels.

Disadvantages

1. Requires more skill and precision compared to simple interrupted sutures.
2. Can be time-consuming, especially for larger wounds.
3. May result in more noticeable scarring due to the increased number of sutures.[13]

Vertical mattress suturing technique

The vertical mattress suturing technique involves placing sutures in a vertical orientation, with each stitch crossing the wound in a manner that resembles a mattress stitch.

Advantages

1. Provides excellent wound eversion, which helps reduce the risk of tissue inversion and ensures optimal wound healing.
2. Offers good wound edge approximation, particularly useful for wounds under tension or with uneven edges.
3. Minimizes the risk of wound dehiscence by distributing tension evenly along the wound edges.

Disadvantages

1. Requires careful placement of sutures to avoid tissue strangulation or compromise of blood supply.
2. May be challenging to perform on curved or irregular wound surfaces.
3. Can lead to more conspicuous scarring due to the placement of sutures both above and below the wound edges.[14]

Horizontal mattress suturing technique

The horizontal mattress suturing technique involves placing sutures parallel to the wound edges, with the needle passing through the skin perpendicular to the wound's surface, creating a "horizontal" pattern.

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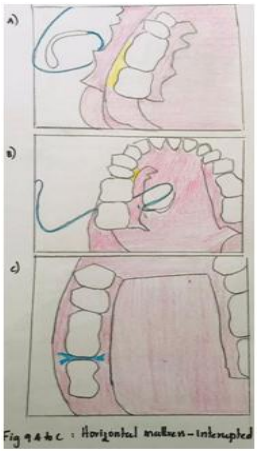

Figure 5

Advantages

1. Provides excellent wound edge version, promoting optimal healing and minimizing the risk of tissue inversion.
2. Distributes tension evenly along the wound edges, reducing the likelihood of wound dehiscence, especially in high-tension areas.
3. Offers superior hemostasis by firmly approximating the wound edges and sealing off blood vessels.

Disadvantages

1. Can cause tissue bunching or puckering, leading to suboptimal cosmetic outcomes.
2. May be challenging to perform in areas with limited access or on curved wound surfaces.
3. Requires meticulous technique to avoid excessive tension on the skin, which can impair blood flow and compromise wound healing.[15]

Sling suturing technique

The "Sling suturing technique" in dentistry involves placing sutures in a manner that creates a loop or sling around a tooth or dental implant to secure it in place. This technique is commonly used in periodontal surgery, particularly for stabilizing flaps or grafts.

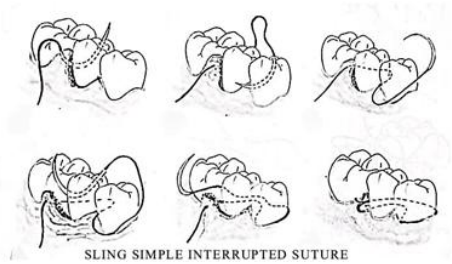

Figure 6

Advantages

1. **Enhanced stability:** The sling suturing technique provides better stability and support for the surgical site compared to traditional suturing methods.
2. **Reduced tension:** By creating a sling around the tooth or implant, tension on the surgical site is minimized, promoting better healing.
3. **Improved blood supply:** The technique allows for better preservation of blood supply to the tissues, which is crucial for successful healing.

Disadvantages

1. **Technical skill required:** Proper execution of the sling suturing technique requires precision and expertise, which may pose a challenge for less experienced practitioners.
2. **Time-consuming:** It may take more time to master and perform compared to simpler suturing techniques.
3. **Limited applicability:** The sling suturing technique may not be suitable for all types of dental surgeries or situations.[16]

Anchor suturing technique

The "anchor suturing technique" in dentistry involves securing sutures by tying them around an anchor point, typically a tooth or dental implant, to stabilize the surgical site.

Advantages

1. **Stability:** The anchor suturing technique provides reliable stabilization of tissues, facilitating proper wound healing.

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2. **Control of tension:** By anchoring the sutures, tension on the surgical site can be more precisely controlled, minimizing the risk of tissue damage and promoting optimal healing.

3. **Versatility:** This technique can be adapted to various dental procedures, including periodontal surgeries, implant placements, and soft tissue grafting.

Disadvantages

1. **Risk of trauma:** Improper placement or tying of the sutures may lead to tissue trauma or necrosis, which can compromise the success of the procedure.

2. **Technical skill required:** Mastery of the anchor suturing technique requires practice and skill, particularly in determining the optimal placement of anchor points and tying secure knots.

3. **Potential for discomfort:** If not executed carefully, the presence of sutures anchored to teeth or implants may cause discomfort or irritation to the patient.[17]

Continuous interlocking suturing technique

The continuous interlocking suturing technique in dentistry involves the placement of sutures in a continuous manner, with each stitch interlocking with the previous one. This technique is commonly used in various dental procedures, including flap closure after surgical interventions.

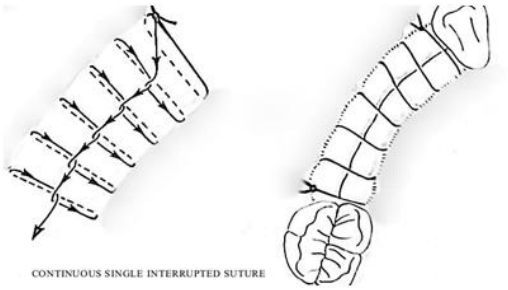

Figure 7

Advantages

1. **Improved wound approximation:** The continuous interlocking suturing technique ensures a tight and uniform closure of the surgical site, promoting better wound approximation.

2. **Reduced risk of dehiscence:** By distributing tension evenly along the incision line, this technique helps minimize the risk of wound dehiscence (separation of wound edges) and subsequent complications.

3. **Time-efficient:** Once mastered, the continuous interlocking suturing technique can be performed quickly, saving time during dental procedures.

Disadvantages

1. **Limited flexibility:** Compared to other suturing techniques, such as interrupted sutures, the continuous interlocking technique may offer less flexibility in adjusting tension or addressing specific anatomical features.

2. **Potential difficulty in removal:** Removing continuous interlocking sutures can be more challenging compared to individual interrupted sutures, particularly if the sutures have become tightly intertwined or embedded in tissue.[18,19]

Periosteal suturing technique

The periosteal suturing technique in dentistry involves suturing the periosteum, the connective tissue covering the outer surface of bones, to stabilize flaps during surgical procedures such as bone grafting or periodontal surgery.

Advantages

1. **Enhanced flap stability:** Suturing the periosteum helps to secure the surgical flap in place, reducing the risk of flap displacement and promoting proper wound healing.

2. **Improved blood supply:** By maintaining the integrity of the periosteum, this technique preserves the blood supply to the surgical site, which is essential for tissue regeneration and healing.

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3. **Reduced postoperative complications:** Periosteal suturing can help minimize the risk of complications such as flap necrosis, dehiscence, or infection by ensuring optimal flap adaptation and closure.

Disadvantages

1. **Technique sensitivity:** Proper execution of the periosteal suturing technique requires skill and precision, as incorrect placement or tension on the sutures can compromise the surgical outcome.
2. **Risk of tissue trauma:** Improper handling of the periosteum during suturing may result in tissue trauma or damage, leading to delayed healing or other complications.
3. **Limited applicability:** The periosteal suturing technique may not be suitable for all surgical procedures or anatomical sites, depending on the nature of the surgery and the condition of the surrounding tissues.[26,27]

Conclusion

In conclusion, suturing techniques play a critical role in various dental procedures, including periodontal surgeries, oral surgeries, and implant placements. The choice of suturing technique depends on factors such as the type of procedure, anatomical considerations, and the desired outcome. While traditional techniques like interrupted sutures remain widely used, advancements in materials and techniques have led to the development of innovative approaches such as continuous suturing, sling suturing, and periosteal suturing.

Each suturing technique has its advantages and disadvantages, and the selection should be tailored to the specific needs of the patient and the surgical site. Proper execution of suturing techniques is essential to ensure optimal wound closure, tissue adaptation, and postoperative healing. Additionally, ongoing research and advancements in suturing materials and techniques continue to contribute to improved outcomes and patient satisfaction in dental surgery.

Overall, mastering a variety of suturing techniques and staying updated on advancements in materials and techniques are essential for dental practitioners to achieve successful surgical outcomes and enhance patient care.

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