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Periodontics II

**University of Jordan**

**Faculty of Dentistry**

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Hand Out

Slide

Sheet



Designed by: Hind Alabbadi

Suture and Suture Materials

Main Goals of Suturing

1. Accelerate healing
2. Approximation of the tissues 🡪 without tension

Tension leads to blood flow reduction and tissue tear which all cause ischemia, necrosis and opening of the wound (due to the inflammatory healing stage causing edema which facilitates the wound opening)

1. Prevent contamination with the oral cavity

As important as incision placement and flap management are to the outcome of the surgical procedure, flap adaptation and stabilization at the end of the procedure are equally important. The surgeon must not rely on sutures to pull the flap beyond its passive positioning ( flap should stay adapted to its position without suture , sutures help stabilize) , as tension is created on the flap.

In the images, left image shows sutures approximating the ends to protect the marginal bone

Right Image shows full closure without tension ( as the mucosal folds are present ( tissue not taught) and there is no blanching )

1. Compression of blood vessels for hemostasis : specially used on the palate when flaps extends beyond the upper 6 , excessive bleeding happens , therefore a suture is placed by passing the suture needle bello the artery ( greater palatine artery) and along the bone then tied to occlude it and stop the bleeding
2. Provide adequate tension of wound closure : to prevent

No dead space

Loose enough to obviate ischemia & necrosis

1. Provide support for tissue margins until healing
2. Reduce postoperative pain
3. Prevent bone exposure
4. Permit proper flap position

Specially in Coronal advancement flap, lateral repositioning , apical repositioning flap .

Suture Materials

1. Resorb able/ Non-resorb able
2. Synthetic/Natural

Ideal Suturing Material

Pliability, for ease of handling (user friendly)

Knot security

Sterilizability

Appropriate elasticity

Non-reactivity

Adequate tensile strength for wound healing

Chemical biodegradability (opposed to foreign body breakdown) meaning a material that the body wont recognize as foreign to prevent inflammation reaction

Examples of suture materials

1. Natural

Non-absorbable

Silk (braided)

ePTFE (monofilament)

Nylon (monofilament)

Polyester (braided)

Absorbable

Plain gut (monofilament)

Chromic gut (monofilament)

1. Synthetic

Polyglycolic (Vicryl) (braided)

Polyglycaprone (Monocryl) (monofilament)

Polyglyconate (monofilament)

Choice of Material

( although preference of practitioner determines the material to be used )

1-Surgical procedure (Ex. For simple extraction and apically repositioned flaps the use of silk is a good choice

However, silk is week in tensile strength and knot security

While Asethetic procedure, implants, bone graft, soft tissue grafts there is a risk of exposure , it’s better to use a higher tensile strength material like Vicyrl , Nylon or ePTFE

2-Biocompatibility

3-Clinical experience & preference

4-Quality & thickness of tissue ex. Using 30 gauge in a thin tissue like the gingiva and causes tissue tear . in Perio , 40 ,50 or 60 are only used

5-Rate of absorption vs. time for tissue healing

Absorption has to be after the healing or in accordance with it .

Knots

Knots have to be flat

Suture security is the ability of the knot and material to maintain tissue approximation during the healing process.

Since the knot strength is always less than the tensile strength of the material, ( this is because the length is less and friction of the material within the knot) when force is applied, the site of disruption is always the knot.( this explains why the knot should not be placed over the wound )

Security of the Knot

Depends on

Coefficient of friction within the knot which is determined by

1-Nature of the material

2-Suture diameter

3-Type of knot

Basic suture silk

User friendly

Inferior to other materials in terms of strength

High degree of tissue reaction ( because of the high wettability of the silk , it becomes soaked with saliva , the knot slippage would be higher ))

Knot Anatomy

3 components

Loop: created by the knot

Knot: composed of a number of tight throws

Ears: the cut ends of the suture

The knot directions are variable according to opinions , if you do the first clockwise knot then anticlockwise this usually determines the tension and prevents you from correcting it with the final knot

However if you do the first two knots in the same direction then do the last knot in opposite direction this means you can control the tension .

Note , the three knots (steps) mean stabilize , secure and block .

Principles of Suturing

1.Completed knot must be tight,firm,&tied so slippage will not occur

2.To avoid wicking of bacteria,knots should not be placed in incision lines

3.Knots should be small&the ends cut short(2-3mm)

Why short ( so the knot wont slip , and the ends wont discomfort the pt)

4.Avoid excessive tension to finer-gauge materials because breakage may occur

5.Avoid using a jerking motion,which may break the suture tying ( never take one bite for the two ends. Also , if the suture slips through the tissue after taking a bite , you should try to re-enter through the same point as the first to minimize blood vessel damage )

6.Avoid crushing or crimping of suture material by not using needle holders on the the free end for 7.Do not tie sutures too tightly because tissue necrosis may occur(Avoid tissue blanching)

8.Maintain adequate traction on one end while tying to avoid loosening the first loop.

Suture Removal

Area should be swabbed with H2O2(removal of encrusted necrotic tissue & blood and kills the bacteria)

Sharp suture scissors should be used to cut the loops of sutures (use an explorer to lift the sutures if they are in the sulcus or closely adapted to the tissue)

Never use the blade as it requires traction of the suture and cause injury to the fragile healed tissues.

A cotton pliers is used to remove the sutures

Surgical Needle Design

Eye:press-fitted( press closed over the suture material ) or swaged( has a hole in which suture material is inserted)

Body:widest point of needle, called grasping area

Point:runs from the tip to the maximum cross-sectional area of the body (conventional cutting, reverse cutting, side cutting, taper cut, …)

Cutting : it cuts above and bellow ( 2 cuts)

While reverse cutting it only causes 1 cut bellow its entry point while the upper part is secured with the suture

Round is best but its handling is difficult .

Note ,Never hold the needle from its point with holder as it bends and blunts out

Needle Holder Selection

1.Approximate size for agiven needle

The smallerthe needle,the smaller the needle holder required

2.Needle should be grasped ¼to½ the distance from the swaged area to the point

3.The tips of the jaws of the needle holder should meet before the remaining portions

4.Needle should be placed securely in the tips of the jaws without rocking,twisting or turning

5.Avoid over closure of the needle holder to avoid damaging the needle

6.Needle holder should be directed by the thumb

 Always use the needle holder so that it’s directed outside the pt’s mouth

Needle Placement

1.Force applied in the direction following the curvature of the needle

2.Suturing from movable to non-movable tissue

3.Avoid excessive tissue bites with small needles

4.Sharp needles should be used with minimal force

5.Do not hold the swaged area nor the point area

6.Needle should penetrate tissue at right angles(never force needle)

7.Avoid retrieving the needle from the tissue from the tip

8.Adequate bite is required (2-3mm)to avoid tissue tearing

Suturing Techniques

Interrupted is mostly used as it provides the best control of the surgical site

Continuous : is faster used in large flaps and short time left

The choice of technique

Individual operator’s preference

Educational background

Skill level

Surgical requirements

Periosteal Suturing

It mainly stabilizes the tissue by connecting it through the suture with the underlying ( periosteal tissue)

Interrupted Sutures

Circumferential, direct, or loop

Figure eight ( out-in then on the other end out-in)

Vertical or horizontal mattress

Intrapapillary placement

A variant of the horizontal mattress is the cross or X suture

At one end you start out-in then on the opposing end in-out

Then enter the first end as out-in

**Please note that I have added all the information that the Doctor mentioned during the lecture .**

**Please go back to the handout for the illustrations**

**Best of Luck Seniors**