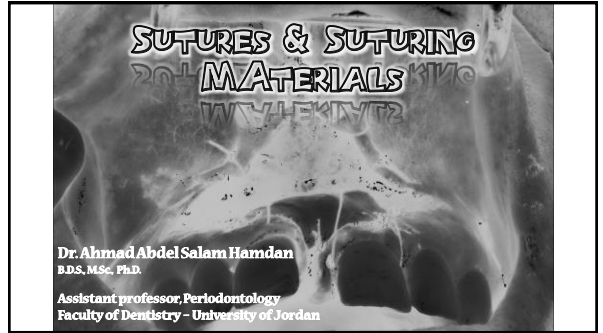


The surest way to corrupt a youth is to instruct him to hold in higher esteem those who think alike than those who think differently

Friedrich Nietzsche



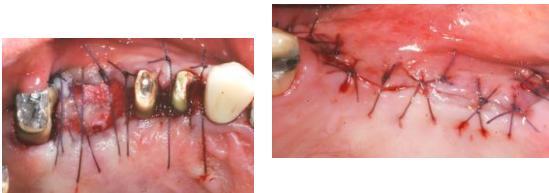
As important as **incision placement** and **flap management** are to the **outcome** of the surgical procedure, **flap adaptation** and **stabilization** at the end of the procedure are **equally important**. [...] The surgeon **must not rely** on **sutures** to **pull** the flap **beyond its passive positioning**, as **tension is created** on the flap.

McDonnell HT & Mills MP

GOALS...

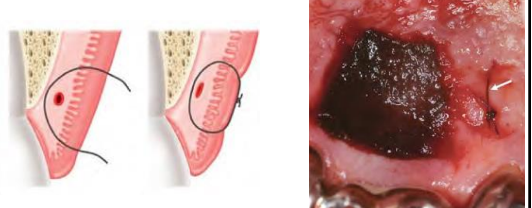
Goals

Approximation of the adjacent cut surfaces



Goals

Compression of blood vessels to stop bleeding



Goals... Suturing is performed to...

- Provide adequate tension of wound closure
 - No dead space
 - Loose enough to obviate ischemia & necrosis
- Maintain hemostasis
- Allow primary-intention healing

Goals... Suturing is performed to...

- Provide support for tissue margins until healing
- Reduce postoperative pain
- Prevent bone exposure
- Permit proper flap position

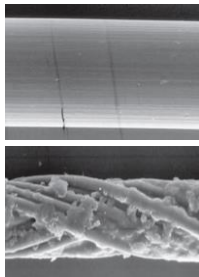
SUTURE MATERIAL...*Suture Material... Qualities of Ideal Suturing Material*

- Pliability, for ease of handling
- Knot security
- Sterilizability
- Appropriate elasticity
- Non-reactivity
- Adequate tensile strength for wound healing
- Chemical biodegradability (opposed to foreign body breakdown)

Suture Material... Materials

- Non-absorbable
 - Silk (braided)
 - ePTFE (monofilament)
 - Nylon (monofilament)
 - Polyester (braided)

- Absorbable
 - Plain gut (monofilament)
 - Chromic gut (monofilament)

*Suture Material... Materials*

- Synthetic
 - Polyglycolic (Vicryl) (braided)
 - Polyglycaprone (Monocryl) (monofilament)
 - Polyglyconate (monofilament)

Suture Material... Choice of Material

- Surgical procedure
- Biocompatibility
- Clinical experience & preference
- Quality & thickness of tissue
- Rate of absorption vs. time for tissue healing

KNOTS & KNOT TYING...

Knots & Knot Tying

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

Thacker et al. 1975

Since the knot strength is always less than the tensile strength of the material, when force is applied, the site of disruption is always the knot.

Thacker et al. 1975

Knots & Knot Tying... Knot Security

Coefficient of friction within the knot

- Nature of the material
- Suture diameter
- Type of knot

Basic suture silk

- User friendly
- Inferior to other materials in terms of strength
- High degree of tissue reaction

Knots & Knot Tying... Knot Anatomy

3 components

Loop: created by the knot

Knot: composed of a number of tight throws

Ears: the cut ends of the suture



PRINCIPLES OF SUTURING...

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 (2-3 mm)
4. Avoid excessive tension to finer-gauge materials because breakage may occur

Principles of Suturing

5. Avoid using a jerking motion, which may break the suture
6. Avoid crushing or crimping of suture material by not using needle holders on them except on the free end for tying
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

Principles of Suturing... Suture Removal

Area should be swabbed with H₂O₂ (removal of encrusted necrotic tissue & blood)

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)

A cotton pliers is used to remove the sutures

SURGICAL NEEDLES...

Surgical Needles... Design

3 parts

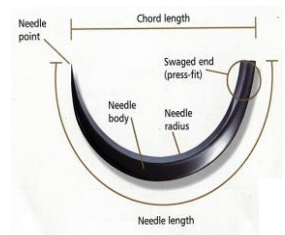
Eye: press-fitted or swaged

Body: widest point of needle, called grasping area runs from the tip to the maximum cross-sectional area of the body (conventional cutting, reverse cutting, side cutting, taper cut, ...)

Chord length: straight line distance between the point of curved needle & the swage

Radius: distance measured from center of circle to body of needle (if the curvature of the needle was continued)

Surgical Needles... Design



Surgical Needles... Needle Holder Selection

1. Approximate size for a given needle
The smaller the needle, the smaller the needle holder required
2. Needle should be grasped $\frac{1}{4}$ to $\frac{1}{2}$ 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

Surgical Needles... Needle Placement in Tissue

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

Surgical Needles... Needle Placement in Tissue

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 (2-3 mm) to avoid tissue tearing

SUTURING TECHNIQUES...

Suturing Techniques

Non - periosteal vs. Periosteal

Interrupted vs. Continuous

The choice of technique

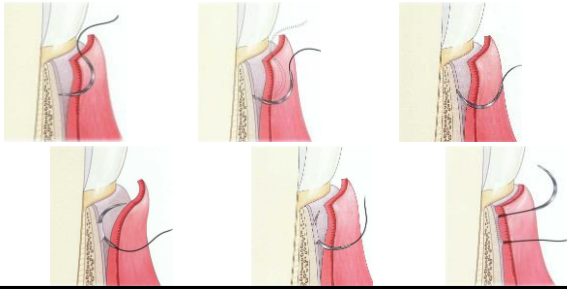
- Individual operator's preference
- Educational background
- Skill level
- Surgical requirements

Suturing Techniques... Periosteal Suturing

Periosteal suturing permits precise flap placement & stabilization

Penetration – Rotation – Glide – Rotation – Exit

Suturing Techniques... Periosteal Suturing



Suturing Techniques... Interrupted Sutures

Uses

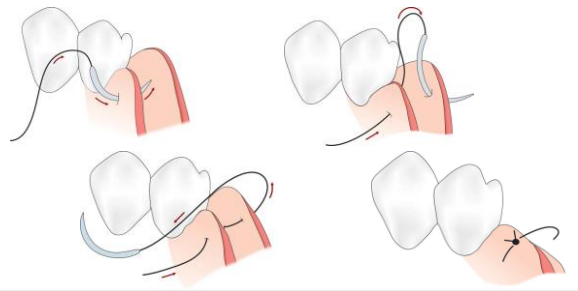
- Vertical incisions
- Tuberosity & retromolar areas
- Bone regeneration procedures +/- GTR
- Widman flaps, OFD, repositioned flaps, APF
- Edentulous areas
- Partial- or split-thickness flaps
- Implant surgery

Suturing Techniques... Interrupted Sutures

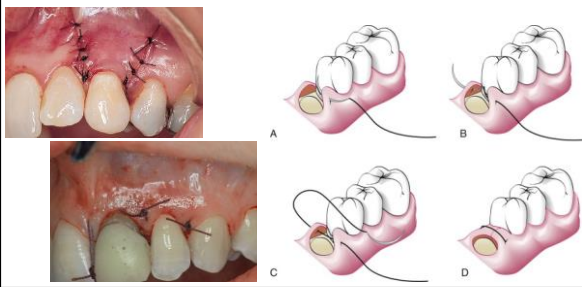
Types

- Circumferential, direct, or loop
- Figure eight
- Vertical or horizontal mattress
- Intrapapillary placement

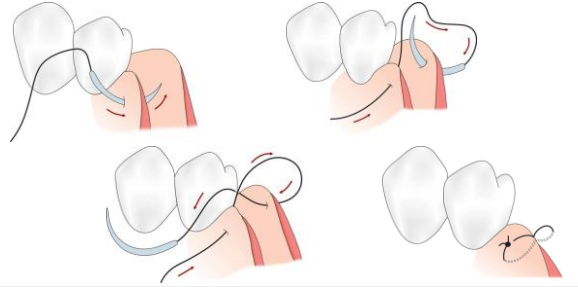
Suturing Techniques... Interrupted Sutures... Direct Suture



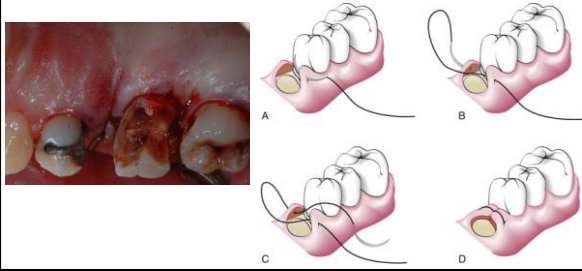
Suturing Techniques... Interrupted Sutures... Direct Suture



Suturing Techniques... Interrupted Sutures... Figure 8 Suture



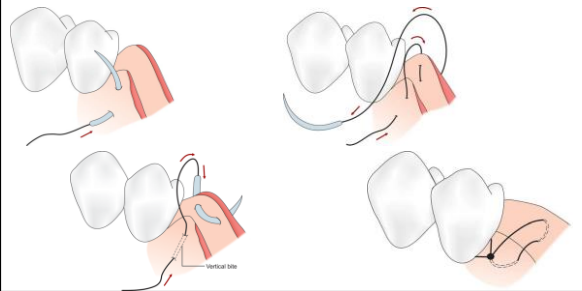
Suturing Techniques... Interrupted Sutures... Figure 8 Suture



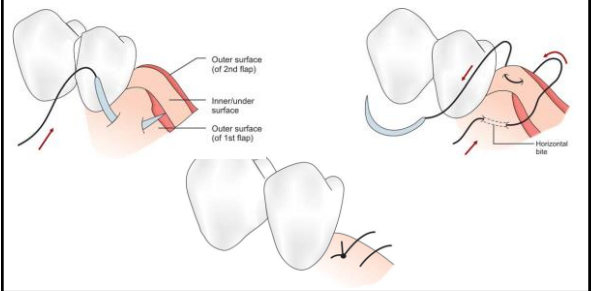
Suturing Techniques... Interrupted Sutures... Mattress Sutures

- Greater flap security & control
- More precise flap placement
- Good papillary stabilization & placement
- Vertical mattress + bone regeneration

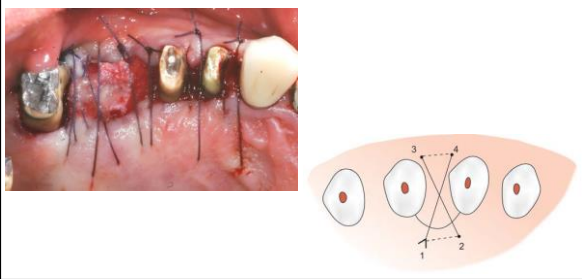
... Interrupted Sutures... Mattress Sutures... Vertical Mattress



... Interrupted Sutures... Mattress Sutures... Horizontal Mattress



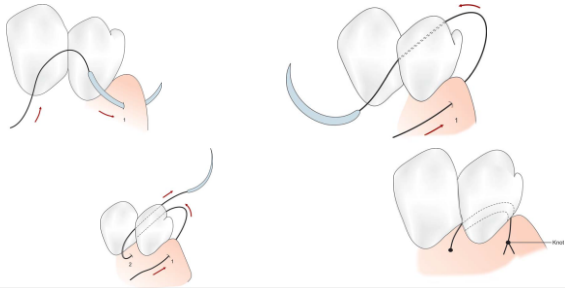
... Interrupted Sutures... Mattress Sutures... Horizontal Mattress



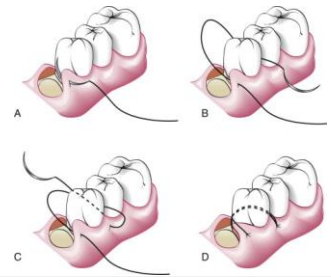
Suturing Techniques... Interrupted Sutures... Sling Suture

- Flaps raised on only one side of a tooth, involving only 1-2 adjacent papillae
- CAF & LPF

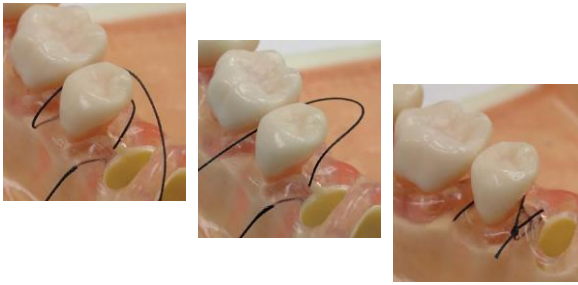
Suturing Techniques... Interrupted Sutures... Sling Suture



Suturing Techniques... Interrupted Sutures... Sling Suture



Suturing Techniques... Interrupted Sutures... Sling Suture



Suturing Techniques... Continuous Sutures

Advantages

- Can include as many teeth as required
- Minimizes the need for multiple knots
- Simplicity
- Teeth are used to anchor the flap
- Permits precise flap placement
- Avoids the need for periosteal sutures
- Allows independent placement & tension of buccal & lingual/palatal flaps
- Greater distribution of forces on flaps

Suturing Techniques... Continuous Sutures

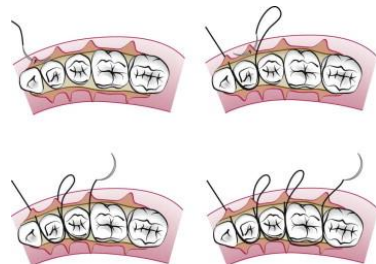
Disadvantages

If the suture breaks, the flap may become loose or the suture may come untied from multiple teeth

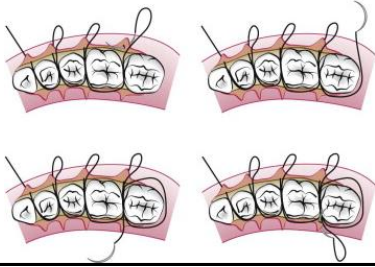
Types

- Independent sling suture
- Mattress sutures
- Continuous locking suture

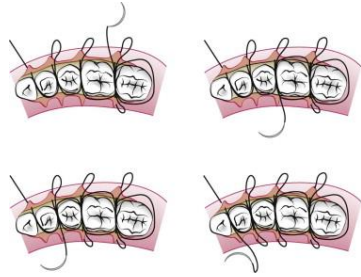
Suturing Techniques... Continuous Sutures... Independent Sling



Suturing Techniques... Continuous Sutures... Independent Sling

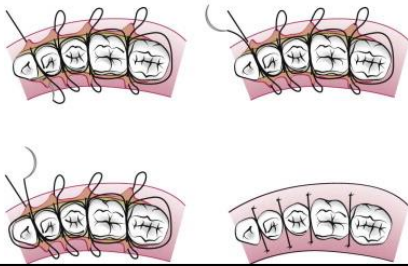


Suturing Techniques... Continuous Sutures... Independent Sling

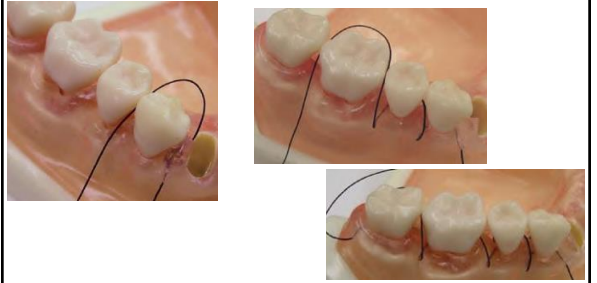


Suturing Techniques...

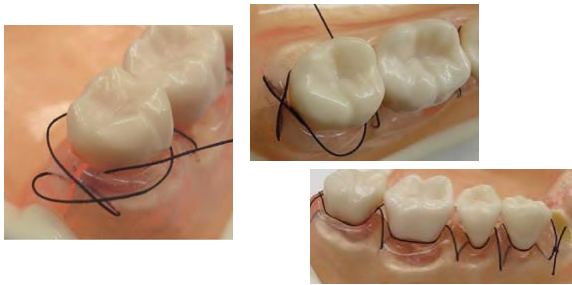
Independent Sling



Suturing Techniques... Continuous Sutures... Independent Sling



Suturing Techniques... Continuous Sutures... Independent Sling



Thank You...