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

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]

- **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.

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.

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
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 \( \text{H}_2\text{O}_2 \) (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... Design

3 parts
Eye: press-fitted or swaged
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, ...)
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... 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 ¼ to ½ 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

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**

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

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**Interrupted Sutures**

**Types**

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

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**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

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**Interrupted Sutures**

**Direct Suture**

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

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

Sling Suture

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

CAF & LPF
Suturing Techniques...

**Interrupted 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

- **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

**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

- **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

Thank You...