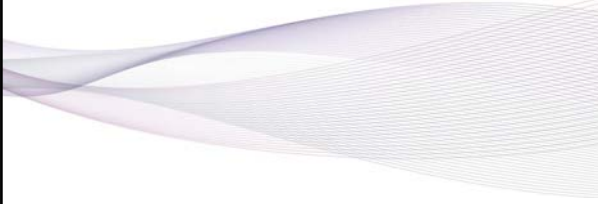





Wound Closure

UK IMPLANTOLOGY YEAR COURSE
MODULE 8
STUART ELLIS BDS MFGDP(UK) DPDS MSc

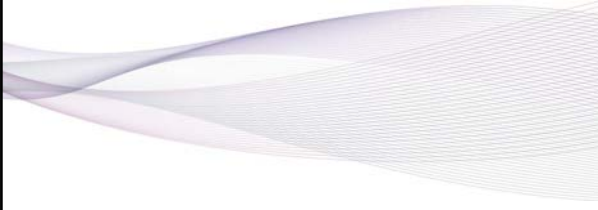




Aims & Objectives

- Discuss justification for suturing
- Consider risks & disadvantages of suturing
- Explain needle design
- Difference in threads
- Practical suturing techniques



Why do we suture?

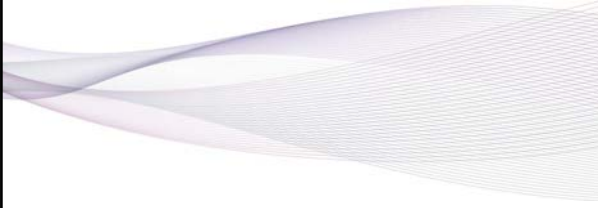

Why do we suture?

Functions of sutures:

- Stabilise flap without traction
- Allow controlled healing
- Minimise cosmetic scarring
- Reduce risk of SSI


Disadvantages

Tissue Reaction to Sutures

Problems:

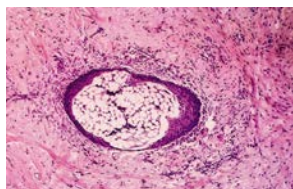
- Suture is a foreign body – inflammatory response
- Bacteria migration into wound – tracking
- Bacterial colonisation – braided / monofilament
- Benefit outweighs risks
- SSI risk about 2% in clean wounds
- SSI risk about 11% in contaminated wounds



Foreign Body Reaction

0-7 days

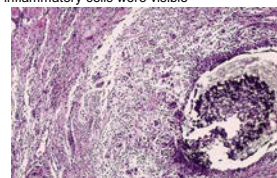
- After 3 days slight invagination of epithelium occurs
- Rate of migration depends upon material used – greater for silk than monofilament
- Bio-film forms around thread
- Inflammatory cells increase in CT
- Epithelialization complete at 7 days (silk)



Foreign Body Reaction

7-14 days

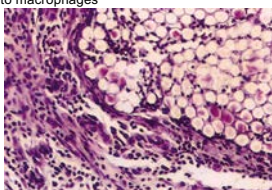
- Epithelium fully keratinized after 14 days
- Double layer keratinized cells with no cell margins and no nuclei
- Granulation tissue replaces areas where inflammatory cells were visible



Foreign Body Reaction

14+ days

- Monocytes migrate into the interstitial spaces of the suture
- Monocytes differentiate into macrophages



Needle design

Suture needles

Ideal Suture Needle:

- Sharp cutting tip – minimises tissue damage
- Same diameter as thread – minimises microgap
- Strong & elastic
- Surgical efficiency – (10°-30°)
- Made of surgical steel

Suture needles

Differences in design of suture needles:

- Cross section – triangular, cylindrical, oval
- Tip taper
- Shape of the eye
- Needle length
- Arc
- Surface treatment – e.g. silicone

Anatomy of a suture needle

- Chord (D)
- Length of needle
- Radius (E)
- Diameter (G)

Radius of a suture needle

Needle tips

Cylindrical needle - rounded tip

Cutting needle - triangular tip

Needle tip - reverse cutting needle

The recommended Oral Surgery needle

- Cutting tip (A)
- Reverse cutting cross section (D)
- Oval body—with gnurling (B)
- 1:1 attachment (C)

Thread attachment

- 1:1 ideal – not yet technically always possible to achieve
- 1:1 reduces micro gap
- Gap more evident with thinner threads

Types of suture

Classifications

- Resorbable : non resorbable
- Multifilament : monofilament

Non resorbable suture materials

Silk:

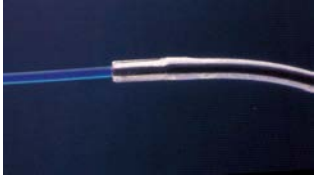
- Natural product
- Braided material
- Low elastic memory
- Glides poorly
- Knots well
- Very strong
- Bacterial colonisation



Non resorbable suture materials

Nylon:


- Polymer of polyamide
- High elastic memory
- Monofilament
- Glides well
- Knots poorly



Resorbable suture materials

Cat Gut


- Monofilament – first described in 10th Century by Abu al-Qasim al-Zahrawi
- *Kitab al-Tasrif* – 30 volume surgical encyclopedia – 500 years primary source
- Natural product
- Not made from pussy cats - cows or sheep intestines
- Name derives from 'kittle'
- Snags easily
- Much greater degree of inflammation than synthetic material – enzymic degradation in addition to bacterial breakdown
- Difficulty of standardising batches & infection concerns



Resorbable suture materials

Vicryl:


- Polyglactin 910
- Braided
- Loses tensile strength in 3-4 weeks
- Absorption complete at 70 days
- Vicryl Rapide – complete at 40 days
- Vicryl Plus – triclosan impregnated



Resorbable suture materials

Monocryl:


- Poliglecaprone 25
- Monofilament
- Loses tensile strength in 2-3weeks
- Absorption complete at 90-119 days
- Glides easily
- Some elastic memory
- Needs a triple surgeons knot



Suture sizing

Size of thread

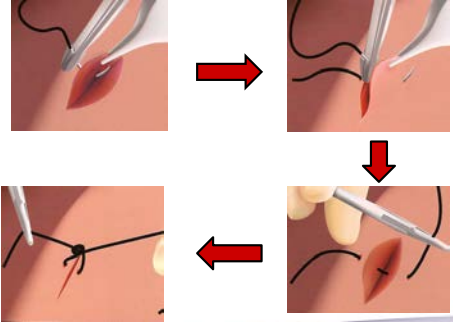
- Based on United States Pharmacopoeia (USP) nomenclature
- Expressed in zeros
- More zeros – finer the thread
- For example 6-0 much finer than 2-0



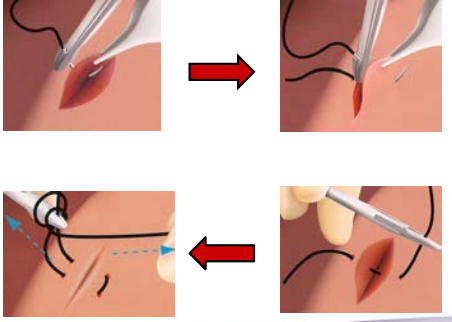
Suture techniques

- Interrupted
- Continuous
- Horizontal mattress
- Vertical mattress
- 'Palacci'

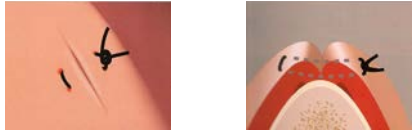
Interrupted Suture



Horizontal Mattress Suture



Horizontal Mattress Suture



Vertical Mattress Suture

