Suture Materials

Characteristic of ideal suture material

- Must be sterile
- Non-allergic
- Non carcinogenic
- High tensile strength (breaking strength is high in small caliber)
- Should be comfortably handled, easy to knot and hold securely
- Should excite minimum tissue reactions
- Non capillary
- Not creating a situation favored to bacterial growth
- Cheap, and can be used in any operation
- Available in different sizes

The choice should be based on physical, biological characteristics of the materils and healing rate in particular tissue; thus these factors should be taken in consideration when a surgeon selection was made.

Classification of suture materials

1. Resorbable sutures: they are used in tissues that healed rapidly, also used for buried sutures and in child operations to avoid the need for suture removal. They can be divided into

- **Natural:** e.g. surgical gut that prepared from adeventitia of lambs intestine, they are monofilament and absorbed by enzymatic digestion,

They are either

Plain; which retain strength 2-4 days inside oral cavity and 5-7days elsewhere, they are absorbed quickly.

Chromic; processed to provide greater resistance to absorption, they retain strength for 3-5 days in oral cavity and 9-14days elsewhere, they are absorbed within 90days.

- **Synthetic:** less irritant to the tissues and stronger than gut more costly, they are absorbed by hydrolysis, multifilament and difficult to tie (need multiple careful knots).

Examples

i. Polyglactin (vicryl): retain strength for 3weeks and resorbed within 90 days.
ii. Polyglycollate (polyglycolic) (dexon): loose tensile strength rapidly and absorbed slowly than above.
iii. Poly dioxonone (PDS): retain strength longer (about 60 days) and used when there is tension and slow healing, it is monofilament, absorbed by hydrolysis, it is excellent secure.

Examples of Resorbable sutures

2. **Non-Resorbable sutures**: it excite little tissue reaction, should be removed except when can be buried deeply where permanent support is required e.g. ligation of bleeding vessel

They can be divided into

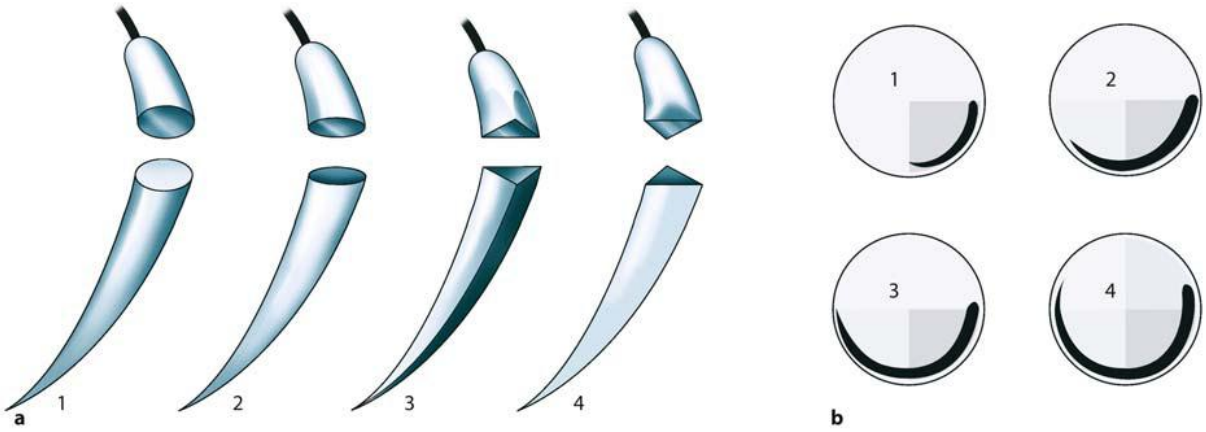
- Natural; like silk suture, they braided (multifilament), easy to knot, flexible and easy to handled, but it act as a wick for moisture and debries accumulation and bacterial accumulation.
- Synthetic; stronger than natural, it is either
  i. Polyamide (nylon) like ethicon and nurolon; they have high tensile strength and moderate tissue reaction.
  ii. Polyester like mersilene and ethibond, they are smooth tie, braided
  iii. Polypropylene like prolene; extremely inert, retained high tensile strength, monofilament, minimal tissue reaction, hold knots better than other types.

Examples of Non-Resorbable sutures

Needles

A variety of needles are available in oral surgery, and they may differ in shape, diameter, cross-sectional view, and size. They are usually made of stainless steel, which is a strong and flexible material. The needles preferred by surgeons today are *atraumatic disposable needles* with pre-attached sutures on their posterior ends. *Needles that may be used and sterilized many times* are also available, with an eye or groove in the needle, through which the suture is passed.

- **Needles with Round or Oval Cross-Sectional View:** These are considered atraumatic and are mainly used for suturing thin mucosa. Their disadvantage is that great pressure is required when passing through the tissues, which may make suturing the wound harder.
- **Triangular Needles:** These needles have sharp cutting edges and are preferred for suturing thicker tissues. When they are used for thin mucosa, care is required because they may tear the tissues. The most suitable needles are semicircular or three-eighths of a circle and 19–20mmlong, in both cases.



a. Cross-sectional view of needles

1. Round tapered
2. Oval tapered
3. Cutting
4. Reverse-cutting

b. Size of needle compared to regular circle

1. one-quarter of a circle
2. three-eighths of a circle
3. half a circle
4. three-quarters of a circle

Suggestive Reading

Norman S William, Roman O Connell, Andrew W McCaskie. Bailey & Love short practice of surgery, 27th edition. Taylor and Francis, 2018