

Update On Suture Materials

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In South Africa, traditional healers use soldier ants to stitch a cut. Holding the edges of a wound together, a healer places the ants, (genus *Dorylus*), on the wound. Instinctively, the ants bite down and seal the cut. The healer then pinches off their bodies, leaving the jaws attached, and the wound is allowed to heal.

Suture materials and surgical needles represent the exceptional technology available to surgeons. Suture and needle selection should be based on sound principles in order to maximize optimal wound healing. Recently, several new sutures and needles have been marketed, adding to the potential selection. Each has its own inherent benefits and properties.

SUTURES

Monocryl

The newest suture marketed by Ethicon, Inc. is Monocryl (poliglecaprone 25), which is available on a variety of needle selections. It is a synthetic, absorbable, monofilament suture which is the strongest "out-of-package suture" available from Ethicon. It is recommended for subcuticular closure of the skin. It completely absorbs in approximately 90 to 120 days, with 50% to 60% retention of its tensile strength at two weeks, and 20% to 30% retention of its tensile strength at three weeks. It has excellent handling characteristics, glides effortlessly through skin, and is virtually inert in tissue.

Maxon

Maxon (polyglyconate) is another relatively new absorbable monofilament suture. A product of Davis and Geck, it is available as a dyed or undyed suture. It is quite similar to PDS suture (polydioxanone), however, it has improved handling characteristics. It is a copolymer consisting of 65% polyglycolic acid and 32.5% trimethylene carbonate.

The suture is non-antigenic and non-pyrogenic. Only slight tissue reaction is elicited during its prolonged absorption. Suture absorption is minimal until approximately the sixtieth day after implantation, and near complete hydrolysis occurs within six months.

Maxon is used when prolonged wound support is required for healing. Polyglyconate suture demonstrates 81% strength retention at two weeks, 59% strength retention at four weeks, and 30% strength retention at six weeks. These strength retention figures are very similar to those of PDS. Maxon is most often used in medial capsular repair of the first metatarsophalangeal joint, and for adductor tendon transfers. This suture is also used in primary ligament repairs, or to augment major tendon transfers repairs.

Maxon has been used in place of permanent braided polyester, thereby avoiding potential complications associated with permanent sutures, such as suture prominence and abscess. The author has noted, on occasion, a painful inflammatory reaction to the suture knot along the medial capsule, subsequent to first metatarsophalangeal joint capsulorrhaphy. This is most common between the fourth and eighth postoperative week. Inflammation is typically localized directly over the suture knot ends, and in all cases it has resolved without suture abscess. Therefore, it is recommended that suture knots be kept to a minimum and buried into deep tissue when possible.

Fast-Absorbing, Plain Gut

Ethicon has also introduced a fast-absorbing, plain gut suture, marketed for use in skin closure. These sutures absorb quickly without the need for removal, and therefore are recommended for use in children, or in areas where the surgeon wants to avoid suture removal.

Novafil

Novafil (polybutester) is a monofilament, non-absorbable suture introduced by Davis and Geck. It is a copolymer of polybutylene, teraphthalate, and polytetramethylene ether glycol, and is therefore chemically related to the multi-filament, polyester sutures. It is a "stay" or permanent suture, and causes only minimal, transient, acute, inflammatory reactions, followed by fibrous tissue encapsulation. This suture has not been shown to enhance infection. Novafil has handling properties similar to polypropylene and polyester sutures. Its knot-tying capability is much like polyester, however, it is slippery like polypropylene. Its stretch and memory properties may surpass those of polypropylene. Overall, Novafil handles well and has excellent tensile strength.

SURGICAL NEEDLES

Ethicon has introduced a new series of needles called PC, or precision cosmetic needles. It is a conventional cutting needle or "surface-seeking" needle, which is hand-honed and 15% sharper than the PS, or plastic surgical needle (which in turn, is of reverse cutting design). Likewise, PS needles are 40% sharper than FS needles. The PC-Prime needle introduces a unique point geometry which reduces the cutting edge angle of the needle, thereby requiring less force to penetrate tissue, which minimizes tissue trauma.

Ethicon has also introduced its Ethiguard series of needles. These are blunt point needles which are available on monocryl, vicryl and chromic sutures. They are on CT or circular taper needle configurations, and are designed not to penetrate surgical gloves, thereby reducing the potential for HIV and hepatitis infection transmission.

Davis and Geck has also introduced a similar needle design. These needles can be used in muscle, subcutaneous fat, and loose connective tissues. They represent a good product with a high safety profile.

Additional improvements have been made in needle packaging to provide relay suture packs with controlled release needle sutures (CR). These sutures eliminate extra steps when closing with multiple sutures.

Surgical sutures and needles are constantly being improved to meet the demanding needs of a variety of surgeons. A clear understanding of the variety of available sutures and needles will allow the surgeon advanced opportunities in wound management.