

Comparative study suggests greater care necessary in selecting absorbable sutures in surgical closings

By Editorial Staff

The results of a new comparative study of sutures conducted at the University of Western Ontario's orthopaedic research laboratories early last Spring, suggest that surgeons have made mistakes in selecting sutures that don't last long enough. Greater care should therefore be given to the choice of absorbable sutures, especially those selected for organs within the body, or for those structures that are not well vascularized.

Reporting to the annual meeting of the Orthopaedic Research Society held in San Francisco recently, Dr. Robert Bourne, an orthopaedic surgeon at the University Hospital in London and head of the research team, said that over the past decade or so, surgeons have been going from non-absorbable to absorbable sutures, "...and I think that often mistakes have been made in selecting a suture that doesn't last long enough."

Premature disintegration

"For example, if someone was repairing a torn rotator cuff and wanted to select a certain absorbable suture, the suture would disintegrate before the rotator cuff could be expected to heal. Likewise," he said in an interview, "in doing an artificial knee replacement, I think the suture has the potential to dissolve and disintegrate prior to the repair of the extensor mechanism. This could lead to either failure of the operation, or to unnecessary complications."

"For general surgeons, this has implications in terms of closing an abdomen. Weaker absorbable sutures are commonly used, and I think that is inappropriate. I think if they are going to use an absorbable suture, they should use one of the longer-acting monofilament ones. These don't handle as easy, but for longevity and strength, are better."

Other surgical implications

The University of Western Ontario study of the comparative strengths of sutures also has implications, among others, for gynecologists doing hysterectomies, for pediatric surgery, and for hernia repair procedures.

In his remarks to the Orthopaedic Research

Society, Dr. Bourne reported on the tensile strength testing of four absorbable sutures (0 size) both dry and with 24-hours of saline soaking, as compared with four nonabsorbable sutures of the same size: silk, Ethibone, TiCron and Prolene.

The various sutures were also tested, dry and wet, with one hitch, and with four, five and six knots.

In vivo testing was also done in rabbits in whom the various sutures were implanted. These were then removed for tensile strength testing at one, two, three, four, six and 12 weeks.

Polydioxanon the strongest

Among the absorbable sutures tested, the strongest was polydioxanon, which has a half-life of six weeks. The next strongest was polyglyconate with a half-life of three weeks. Polyglycolic acid, however, only had a half-strength, or the time when strength decreases by 50%, of two weeks, the research study showed.

Interestingly, the absorbable sutures were in some cases equal or superior in strength as they came out of the box. However, tensile strength in the absorbable sutures decreased by about 15% in the first week and by about 40% in the second week. The exception was polydioxanon, which retained 96% of its strength in the second week.

Whereas polydioxanon retained 86% of its strength at three weeks in vivo in the rabbit tests, the polyglyconate sutures retained only 40%, and the other two absorbables were "very fragile."

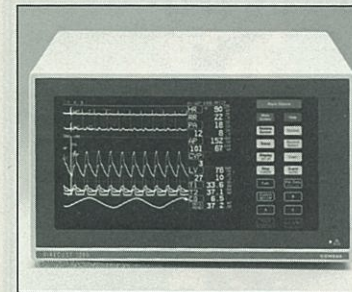
Dr. Bourne said that the study also indicated that saline soaking decreased strength by from 3.6% to 13%. Elasticity was also reduced. Also, one hitch, or six knots, reduces strength by from 30%-35%. He mentioned that six square knots are required for consistent security.

Conclusion

Concluding, he said that if absorbable sutures are used, he tends to use the strongest one. "The weaker, braided sutures may be all right to use for skin, where you have a good blood supply, but once you're dealing with avascular structures, like a tendon, you shouldn't use these."

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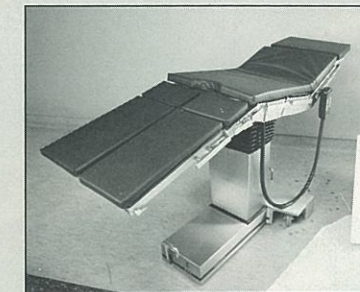
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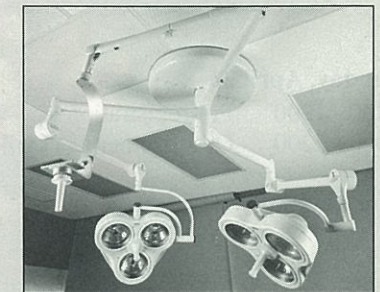
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