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Re: Henderson J, Sutcliffe M, Gillespie P. The tension band principle and angular testing of extensor tendon repairs. J Hand Surg Eur. 2011, 36: 297 –302

Graham Cheung, James Henderson, Jill Arrowsmith, Michael Sutcliffe and Patrick Gillespie

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Letters about Published Papers

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Re: Ozcelik B, Egemen O, Sacak B.
How to prevent the avulsed soft tissues from wrapping around the K-wire.
J Hand Surg Eur. 2011, 36: 518–9

Dear Sir,

We protect soft tissues from Kirschner (K) wires by passing the wire through a drill guide, which can also help steer the K-wire. Other methods of isolating the K-wire from the soft tissues may decrease control of the thin, flexible wire. The guide is not transparent, but this is not a problem. Drill guides down to 1.0 mm are available, although any guide with an internal diameter greater than that of the wire can be used.

James Henderson MA MD FRCS(Plast)
Peter Chapman MA FRCS(Trauma &Orth)
Norfolk and Norwich University Hospital
NHS Trust Norwich, UK
Email: jh@jameshenderson.net

Reply

Dear Sir,

Re: Ozcelik B, Egemen O, Sacak B.
How to prevent the avulsed soft tissues from wrapping around the K-wire.
J Hand Surg Eur. 2011, 36: 518–9

We would like to thank Dr Henderson and Chapman for their comments about our letter describing a simple solution to protect the soft tissues from the K wire (Ozcelik et al, 2011). They report that they use a stainless steel guide which is not transparent for this purpose. Although the handle of the drill guide facilitates the placement of the K-wire, the rigid structure of the guide may be a problem, at least in our hands. Because while we introduce the K- wire, sometimes we bend it and change its direction to obtain proper alignment of the bones. Moreover the surgeon must use one hand to use the wire driver and the other to handle of the drill guide. We think that this maneuver impairs the control of the surgeon on the fractured bone which must be handled and positioned completely by an assistant now. Besides we prefer a transparent material to see the tip of the K-wire. Again we would like to thank Dr Henderson and Chapman for their comment.

Reference

Ozcelik B, Egemen O, Sacak B. How to prevent the avulsed soft tissues from wrapping around the K wire. J Hand Surg Eur. 2011, 36: 518–9.

Bulent Ozcelik, MD and Onur Egemen, MD.
Ist-El Hand Surgery, Microsurgery and Rehabilitation Group and Okmeydani Education and Research Hospital, Istanbul, Turkey.
Email: Onuregemen@gmail.com

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Re: Henderson J, Sutcliffe M, Gillespie P. The tension band principle and angular testing of extensor tendon repairs. J Hand Surg Eur. 2011, 36: 297–302

Dear Sir,

We read with great interest the article by Henderson et al. and their excellent biomechanical study on the tension band principle of extensor tendon repair. We make the observation that although this study showed that a dorsally placed suture in a 7 mm thick pig extensor is sound, whether this can be applied in human extensors — which are on average 0.65 mm thick at the level of the distal interphalangeal joint, 1.0

mm at the proximal interphalangeal joint, and 1.4 mm at the metacarpophalangeal joint (Doyle, 1999) — is rather dubious. In such flat tendons the core sutures are already very close to the dorsal surface and, therefore, any theoretical advantage from the dorsal position of the Silfverskiöld suture is lost.

Reference

Doyle JR. Extensor tendons – acute injuries. In Green (Ed.) *Operative hand surgery*, 4th Edn. New York, Churchill Livingstone, 1999: 195–198.

Graham Cheung MBChB, FRCS (Tr+Orth) and
Jill Arrowsmith FRCS (Plast)
Pulvertaft Hand Unit, King's Treatment Centre,
Royal Derby Hospital, Derby, UK
Email: gckcheung@hotmail.com

Reply

Dear Sir,

Re: Henderson J, Sutcliffe M, Gillespie P. The tension band principle and angular testing of extensor tendon repairs. J Hand Surg Eur. 2011, 36: 297–302

We thank Cheung and Arrowsmith for their interest in our paper. They make a good point. We have subsequently tested a buried ("reverse") Silfverskiöld repair that had the longitudinal strands buried 2 mm within the tendon and found no significant difference in the strength or stiffness of this suture compared with the standard Silfverskiöld (Henderson J et al., in press). In all our experiments we made the suture bites superficially in the porcine tendons, aiming to ensure that the techniques would be feasible in flat human extensor tendons, an approach that has been validated by others (Boyer et al., 2001).

It may well be that there is little immediate mechanical advantage of a dorsal suture over a core suture in a thin human extensor tendon, but the following points are critical, as we indicated in our paper.

1) The dorsal-only epitendinous repair is easy to perform, whilst accurately performing a multi-strand core suture in a tendon as thin as 0.65 mm (Doyle, 1999) is difficult. Although a double mattress suture is easy, it was significantly less stiff and weaker than the multistrand, grasping Silfverskiöld repair, as was the Kessler suture. Both of the conventional sutures failed by pullout, whilst the Silfverskiöld failed by suture snapping.
2) Even if not leading to an increase in the stiffness or strength of the repair, we hypothesized that the tension band effect would lead to better apposition of the severed tendon ends after dorsal-only repair, allowing better healing. Conversely, we found that by turning the tendon over in the apparatus (i.e., a palmar-only epitendinous repair), gapping of the repair occurred immediately.
3) Reducing the amount of suture material within the tendon substance is likely to be beneficial for tendon healing (Wong et al., 2006).

Of course the only true test of a tendon repair is *in vivo* testing, for which we are currently collecting data.

References

Boyer MI, Meunier MJ, Lescheid J, Burns ME, Gelberman RH, Silva MJ. The influence of cross-sectional area on the tensile properties of flexor tendons. J Hand Surg Am. 2001, 26: 828–32.

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Henderson J, Sutcliffe M, Gillespie PG. Epitendinous only extensor tendon repairs- an evaluation. J Hand Surg Am. In press.

Wong JK, Cerovac S, Ferguson MW, McGrouther DA. The cellular effect of a single interrupted suture on tendon. J Hand Surg Br. 2006, 31: 358–367.

James Henderson MA MD FRCS(Plast),
Michael Sutcliffe PhD and
Patrick Gillespie MA MD FRCS(Plast)
Department of Plastic Surgery, Norfolk and
Norwich University Hospital NHS Trust, Norwich,
Department of Engineering, University of
Cambridge, Cambridge, and
Department of Plastic Surgery,
Addenbrooke's Hospital, Cambridge, UK
Email: jh@jameshenderson.net

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