Evidence in focus

Study summary

Sano H, et al. *J Orthop Sci* (2016)*

smith&nephew

Supporting healthcare professionals for over 150 years

Fixation properties, stress distribution and failure patterns differ between coil-type and screw-type suture anchors for rotator cuff repair

HEALICOIL◇ REGENESORB suture anchor had the best initial fixation properties of anchors tested

Study overview

- An independent study conducting virtual pull-out testing using 3-dimensional finite element method (3D-FEM)
- Computer models of three anchors; one screw-type anchor (TWINFIX◇ Ti suture anchor), and two coil-type anchors (HEALICOIL PK suture anchor and HEALICOIL REGENESORB suture anchor) were inserted into the isotropic cube model that simulated cancellous bone
- A tensile load (500 N) along the long axis of the inserted anchor was applied to the site of suture thread attachment to simulate a traction force

Key results

- With TWINFIX Ti screw-type suture anchor, the highest stress and element failure occurred around the anchor threads, closest to the surface of the cube
- Conversely, the highest stress and element failure with both coil-type anchors occurred deeper, near the anchor tip and site of suture thread attachment
- HEALICOIL REGENESORB suture anchor showed the least displacement of any anchor tested, with less than 0.1mm displacement at a load of 500N, vs 0.1mm displacement at 400N and 370N for TWINFIX Ti suture anchor and HEALICOIL PK suture anchor, respectively (Figure)

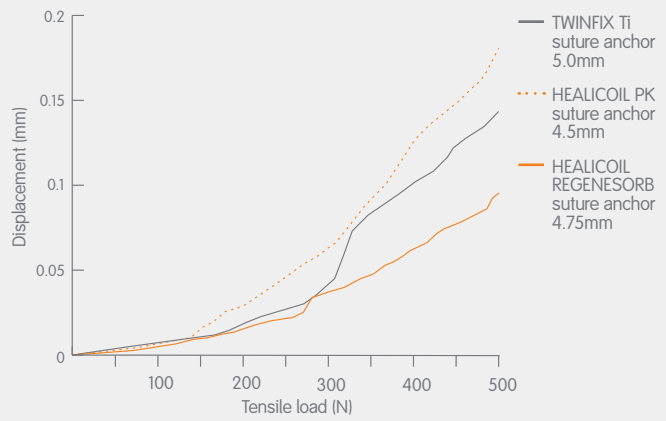

Figure. Mean value of displacement

Conclusion

In virtual pullout testing of the screw-type anchor, stress distribution and element failure occurred around the proximal threads, whereas in coil-type anchors, stress and element failure occurred nearer the distal anchor tip. As proximal bony tissue is often damaged during repair, this may lead to a greater risk of pull-out with screw-type anchors. HEALICOIL REGENESORB suture anchor had the best initial fixation properties of all anchors tested.

Considerations

- 3D-FEM is a computer aided engineering tool, which has been validated in the prediction of femoral and vertebrae fractures and has been used to predict the failure risk of inserted implants

Study citation

*Sano H, Tokunaga M, Noguchi M, et al. Comparison of fixation properties between coil-type and screw-type anchors for rotator cuff repair: A virtual pullout testing using 3-dimensional finite element method. *J Orthop Sci.* 2016;21(4):452-457.

17285-en V1 0219. Published February 2019,

www.smith-nephew.com