

Fixation Strength Comparison of All-Suture vs. Traditional Rotator Cuff Anchors in Porcine Bone

Overview

Summary of the ultimate load-to-failure results in porcine bone for Y-Knot[®] RC all-suture anchor compared to traditional 5.5mm fully-threaded rotator cuff anchors.

Anchor	Manufacturer	Anchor Material	Sutures*	Size
Y-Knot RC	ConMed Linvatec	UHMWPE (Hi-Fi [®] flat braid)	#2 Hi-Fi [®]	2.8mm
Corkscrew FT (BC)	Arthrex	Biocomposite (TCP/PLLA)	#2 FiberWire	5.5mm
TwinFix (BC)	Smith & Nephew	Biocomposite (HA/PLLA)	#2 Ultrabraid	5.5mm
TwinFix (PK)	Smith & Nephew	PEEK	#2 Ultrabraid	5.5mm
Healicoil (PK)	Smith & Nephew	PEEK	#2 Ultrabraid	5.5mm
Healix (BC)	DePuy Mitek	Biocomposite (TCP/PLGA)	#2 OrthoCord	5.5mm
Healix (PK)	DePuy Mitek	PEEK	#2 OrthoCord	5.5mm
ALLthread (PK)	Biomet	PEEK	#2 MaxBraid	5.5mm

Table 1: Rotator cuff anchor properties. "BC" is biocomposite, "PK" is PEEK.

Methods

Anchors were implanted in porcine cortical bone and tensile loads were applied parallel to axis of insertion at 12.5mm/s until failure. Mean failure loads are compared for anchors listed in Table 1.

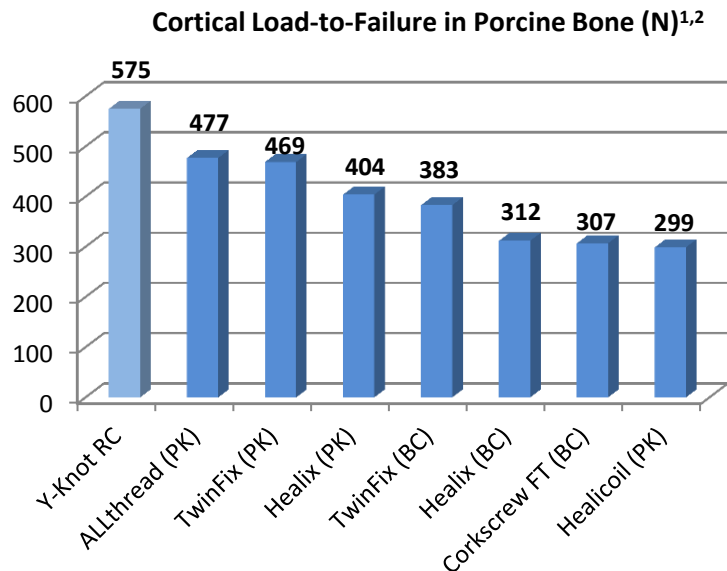
Results

The Y-Knot RC all-suture anchor exhibited $575.3 \pm 136.0 \text{ N}^1$ mean ultimate failure load, which was higher than all traditional 5.5mm PEEK and biocomposite anchors included in this analysis. The 5.5mm PEEK anchors exhibited the following failure loads:

- ALLthread (PK): $476.5 \pm 22.2 \text{ N}^2$
- TwinFix (PK): $469.4 \pm 48.7 \text{ N}^2$
- Healix (PK): $404.3 \pm 24.4 \text{ N}^2$
- Healicoil (PK): $298.7 \pm 37.4 \text{ N}^2$.

The 5.5mm biocomposite anchors exhibited the following failure loads:

- TwinFix (BC): $382.6 \pm 38.2 \text{ N}^2$
- Healix (BC): $312.1 \pm 31.0 \text{ N}^2$
- Corkscrew FT (BC): $307.4 \pm 24.6 \text{ N}^3$



Clinical Relevance

The Y-Knot RC all-suture anchor exhibited nearly 5x higher pullout¹ than the maximal physiologic force on the supraspinatus (117 N^4). Additionally, the 2.8mm hole created by the Y-Knot RC anchor conserves bone, providing more tendon-to-bone contact than a 5.5mm fully threaded suture anchor.

¹ Data on file. Triple-loaded version tested in cortical porcine bone.

² Barber FA, et al. Cyclic Loading Biomechanical Analysis of the Pullout Strengths of Rotator Cuff and Glenoid Anchors: 2013 Update. *Arthroscopy* 2013; 29:832-844.

³ Data on file. Double-loaded version tested in cortical porcine bone.

⁴ Tashjian RZ, et al. Initial Fixation Strength of Massive Rotator Cuff Tears. *Arthroscopy* 2007; 23:710-716