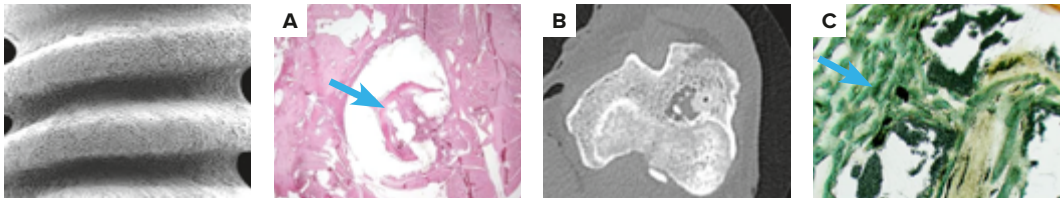
Scientific Update on BioComposite Implants



SEM-25× magnification

Biomechanics

8 mm × 20 mm FastThread™ BioComposite Interference Screw in ACL Reconstruction Using Bone-Tendon-Bone (BTB) Grafts *Arthrex White Paper.* LA1-00099-EN_A.

- The 8 mm × 20 mm FastThread BioComposite interference screw performed better with regards to ultimate load as well as stiffness than the 8 mm × 20 mm Biosure Regenesorb screw and the 8 mm × 23 mm BioComposite interference screw

10 mm × 30 mm FastThread™ BioComposite Interference Screw in ACL Reconstruction Using Soft-Tissue Grafts *Arthrex White Paper.* LA1-00097-EN_A

- In terms of stiffness, insertion torque, and cyclic displacement the 10 mm × 30 mm FastThread BioComposite interference screw performed better than 10 mm × 28 mm and 10 mm × 35 mm BioComposite interference screws
- In terms of torque values the 10 mm × 30 mm FastThread BioComposite screw performed better than 10 mm × 28 mm BioComposite screws
- In terms of ultimate and yield load the 10 mm × 35 mm BioComposite screws had higher values than the 10 mm × 28 mm BioComposite screws and 10 mm × 30 mm FastThread BioComposite screws

Kindya MC1, Konicek J2, Rizzi A1, Komatsu DE1, Paci JM3.

Knotless Suture Anchor With Suture Tape Quadriceps Tendon Repair Is Biomechanically Superior to Transosseous and Traditional Suture Anchor-Based Repairs in a Cadaveric Model. *Arthroscopy.* 2017

- Repair of quadriceps tendon ruptures with BioComposite SwiveLocks with SutureTape is biomechanically superior in cyclic displacement, construct stiffness, and ultimate load to failure compared with transosseous and fully threaded BioComposite Corkscrews in cadaveric specimens

Eichinger M1, Schmoelz W1, Attal R2, Moroder A1, Heinrichs CH1, Smekal V3, Mayr R4.

Screw oversizing for anterior cruciate ligament graft fixation in primary and enlarged tibial tunnels: A biomechanical study in a porcine model. *Knee.* 2018 Oct

- Matched-sized interference screws provided better ACL graft fixation in comparison with an oversized screw diameter
- In revision cases, the fixation strength of interference screws in enlarged tunnels was inferior to the fixation strength in primary tunnels

Arthrex®

Degradation and Integration

Arthrex 7 mm × 23 mm BioComposite Interference Screw vs. DePuy Mitek 7 mm × 23 mm Milagro Screw. *Arthrex White Paper* LA0153A

- The rate of polymer degradation associated with the Milagro screw accounts for the high level of acidosis observed in the accelerated study
- A significant portion of the Milagro's acidosis occurs during the equivalent of weeks 8 through 12 real time, and may delay healing as well as inducing inflammation at the surgical site
- The BioComposite interference screw begins acidosis during the equivalent of weeks 16 through 20 real time, after a significant portion of tissue regeneration has occurred
- The composite material used in the BioComposite interference screw acts as a pH buffer, reducing the concern that any adverse reaction, associated with local acidosis, may occur

BioComposite SutureTak, BioComposite Corkscrew FT and BioComposite PushLock: An In Vitro Degradation Study. *Arthrex White Paper* LA0523A

- All anchors tested in these studies maintained mechanical integrity over 16 weeks of in vitro degradation

James L. Cook, DVM, PhD; Chantelle Bozynski, DVM; and Keiichi Kuroki, DVM, PhD from the University of Missouri

Evaluation of FastThread™ BioComposite Interference Screws in a Preclinical Canine Model. *Arthrex White Paper* LA1-00096-EN_A

- In this preclinical canine ACL fixation model, vented FastThread BioComposite interference screws
  - Maintained integrity and position,
  - Oroduced no untoward responses in the knee,
  - Were associated with excellent implant-bone interfaces and consistent bone ingrowth into the cannulation channel for all implants at both femoral and tibial insertion sites at 4 months post surgery
- Based on these data, FastThread interference screws appear to be appropriate for clinical use

James L. Cook, DVM, PhD; Keiichi Kuroki, DVM, PhD; and Matt Smith, MD

Histological Analysis of the 2.4 mm BioComposite SutureTak and JuggerKnot Suture Anchor. *Arthrex White Paper* LA0528B

- 2.4 mm BioComposite SutureTak anchors have superior bone integration characteristics and maintenance of socket diameter compared to JuggerKnot anchors, when placed in the glenoid rim in a canine model

Arthrex® Bio and BioComposite™ Implants: Post-Op Complaint Analysis. *Arthrex White Paper* LA1-0199-EN_E

- The complaint data compiled for this review clearly demonstrate that the risk of inflammatory response or reaction is very low for both the biodegradable and nondegradable implants manufactured by Arthrex, Inc.

Arthrex®

Clinical Studies

Stephane Aunoble,1 Denis Cle´ment,2 Patrick Frayssinet,3 Marie Francois Harmand,4 Jean Charles Le Huec1

Biological performance of a new _-TCP/PLLA composite material for applications in spine surgery: In vitro and in vivo studies. *J Biomed Mater Res, 2006*

- In vivo results indicate that, in comparison with pure PLA, tricalcium phosphate-containing composite materials had
  - faster degradation kinetics,
  - caused less inflammatory reaction and
  - promoted contact osteogenesis
- The composite material containing 60 % β-TCP demonstrated a similar performance to pure tricalcium phosphate bone grafts in terms of osteogenesis, and is apparently compatible with the production of intra-osseous implants for situations representing high levels of mechanical strain

F. Alan Barber M.D. a, William D. Dockery M.D. b

Long-term Absorption of β–Tricalcium Phosphate Poly-L-Lactic Acid Interference Screws. *Arthroscopy: The Journal of Arthroscopic & Related Surgery*

- Complete degradation of β-TCP–PLLA interference screw and no remnant was present 4 years after insertion
- Osteoconductivity was confirmed by CT scans at 75 % of the screw sites and completely filled the site in 10 %
- The addition of β-TCP to PLLA results in a BioComposite interference screw that is osteoconductive