Evaluation of FiberWire® Suture in a Canine Meniscal Repair Model

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Background

Meniscal repair is currently performed using various suture materials placed using all-inside, inside-out, or outside-in techniques. FiberWire suture is constructed of a multistrand, long-chain ultra-high–molecular weight polyethylene (UHMWPE) core with a braided jacket of polyester and UHMWPE that gives FiberWire suture its superior strength, soft feel, and abrasion resistance.¹

Purpose

The purpose of this study was to assess the effects of FiberWire suture in a canine model with respect to maintaining suture integrity and opposing articular cartilage damage during the 3 months following implantation, while allowing full activity.

Study Design

Translational animal study.

Methods

Three adult purpose-bred hounds underwent aseptic surgery for arthroscopy-assisted meniscal suturing in both knees (n=6) of each canine, alternating between lateral and medial meniscus for each knee. One 2-0 FiberWire suture was placed in the red-white zone of the load-bearing portion of the anterior horn of the meniscus using a zone-specific cannula in an inside-out technique. Knees were assessed clinically based on maintenance of joint function, and at 3 months post-implantation using arthroscopic, gross, and histology evaluations to determine maintenance of suture integrity and evidence of opposing articular cartilage damage. Histologic scoring of the tissues was performed by two board-certified veterinary pathologists, blinded to treatments, using the OARSI histologic scoring system for canine OA for synovia and osteochondral tissue.² Based on this, a total cartilage pathology severity score for the tibial plateau and the femoral condyle was determined for each of the canines.

Figure 1. Representative arthroscopic images of the medial compartment synovium of the canine knee 3 months after meniscal suturing using FiberWire suture.
Results

All canines maintained normal clinical function after recovery with no complications or impairments noted. Knee range of motion was within normal limits in all canines at the end of the study period. Arthroscopic assessments at 3 months postimplantation documented maintenance of suture integrity (Figure 1). Histologic assessments at 3 months post-surgery documented minimal to no apposing articular damage associated with meniscal tears repaired using FiberWire® meniscal sutures (Table 1). The mean and range of histopathology severity scores are within reference ranges for sham-treated control joints and below those associated with untreated meniscal tears. 3,4

Conclusion

FiberWire sutures can be effectively placed in the anterior horn of the canine meniscus. FiberWire sutures maintained integrity without causing significant opposing articular cartilage damage over 3 months following implantation in this preclinical model.

References


