



Signalment:

“Teal”
 9-year-old FS Laborador Retriever
 7/9 BCS

History:

Teal is an avid and talented duck retriever. She was presented to her primary veterinarian for acute lameness of the right pelvic limb. She suddenly became non-weight bearing while playing, after which she was intermittently weight bearing and contracting her right pelvic limb. She was placed on Deramaxx once daily and house-confinement for 2 weeks by the primary veterinarian.

Clinical Exam:

Grade 4 severe weight-bearing lameness of the right pelvic limb. On orthopedic exam, a lowered hock with increased flexion of digits was present. The right calcaneal tendon was thickened and difficult to completely localize on palpation.



Figure 1



Figure 2



Figure 3



Figure 4

Diagnostic Imaging:

Radiography: Radiographs of the right tarsus revealed an intact calcaneus, soft tissue swelling, and distal calcaneal tendon thickening with calcaneal periosteal reaction.

Ultrasonography: Loss of tendon fiber linearity at the calcaneal tuberosity, with thickened complex granulation tissue. Left calcaneal tendon was within normal limits.

Diagnosis:

Right calcaneal tendon rupture

Treatment/Management:

Teal was hospitalized for primary tendon repair and application of an external fixator. She was pre-medicated with atropine (0.02 mg/kg SQ), acepromazine (0.02 mg/kg IM), and morphine (0.3 mg/kg IM). She was induced with diazepam (0.3 mg/kg IV) and propofol (3 mg/kg IV), and maintained with isoflurane (1-2%). An epidural with Duramorph and bupivacaine was administered. IV fluids (Norm-R 10 ml/kg/hr) and cefazolin (22 mg/kg IV q 2hrs) were administered during the surgery.

A tourniquet was placed proximal to the surgical site, and the calcaneal tendon was exposed using a lateral approach. The distal damaged tendon was sharply excised. The tendon was reattached to the calcaneus with braided polyblend suture (#2 fiberwire Arthrex Vet Systems) in a 3-loop pulley system. A secondary palmar locking loop was added for additional security. The tarsus was then fixed in extension with a type II external fixator.

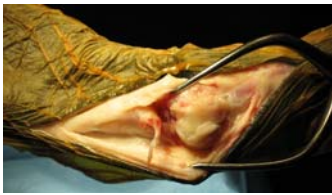


Figure 5

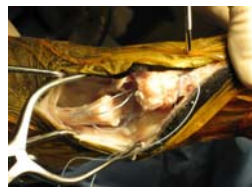


Figure 6

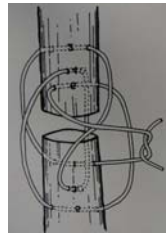


Figure 7



Figure 8

Post-operative care:

Strict cage rest was imperative for at least 4-6 weeks; NSAIDs, sedatives, and analgesics were used as adjunctive therapy. Teal was seen weekly to check for signs of infection of implant loosening. The ESF was removed 6 weeks post-op, and a soft bandage was placed for 1 week.

A re-rupture of Teal's tendon was suspected about 1 month post-op while she was allowed to jump while tethered (not strictly cage-rested). She became acutely lame, and a repeat tendon ultrasound revealed abrupt tendon fiber disruption. Teal was thereafter strictly crate-confined and underwater treadmill therapy was initiated. Teal completed 9 sessions of physical therapy, and regained complete function of her affected limb. Teal has returned to normal activity and is retrieving ducks as if nothing ever happened.

Discussion:

The calcanean tendon consists of the tendons of the superficial digital flexor, gastrocnemius, and a conjoined tendon formed by tendons of the biceps femoris, semitendinosus, and gracilis. Rupture usually occurs at the calcanean tendon insertion on the calcaneus, although fracture of the calcanean tuberosity can occur as well.

A study on working dogs revealed a good prognosis for surgical treatment of calcanean tendon injury if an appropriate tenorrhaphy technique is used and rigid immobilization is enforced for at least 6 weeks post-operatively [2]. Surgical treatment is therefore a viable option for patients with this injury.

A study performed by Moore et al. revealed the superiority of the 3-loop pulley suture pattern compared to the 2 locking-loop sutures for repair of the calcanean tendon [3]. The 3-loop pulley system is more resistant to gap formation during tensile loading. Since gap formation can significantly delay tendon healing, the 3-loop pulley system carries a better prognosis than the 2 locking-loop sutures [3, 4].

Preoperatively, cage rest is important to 1) prevent further tearing if rupture is partial and 2) decrease inflammation to the site. Adjunctive non-steroidal anti-inflammatory therapy and/or acepromazine therapy may be helpful for analgesic or sedative effects, respectively.

A complication with tenorrhaphy (aside from other general complications related to general surgery and anesthesia) is re-rupture of the calcanean tendon.



Figure 9



Figure 10

References:

- 1) Lamb CR, Duvernois A. Ultrasonographic anatomy of the normal canine calcanean tendon. *Vet Radiol Ultrasound* 46(4): 326-330, 2005.
- 2) Worth AJ, Danielsson F, Bray JP, Burbridge HM, Bruce WJ. Ability to work and owner satisfaction following surgical repair of common calcanean tendon injuries in working dogs in New Zealand. *N Z Vet J* 2 (3): 109-116, 2004.
- 3) Moores AP, Owen MR, Tarlton JF. The three-loop pulley suture versus two locking-loop sutures for the repair of canine Achilles tendons. *Vet Surg* 33(2): 131-137, 2004.
- 4) Montgomery R, Fitch R. Muscle and Tendon Disorders. In Slatter D (ed): *Textbook of Small Animal Surgery*, 3rd ed. W. B. Saunders Co., Philadelphia, 2003, p 2269.

Figures:

- 1) Teal with dropped hock and flexed digits, lateral view
- 2) Teal with dropped hock and flexed digits, caudal view
- 3) Radiograph of right hock
- 4) Ultrasound of right and left calcanean tendon
- 5) Ruptured calcanean tendon, intra-op
- 6) Placement of 3-loop pulley with Fiberwire.
- 7) See reference #4
- 8) External fixation
- 9) Teal 6 weeks post-op
- 10) Teal 10 weeks post-op