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## Optimizing canine fracture management in field conditions: A case of complete oblique femoral fracture treated with retrograde intramedullary pinning and wiring

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### Abstract

This case report describes the effective management of a complete oblique femoral fracture in a 3-years 8-months old male Labrador retriever weighing 25 kg. The dog presented with an inability to bear weight on the left hind limb after sustaining a traumatic injury. Under field conditions, retrograde intramedullary pinning and cerclage wiring were employed to stabilize the fracture. For anaesthesia, premedication included atropine, xylazine for sedation, and ketamine to induce and maintain anaesthesia. Post-surgical care included antibiotics, analgesics, and supportive therapy. The dog showed remarkable recovery, regaining the ability to walk within 72 days, and the intramedullary pin was removed after 6 months. This case highlights the feasibility of performing complex orthopedic surgeries in field settings, with successful outcomes.

**Keywords:** Oblique femoral, intramedullary pinning, canine

### Introduction

Femoral fractures are among the most common long bone fractures seen in veterinary practice and require surgical intervention for optimal recovery (Houlton *et al.*, 2010) [2]. Complete oblique fractures pose a challenge in maintaining proper alignment during the healing process (Fig.1). Intramedullary pinning combined with cerclage wiring is a recognized method for stabilizing such fractures, particularly in large-breed dogs (Fig.2) (McCarthy *et al.*, 2015; Roush *et al.*, 2011) [5, 8]. This case report presents the successful field management of a complete oblique femoral fracture in a Labrador retriever, emphasizing the rapid recovery and positive long-term outcomes using retrograde intramedullary pinning and cerclage wiring (Fig.2).

### Materials & Methods

A 3-years 8-months old male Labrador retriever weighing approximately 25 kg was presented following a traumatic incident resulting in an inability to bear weight on the left hind limb. On physical examination, the dog exhibited a body temperature of 102.3°F, and pale pink mucous membranes were noted. Radiographs confirmed a complete oblique fracture of the left femur (Jubb *et al.*, 2009) [3]. The dog was in stable condition, and surgical intervention was determined to be the best course of action. The surgical procedure involved the use of a 3.5 mm, 8-inch double trocar Steinmann pin (Fig.2).

### Surgical Treatment

For anaesthetic management, the patient was premedicated with atropine sulphate administered intramuscularly at a dose of 0.04 mg/kg body weight to reduce salivary secretions and maintain heart rate. After 10 minutes, xylazine HCl at 1.2 mg/kg body weight I/M was administered for sedation. Once adequate sedation was achieved, general anaesthesia was induced with ketamine HCl at a dosage of 5 mg/kg body weight intravenously.

Anaesthesia was maintained with incremental doses of ketamine as required to ensure stable anaesthetic depth throughout the surgical procedure (Jubb *et al.*, 2009) [3]. Tranexamic acid is an antifibrinolytic agent commonly used in canine surgery to reduce excessive bleeding during surgical procedures, particularly in orthopedic surgeries. The typical dosage for dogs is 10 mg/kg administered intravenously, usually given 30 minutes prior to the surgical procedure (Reinertson *et al.*, 2020) [6].

Surgical intervention was performed using the retrograde intramedullary pinning



**Fig 1:** X-ray image showing a complete oblique fracture of the femur bone



**Fig 2:** X-ray image after 6 days post-surgical intervention, displaying successful pinning and wiring of the femoral fracture, with restored alignment and stabilization of the bone

technique (Fig.3). A cranio-lateral incision was made over the femur to access the fracture site. After incising the skin and underlying fascia, the muscles were carefully separated to expose the fractured bone. A 3.5 mm, 8-inch double trocar Steinmann pin was inserted retrogradely through the distal aspect of the femur and advanced proximally. The pin was passed through the fractured site, ensuring the alignment of the bone fragments.



**Fig 3:** Illustration of the retrograde technique for intramedullary pinning.



**Fig 4:** Swelling observed in the operated limb on postoperative day 2.

Additional cerclage wiring was applied to ensure proper alignment and immobilization of the fracture fragments (Stoodley *et al.*, 2011) [9]. The surgical site was closed routinely, and post-surgical pain management was addressed with Butorphanol administered intravenously at 0.2 mg/kg body weight. Post-operative antibiotic therapy commenced with an intravenous injection of Intacef Tazo (Ceftriaxone + Tazobactam) at a dose of 562.5 mg, followed by oral administration of Zifi (Cefixime) 200 mg twice daily (BID) for 5 days to prevent infection. Analgesia was continued with Tablet Meftal (Mefenamic acid) 250mg OD for 3 days to control inflammation and post-



**Fig 5:** Image illustrating the removal of the Steinmann pin after 6 months.



**Fig 6:** The dog successfully walking 72 days post-surgery, demonstrating significant recovery and restored mobility following the femoral fracture repair.

surgical discomfort (Liska & Schaeffer, 2019) [4]. Additionally, the dog received supportive care with Skycal-DS (a calcium supplement) at 10 ml BID and Sharkoferrol (an iron supplement) at 5 ml BID daily to promote bone healing and recovery and strict movement restriction. On the second day following surgery, mild swelling was observed in the operated limb (Fig.4). This complication was managed with an intramuscular injection of Dexamethasone at 0.2 mg/kg body weight, resulting in a reduction of the swelling by the following day (Trotter *et al.*, 2018) [10]. The surgical wound was dressed with Betadine antiseptic solution and Aluspray every alternate day for 10 days. Sutures were removed on day 12 post-surgery (Roudabush *et al.*, 2013) [7] and made an uneventful recovery. The patient showed rapid improvement, regaining the ability to ambulate within 72 days post-operatively (Fig.6) (Wilson *et al.*, 2017) [11]. Follow-up radiographs confirmed proper alignment and healing of the fracture. The intramedullary pin was removed 6 months after the surgery, with the dog demonstrating full functional recovery and no further complications (Houlton *et al.*, 2010) [2].

### Result and Discussion

Femoral fractures, particularly oblique ones, present significant challenges in terms of achieving and maintaining fracture stability during healing. Intramedullary pinning combined with cerclage wiring is a well-established technique for providing fracture stabilization, especially in larger breeds such as Labrador Retrievers. Retrograde intramedullary pinning, as used in this case, allowed for effective stabilization of the fracture, leading to proper alignment and early weight-bearing. Despite the challenges of field conditions, this case demonstrates that with appropriate surgical technique and post-operative care, excellent outcomes can be achieved. The rapid recovery seen in this case, with walking ability restored in just 72 days (Fig.6) (Wilson *et al.*, 2017) [11] and the pin removed after 6 months (Fig.5), is indicative of effective fracture stabilization and healing (Houlton *et al.*, 2010) [2]. The use of corticosteroids (Dexamethasone) to manage post-operative swelling further contributed to the successful outcome (McCarthy *et al.*, 2015; Roush *et al.*, 2011) [5, 8].

### Conclusion

Retrograde intramedullary pinning combined with cerclage wiring is an effective surgical technique for managing complete oblique femoral fractures in dogs, even in field conditions. This case illustrates the method's reliability, with the patient recovering full limb function within a short period. The rapid recovery, lack of complications, and successful long-term outcome emphasize the importance of proper surgical technique and diligent post-operative care.

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