

Bilateral TENs Application in the Surgical Management of Femur Fracture in a Doberman Puppy

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Abstract

A five-months-old male Doberman puppy weighing 13.9 Kgs was presented with the complaint of non-weight bearing lameness from right hindlimb. On physical and clinical examination, crepitation over the right thigh, mild degree of swelling, pain and intact neurological reflexes of the affected limb was observed. Radiography confirmed complete, transverse, diaphyseal, overriding fracture of right femur. Internal rigid fixation of fracture was performed using double TENs technique after haemato-biochemical estimations. The puppy exhibited early weight bearing and ambulation from 2nd day onwards and showed excellent bone healing and uneventful recovery when followed till 45th day post-operatively.

Keywords: Doberman puppy, Femur fracture, TENs.

A fracture is a partial or complete break in the continuity of bone or cartilage and has long been a challenge to veterinary orthopedicians. Fractures in animals inevitably lead to pain and suffering, as well as a loss of

function in the affected limb (Vardhan *et al.*, 2017). Among young and growing dogs, the most frequently encountered orthopedic issue is fractures of the long bones mostly femurs (Aithal *et al.*, 1999) caused mainly due to vehicular accidents in dogs. Various internal fixation devices can be utilized in femoral fractures and intramedullary pinning is the most common method of internal fixation. ESIN offers several advantages, including minimal invasiveness and the ability to avoid growth plate injury in juvenile fracture management. Titanium nails are known to be more flexible in contrast to the stiffer stainless-steel nails owing to their lower modulus of elasticity. The present study deals with the internal fixation of femoral fracture using double TENs technique.

Case History and Observations

A five-months-old male Doberman puppy weighing 13.9 Kgs was presented to the Teaching Veterinary Clinical Complex, KNPCVS, Shirwal with the complaint of limping from right hindlimb for one day having a history of vehicular accident. Animals exhibited normal appetite and mentation with excellent general health conditions. Non-weight bearing lameness of grade-6 (Carr and Dycus, 2016) was observed upon distant observation and gait analysis. Complete physical examination revealed crepitation, mild swelling and pain on palpation over the right femoral area indicative of femoral fracture. All the neurological reflexes were normal in the affected limb. Confirmatory diagnosis was done by taking two orthogonal radiographs of the affected limb which revealed complete, transverse, overriding, proximal third diaphyseal fracture

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Fig. 1: Preoperative two orthogonal radiographs of right femoral diaphyseal fracture

of right femur (Fig. 1). Clinical parameters like temperature (100.9), heart rate (128 beats per minute), respiratory rate (26 per minutes), palpable lymph nodes (normal) and color of mucous membrane (pink) were recorded. Blood samples were analyzed for haemato-biochemical changes and revealed normal values. The puppy was scheduled the next day for open reduction and internal fixation using bilateral TENs application.

Treatment and Discussion

The puppy was kept off-feed for 8 hours and off-water for 4 hours on the day of surgery. Aseptic surgical site preparation along with prophylactic antibiotic using inj. Amoxicillin-sulbactam @ 12.5 mg/kg and pre-emptive

analgesia using inj. Melonex @ 0.2mg/kg administration via parenteral route was done prior to anesthetic induction. Premedication with inj. Atropine sulfate @ 0.04 mg/kg S.C. followed by inj. Xylazine HCl @ 1.0mg/kg I.M. and Inj. Butorphanol @ 0.2 mg/kg I.V and anesthetic induction and maintenance were achieved using inj. Zolazepam- tiletamine @ 2.5mg/kg I.V. Preoperative hanging limb traction was applied for easy reduction of fractured fragments. A craniolateral skin incision was from the level of the greater trochanter of femur to the level of the patella. The subcutaneous fat, superficial fascia and fascia lata were incised. Fracture site was exposed by caudal and cranial retraction of biceps femoris and vastus lateralis muscles, respectively. Both the titanium nails were inserted in a double C-shaped fashion through predrilled holes on both the lateral and medial femoral epicondyles, advanced into the proximal bone fragment and impacted into the opposite metaphyses. Post-repair, tensor fascia lata was sutured in a simple continuous pattern using No. 0 polyglactin 910 and subcuticular sutures were placed using 2-0 polyglactin 910. Skin was closed in a row of simple interrupted sutures using 2-0 polyamide. Postoperative antibiotics and analgesics were administered for 5 days with Elizabethan collar application for 15 days.

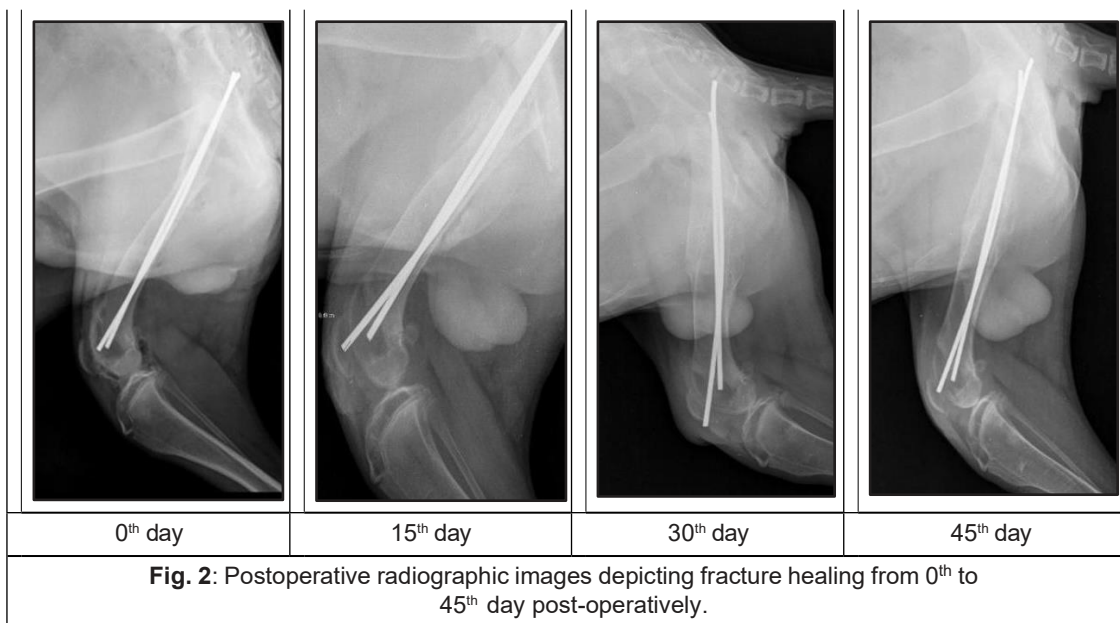


Fig. 2: Postoperative radiographic images depicting fracture healing from 0th to 45th day post-operatively.

Animal was restricted to cage rest for the first 10 days post-op and then controlled leash walks for the next 10 days. Skinsutures were removed after 12 days of surgery. Gradual bone healing was assessed using serial radiographic evaluation and weight bearing on affected limb on 0th, 15th, 30th and 45th day postoperatively which revealed early callus formation and bone healing (Fig. 2). Slight degree of nail migration was observed on 30th day postoperatively as a sole complication (Fig. 2).

Double titanium elastic nailing (TEN) is a superior rigid internal fracture fixation method among young and growing puppies owing to its double bracing action and six-point fixation (Singh *et al.*, 2015). Additionally, due to the features like high strength to weight ratio, excellent biocompatibility, lower elastic modulus, and superior corrosion resistance (Kumar *et al.*, 2006), TENs application is a promising alternative to bone plating in younger animals without causing any disturbance to the bone growth plate.

Summary

The femoral fracture in young puppies can be effectively managed with TENs technique with early ambulation and weight bearing owing to extensive callus formation.

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