

Rush pinning for supracondylar femoral fracture in dogs

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DOI No.: 10.5958/0973-9726.2026.00014.8

Accepted: Jan. 2026

This study evaluated the clinical outcome of the Rush pinning technique in the management of supracondylar femur fractures in dogs. Six dogs, weighing from 6.8 to 14 kg and aged from 2 months to 5 years, were included in the study. All cases were surgically treated using the Rush pinning method. Postoperative assessment involved periodic clinical and radiographic evaluations over a follow-up period ranging from 3 to 16 weeks. Five out of the six dogs demonstrated uneventful recovery with satisfactory restoration of limb function, indicating that the Rush pinning technique is an effective treatment option for supracondylar femur fractures in dogs.

Keywords: Dog, Femur, Rush pin, Supracondylar fracture

Supracondylar fractures are the second most common type, following diaphyseal fractures, and constitute 17–28% of all femoral fractures in dogs (Harasen, 2001; Mahajan, 2010). The short length of the distal bone segment, the large medullary canal, and the caudal bow of the distal femur present significant challenges for the stabilization of supracondylar femoral fractures (Lidbetter and Glyde, 2000). Currently, the most commonly employed treatment methods include single or multiple intramedullary pins, cross pins, Rush pins, and bone plating (Harasen, 2001; Kumar *et al.* 2024).

Rush pins offer a mechanical advantage by providing continuous compression at the fracture site without involving the joint surfaces or compressing the epiphyseal growth plate, which increases their utility in young dogs (Campbell, 1976). Rush pins provide dynamic fixation by stabilizing the fracture

fragments at two or three points in a spring-loaded manner (Anderson, 1974; DeCamp, 2016). Although the technique has been described by many researchers, there is a paucity of data regarding clinical outcomes, technical difficulties, and complications associated with Rush pinning for supracondylar femoral fractures in dogs (Kumar *et al.*, 2024). Therefore, this study was undertaken to evaluate the technique and report the clinical outcomes.

Six dogs presented with supracondylar and distal physal femoral fractures were included in the study. All dogs, except one, were under one year of age and weighed between 6.8 and 14 kg. The dogs exhibited varying degrees of hind limb lameness, along with pain and crepitus at the fracture site. Preoperative radiographs in two orthogonal views were obtained to confirm the diagnosis.

In all cases, open reduction and internal fixation were performed under general anaesthesia. Rush pins of 1.5 mm diameter and lengths ranging from 60 mm to 120 mm, depending on the length of the femur, were used. Pins measuring approximately two-thirds to three-fourths of the diaphyseal length were selected, as recommended by Newton and Nunamaker (1985).

A standard parapatellar skin incision was made. An additional incision was made in the lateral fascia of the stifle joint, parallel to the lateral border of the patella and along the cranial border of the biceps femoris muscle. The joint was maintained in extension, and the patella along with the quadriceps muscle was luxated medially.

The Rush pins were inserted lateral to the distal end of the trochlea, just proximal to the origin of the lateral

Table 1: Fracture details and treatment adopted.

| Signalment | Type of fracture | Functional outcome |
|--------------------------------|---|--------------------|
| Labrador, F, 14 kg, 6 m | Closed, complete, wedge shaped, distal diaphyseal | Excellent |
| ND, M, 7 kg, 2 m | Closed, complete, transverse, supracondylar, extra-articular | Excellent |
| ND, F, 10 kg, 3 m | Closed, complete, transverse, overriding, physal, extra-articular | Poor |
| ND, M, 9 kg, 5 m | Closed, complete, transverse, distal diaphyseal | Good |
| Spitz, F, 7.5 kg, 5 m | Closed, complete, transverse, supracondylar, extra-articular | Good |
| Cocker Spaniel, M, 14 kg, 5 yr | Closed, complete, transverse, distal diaphyseal | Excellent |

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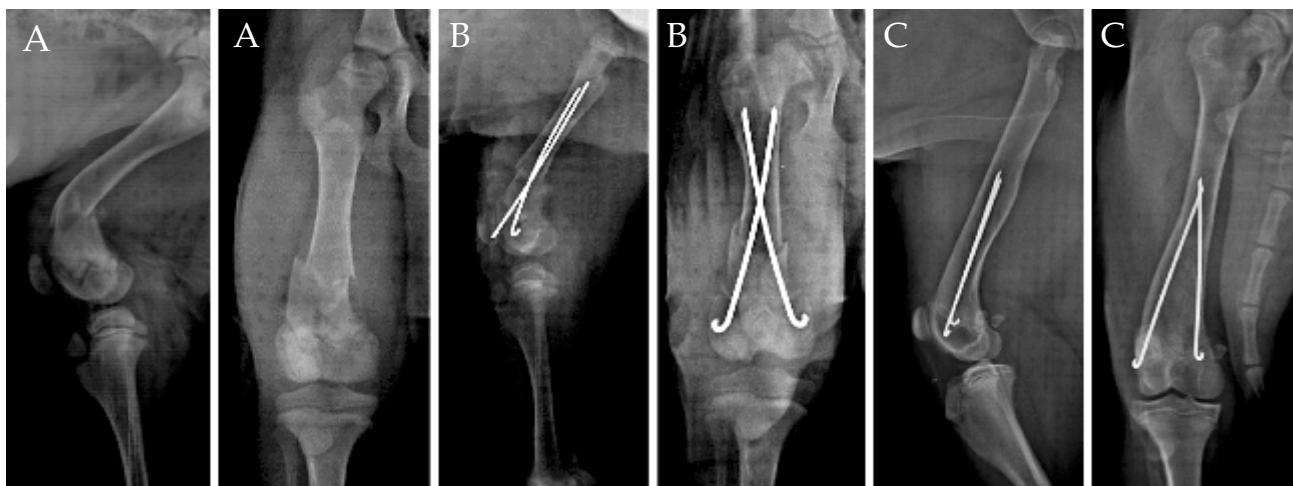


Fig. 1: Orthogonal radiographic views of a supracondylar femoral fracture in a dog: (A) preoperative views; (B) immediate postoperative views demonstrating satisfactory fracture reduction and fixation; and (C) 120th postoperative day showing complete bone healing with remodelling.

digital extensor muscle at the level of the extensor fossa, and at a corresponding site medially (Campbell, 1976). Initially, pilot holes for the Rush pins were created using a 1.5 mm Steinmann pin.

After the pins were completely seated in the medullary canal, the hooked ends were countersunk to avoid interference with the articular surface or the joint capsule. The joint capsule was closed using non-absorbable suture material (polypropylene, 2-0) in a simple interrupted pattern, and the tensor fascia lata was sutured with an absorbable material (polyglactin 910, 2-0) in a routine simple continuous pattern. The subcutaneous tissue and skin were closed in a routine manner.

Postoperatively, the surgical wound was dressed on alternate days until suture removal and cefotaxime (20 mg/kg body weight, i.m.) twice daily for five days, and meloxicam (0.2 mg/kg, s.c.) once daily for three days were administered. Immediate postoperative radiographs revealed good fracture reduction and proper positioning of the implants. Clinical and radiographic evaluations were conducted at 15-day intervals or whenever the animal was presented to the clinic for postoperative follow-up (Fig. 1). All dogs, except one, began bearing weight within the first week after surgery. On the final reappraisal day, full weight-bearing was observed in five cases, while one case exhibited persistent lameness. The functional outcome was graded as good to excellent in five cases and poor in one case (Table 1).

The implants were not removed in any case, as no implant-related complications were observed. Persistent lameness in one case (Case No. 3) was attributed to quadriceps contracture, likely resulting from delayed surgical intervention (10 days after fracture occurrence). Previous studies have also

reported successful management of simple transverse and short oblique supracondylar femoral fractures in young dogs using Rush pinning (Kumar *et al.*, 2024).

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