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Successful surgical management of tibial diaphyseal fracture using type-II ESF in an 18-month-old Ongole bull

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Tibial fractures are commonly encountered in cattle and represent a significant challenge in veterinary practice due to the anatomical and biomechanical complexities of the tibia. Various treatment options have been explored for their management, including conservative approaches such as stall rest and casting, as well as surgical techniques like transfixation pin-casts and bone plating (Anderson and St. Jean, 2008; Gangl and Lang, 2019). External Skeletal Fixation (ESF) has emerged as a valuable method, particularly in cases of open fractures, as it facilitates early weight-bearing, preserves the periosteal blood supply, and allows for effective wound management (Anderson and St. Jean, 2008). ESF also offers several advantages, including early restoration of limb function, ease of removal, and minimal disruption to local vascular structures, making it a preferred option for managing fractures in large animals (Aithal *et al*., 2004, 2007 and 2010; Singh *et al*., 2007; Toufik *et al*., 2024). This study aimed to evaluate the clinical efficacy of Type-IIA ESF in the treatment of a tibial fracture in an Ongole bull, with a focus on postoperative recovery and functional outcomes.

Fig. 1: Radiograph showing complete small oblique diaphyseal fracture of the tibia

An 18-month-old Ongole bull weighing approximately 250 kg was presented with non-weight-bearing lameness in the left hind limb, 10 days after being involved in an automobile accident. Clinical and radiographic examinations confirmed a complete, small oblique diaphyseal fracture of the tibia with mild displacement of the fracture fragments (Fig. 1). The fracture was managed using a Type-II external skeletal fixator. A light plane of anesthesia was induced using ketamine HCl (2 mg/kg body weight, i.v.) and diazepam (0.2 mg/kg body weight, i.v.), along with anterior epidural analgesia using 8 mL of 2% lignocaine HCl. Stabilization was achieved by applying a Type-II linear ESF, utilizing 11 mm connecting rods, 4 mm centrally threaded pins, and 5 mm AO two-way clamps. A protective bandage was applied postoperatively to prevent contamination.

Immediate postoperative radiographs confirmed proper alignment of the fracture fragments (Fig. 2). The postoperative treatment regimen included intramuscular administration of ceftriaxone (10 mg/kg body weight) and meloxicam (0.5 mg/kg body weight) for five days, along with oral administration of Ostovet syrup (100 mL/day) for 30 days.

The number and type of pins used in this case were consistent with the recommendations of Vogel and Anderson (2014). The use of centrally threaded pins effectively prevented pin migration and loosening of the fixator. However, Palsania *et al*. (2022) reported favourable outcomes in similar cases using smooth Steinmann pins. In the present case, the third transcortical pin was inadvertently placed within the fracture line. This was necessitated by the fracture configuration, as palpation of fascial planes was not feasible due to significant swelling in the affected area. Anderson and St. Jean (2008) noted that identifying fascial planes around the tibia is often challenging due to extensive soft tissue coverage, and that inflammation and fracture-associated haematoma further complicate accurate localization. As a result, transfixation pins are frequently positioned based on the fracture configuration, with necessary adjustments

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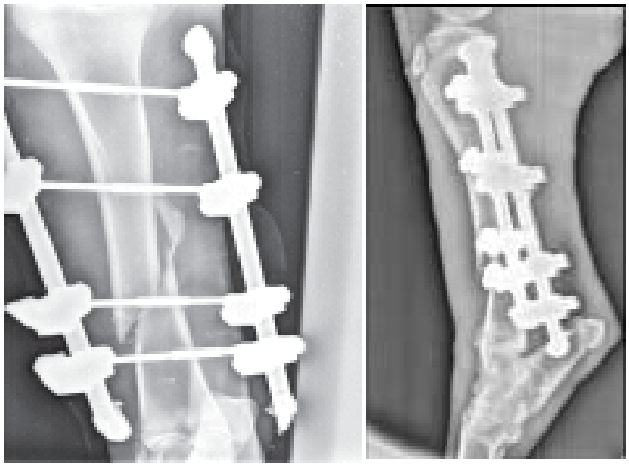

Fig. 2: Immediate postoperative radiographs showing proper

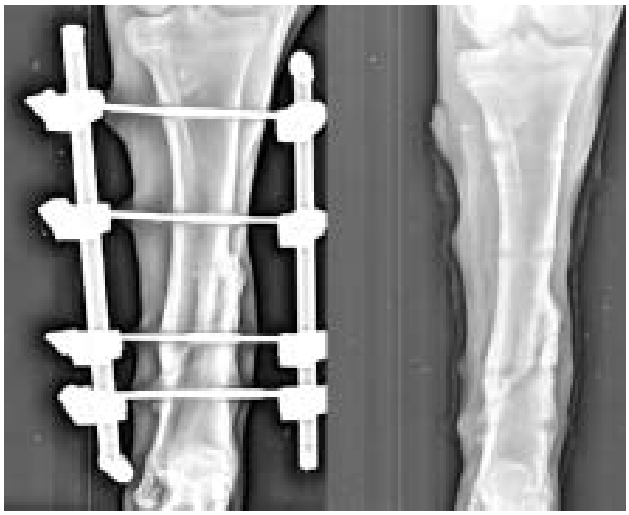

Fig. 3: Radiograph showing bone union at the fracture site on 6th postoperative week.

made to accommodate the surrounding soft tissues. Partial weight-bearing with mild lameness was observed by the third postoperative day. By the third week, clinical union was evident, and radiographs showed progressive healing, including periosteal callus formation and a visible fracture gap. Complete radiographic union was confirmed by the sixth week, at which point the external fixator was removed (Fig. 3), and the bull exhibited normal limb function. No implant-related complications or adverse effects were noted during the six-month follow-up, indicating the success of the ESF technique. Early weight-bearing observed in this case aligns with findings by Palsania *et al*. (2022). This study demonstrated that Type-II ESF provided excellent stability and promoted early limb use, consistent with previous reports (Pattanaik *et al*., 1996). In contrast, mild lameness persisting until fixator removal was reported by Aithal *et al*. (2010), Chourasia *et al*. (2019), and Palsania *et al*. (2022). The absence of postoperative complications further highlights the feasibility of ESF for tibial fracture management in large bovines. Given the economic importance of cattle in rural farming, effective fracture treatment is essential to reduce financial losses and support animal welfare.

The successful management of a tibial fracture in an Ongole bull using Type-IIA external skeletal fixation highlights the effectiveness of this technique in large ruminants. Its favourable biomechanical properties, early return to limb function, and absence of complications make ESF a reliable alternative to conventional fracture management methods.

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