Indian J. Vet. Surg. 46(1): 68-69 June 2025

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Stabilization of horn fracture using cross pinning with ozonated autohaemotherapy in a Kangayam bull

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DOI: 10.5958/0973-9726.2025.00016.8 *Received: March 2025*

The horn fractures happen on account of accidents and aggressive fighting in the field. As horns are of economic and functional importance to bovines, one of the very important factors of veterinary care related to cattle is the stabilization of horn fractures. An incomplete treatment often leads to complications like complete fractures or frontal sinusitis, prompting for dehorning (Sama *et al*., 2016; Patil *et al*., 2017). An incomplete fracture of the horn involving its distal portion heals, if it is properly immobilized. In the present case, as external coaptation was not found suitable, hence after initial stabilization by using cross pinning, additional stability was given by the application of an external skeletal fixator, allowing proper alignment of the fractured fragments. The treatment approach enabled the successful repair of the bone and the preservation of the horn.

A 14-yr-old Kangayam bull was presented with the history of horn fracture due to animal tripping over a rope the day before. Clinical examination revealed over ridding fracture at the base of the left horn, with incomplete separation of horn core along with unilateral epistaxis from the left nostril. Based on the clinical symptoms it was diagnosed as a case of incomplete fracture of left horn (Fig. 1).

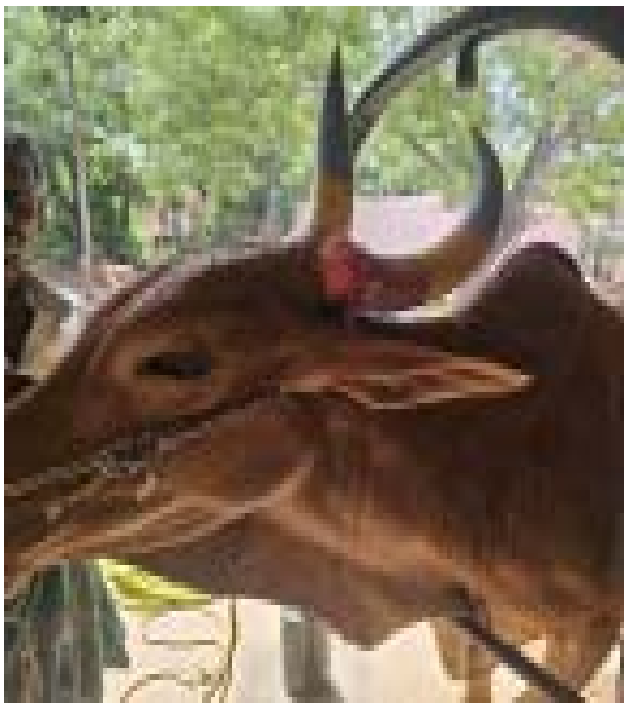

Fig. 1: Open fracture at base of the horn with extensive bleeding and separation of horn sheath.

The bull was sedated with xylazine (6 mg, i.v.), and cornual nerve block was done using 5 mL of 2% lignocaine HCl. The animal was restrainted in standing position. Inj. carbazochrome salicylate (20 mg) was given intramuscularly. The fracture site was cleaned with povidone iodine and aseptically prepared. The overriding part of the horn was trimmed and the fracture fragments were brought into alignment. Cross pinning was done with two 2.5 mm Steinmann pins, drilled from the base of distal fragment to the distal end of the proximal fragment. Externally, the ends of the pins were stabilized with a circular aluminium rod using M-seal. 2 mL blood from the jugular vein was collected in a syringe containing 0.5 mL of EDTA and mixed with ozone gas @ 30 µg/mL with oxygen flow rate of 2 L/min. Ozonated autohaemotherapy was done by injecting it at the fracture site; in addition, a POP cast along with bamboo stick splint was applied in a figure of 8 fashion to stabilize the horns (Fig. 2). Post-fixation, the animal was treated with antibiotic streptopenicillin (10 mg/kg body wt., i.m.) for 5 days, isoflupredone acetate (10 mL, i.m.) and anti-histamine chlorpheniramine maleate (0.2 mg/kg body wt.) for 3 days. Two weeks post-surgery, the stability of the fracture site was obtained, the POP and implants were removed after a month.

Fractures of horn are difficult to immobilize, many materials including metallic splints (Patil *et al*., 2017) and bamboo sticks (Balappanavar, 2005; Lakshmi *et al*., 2013) have been used for the external stabilization of fractured horns with intact skin. In the present case fracture was stabilised with two 2.5 mm Steinmann pins, which are externally stabilized

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Fig. 2: Figure of 8 bandaging with POP and external immobilization at the base of the horn with cross-pinning.

with a circular aluminium rod using M-seal, along with a POP cast. Sama *et al.* (2016) also used combination of wiring and a plaster cast for successful treatment of a unilateral horn fracture in a Kankrej bullock.

Ozone therapy has shown beneficial effects on bone healing in experimental studies of rat skull defects (Bayar and Karsli, 2025). It can elevate levels of biomarkers such as VEGF-A and EGF, which are vital for tissue repair (Yuniati *et al*., 2021). Autohaemotherapy, a primary or adjuvant to the conventional treatment regimens, is highly beneficial in the large and small animal veterinary practice. It promotes healing of tissue by subsiding purulent biodegradation of the soft tissue, improved cell metabolism, potentiated immune system and accelerated restoration of homeostasis with improved blood/lymph circulation (Bhatt *et al*., 2021). Ozonated autohemotherapy has emerged as a promising approach for enhancing wound and fracture healing, particularly in cases of horn fracture wounds. This therapy increases the therapeutic properties of ozone, which include anti-inflammatory, analgesic, and antioxidant effects, thereby promoting tissue regeneration and healing. Ozone therapy improves tissue oxygenation and accelerates glucose metabolism, which is crucial for healing (Akkawi, 2020).

This case report highlights a practical and effective approach to manage horn fractures in bullocks, by using cross pinning with circular wire external fixator in combination with ozonated autohaemotherapy, which can allow complete union of the fracture without complications, ensuring a fast recovery and early return to work.

Acknowledgement

The authors are thankful to the Dean, Rajiv Gandhi Institute of Veterinary Education and Research, Puducherry, for the facilities provided to conduct this study.

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