SURGICAL STABILIZATION OF MANDIBULAR FRACTURE IN A FREE-RANGING STRIPED HYENA (*Hyaena hyaena*): A CLINICAL CASE REPORT

Ilayaraja, S.[1*], Adhithyan, N.K.[2], Sha, A.A.[3], Maharana, S.S.[4] and Baijuraj, M.V.[5]

[1,2,3,4,5] *Agra Bear Rescue Facility, Wildlife SOS, Agra, Uttar Pradesh, India*
***Corresponding author**: ilasuvet@gmail.com*

Abstract
Mandibular fractures in wild carnivores present significant clinical challenges due to constraints in safe restraint, surgical stabilization, and post-operative management. This report describes the successful management of a mandibular fracture in a free-ranging striped hyena (Hyaena hyaena) rescued following a human–wildlife conflict incident. An adult female hyena presented with severe facial swelling, mandibular instability, impaired vision, and inability to feed. Radiographic evaluation confirmed a mandibular fracture and symphysis. Surgical stabilization was achieved using cerclage wire fixation under general anaesthesia. Post-operative care included antimicrobial therapy, anti-inflammatory medication, nutritional support, wound management, and photo-biomodulation therapy. The animal was maintained on a soft diet to minimize masticatory stress. Voluntary feeding resumed by 11 weeks, and radiographic union was confirmed at 12 weeks, following which the fixation material was removed. This case highlights the effectiveness of orthopedic wire fixation combined with structured post-operative care in achieving functional recovery in mandibular fractures of wild carnivores.

Keywords: *Striped hyena, mandibular fracture, orthopedic wire fixation, human–wildlife conflict*

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INTRODUCTION

The striped hyena (*Hyaena hyaena;* Linnaeus, 1758) is a medium-sized carnivore distributed across north eastern Africa, Arabian Peninsula, Central Asia, and the Indian subcontinent [1]. In India, it occupies dry deciduous forests, scrublands, rocky terrains, and semi-arid ecosystems, functioning primarily as an ecological scavenger. By removing carrion, the species contributes significantly to ecosystem sanitation and disease control [2,3].Despite its ecological importance, the striped hyena faces multiple conservation threats including habitat degradation, vehicular trauma, poisoning, illegal trade, and increasing human–wildlife conflict [1,4,5]. In India, the species is listed as near threatened in the IUCN Red List and is protected under Schedule I of the Wildlife (Protection) Act, 1972 [1]. The expansion of human settlements and access to anthropogenic food sources frequently bring hyenas into proximity with human habitation, elevating the risk of injury [1,6–8]. Traumatic injuries, particularly fractures, are commonly encountered in rescued wild carnivores [9]. Mandibular fractures are especially critical due to their direct impact on feeding, prehension, and survival. Successful management requires accurate diagnosis, stable fixation, and meticulous post-operative care [10].Although various techniques such as interfragmentary wiring, external fixation, and bone plating are described, published reports on mandibular fracture management in striped hyenas remain limited [11–13]. The present report documents the clinical management and outcome of such a case, providing practical insights for wildlife veterinarians.

MATERIALS AND METHODS

Case presentation

An adult female striped hyena (approximately 22 kg) involved in a human–wildlife conflict was rescued by the Wildlife SOS rapid response unit under the direction of the Uttar Pradesh Forest Department and transported to the Agra Bear Rescue Facility. Clinical examination revealed dehydration, severe facial swelling, head trauma, impaired vision, and mandibular instability ("dropped mandible"), with complete anorexia (Fig. 1a).

Surgical intervention

Radiographic examination confirmed a mandibular fracture and symphysis. General anaesthesia was induced using Xylazine (1 mg/kg IM) and Ketamine (7 mg/kg IM), and maintained with isoflurane inhalation. The surgical approach was adapted from the technique described by Denny and Butterworth (2000)[14]. Following aseptic preparation, trans-osseous tunnels were created adjacent to the fracture line (Fig. 2) using a low-speed drill with continuous saline irrigation. Stabilization was achieved using 16 SWG cerclage wire, applied perpendicular to the fracture line (Fig. 1c). Additional stabilization included, circumferential suture caudal to canine teeth to correct symphyseal separation, and figure-of-eight wiring around lower canines to maintain occlusal alignment (Fig. 1c).

Post-operative care

Post-operative management included antimicrobial therapy, analgesia, and supportive care to facilitate healing and prevent complications. The hyena was administered with Inj. Amikacin @ 10 mg/kg IM for seven days. Analgesic and anti-inflammatory management was provided using Inj. Meloxicam @ 0.2 mg/kg IM for five days, along with vitamin B-complex injections for five days. Local wound care was performed using antiseptic irrigation. Photo-biomodulation therapy was employed to enhance tissue healing and reduce inflammation (Fig. 1d). Supportive oral therapy included Tab. Rutoheal @ 1 tablet PO SID for 60 days, Tab. Cefuroxime @ 20mg/kg BW PO BID for 10 days, Syp. Hemobest trio @ 6 ml PO BID for 45 days, Syp. Hunger plus @ 10 ml PO TID for 15 days, Syp. Orcalmin forte @ 10 ml PO BID for 90 days, Syp. Salmocoat @ 10 ml PO SID for 60 days, and Syp. Sharcoferol pet @ 10 g PO SID for 45 days to support recovery, improve nutritional status, and promote bone healing. Assisted dietary management was performed to minimize mechanical stress on the mandible during recovery. The hyena was initially maintained liquid diet (chicken broth) for 5 weeks, followed by soft diet (boiled chicken) for 4 weeks (Fig. 1e). Raw chicken was gradually introduced thereafter once sufficient mandibular stability was achieved.

RESULTS AND DISCUSSION

Hematological findings indicated anemia (Table 1), evidenced by reduced RBC count and hemoglobin levels. Progressive clinical improvement was observed throughout recovery. Initial anorexia gradually resolved as mandibular stability improved. Voluntary feeding resumed by week 11, indicating functional recovery. Radiographic evaluation at week 12 confirmed satisfactory fracture union (Fig. 2c), following which the fixation material was removed. Mandibular fractures in carnivores are typically associated with high-impact trauma and may result in complications such as malocclusion, infection, or delayed healing. Stable fixation is critical to restore occlusion and masticatory function. Cerclage wiring provides a minimally invasive and effective stabilization technique, particularly in wildlife cases where advanced fixation methods may not be feasible. This case demonstrates that appropriate surgical stabilization combined with intensive post-operative care can result in successful outcomes even in challenging wildlife scenarios.

CONCLUSION

Management of orthopedic injuries in wildlife presents unique clinical challenges. This case report demonstrates that mandibular fractures in striped hyenas can be successfully managed using cerclage wire fixation supported by comprehensive post-operative care. Early diagnosis, appropriate surgical intervention, and structured rehabilitation are critical for achieving favourable clinical outcomes. The findings provide practical guidance for veterinarians involved in wildlife rescue and rehabilitation.

Table 1: Hematobiochemical values in rescued *H. hyaena*

Measurand (unit)	**Result**
White blood count (/L)	1.7×10^{9}
Red blood count (/L)	0.3×10^{12}
Hemoglobin (g/L)	6
Packed cell volume (%)	2.2
Mean corpuscular volume (fL)	69.2
Mean corpuscular hemoglobin (pg)	18.7
Mean corpuscular hemoglobin concentration (g/L)	272
Red cell distribution width (%)	15
Platelet count (/L)	63×10^{9}
Mean platelet volume (fL)	8.6
Glucose (mg/dL)	93
Creatinine (mg/dL)	1.3
Blood urea nitrogen (mg/dL)	25
Total protein (g/dL)	5.8
Albumin (g/dL)	2.1
Globulin (g/dL)	3.7
Alanine transaminase (U/L)	167
Aspartate aminotransferase (U/L)	711
Alkaline phosphatase (U/L)	44
Gamma-glutamyl transferase (U/L)	4
Total bilirubin (mg/dL)	<0.1
Bile acids (µmol/L)	8.6

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Figure 1. Management of mandibular fracture. Critically injured *H. hyaena* (a), mandibular fracture indicated by white arrows (b), surgical stabilization using cerclage wire and non-absorbable suture marked with white arrows (c), photobiomodulation therapy to alleviate pain and enhance healing (d), assisted feeding with boiled chicken to minimize mechanical stress (e), and post-recovery condition (f).

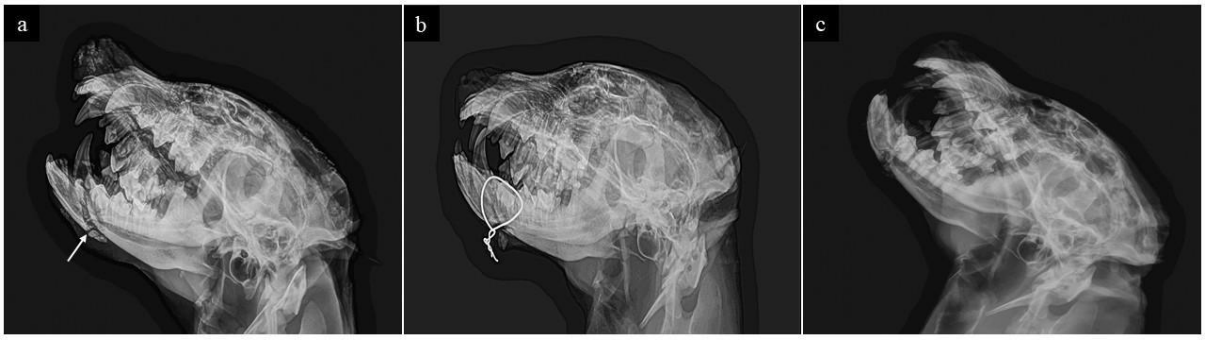

Figure 2. Lateral radiographs of the skull showing the left mandibular fracture indicated by a white arrow (a), fixation using 16 SWG wire placed perpendicular to the fracture line (b), and restoration of occlusion at 12 weeks (c).