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**CLINICAL ARTICLE**

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# Surgical management of symphyseal and bilateral rostral compound mandibular fractures using a novel interdental hemi-cerclage wiring technique in a mongrel dog

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Mandibular fractures account for 1.2-2.7 % of all the fractures in dogs (Okrasinski *et al*., 1991) and are frequently encountered in an urban veterinary establishment. They are most commonly associated with road traffic accidents. A variety of methods such as intramedullary pinning, trans-fixation pinning, plate and screw fixation and external skeletal fixation can be employed for the management of such cases (Owen *et al*., 2004). Mandibular or maxillary fractures can result in life threatening conditions (Boudrieau and Kudisch, 1996) if not managed at the earliest, as there is inability of the animal to eat or drink, along with fluid and electrolyte loss (Kataria *et al*., 2013)

An 8-month-old mongrel dog weighing 10.29 kg was presented with clinical signs of haemorrhage originating from the mandible. According to the history, the animal had been involved in an automobile accident about 4-5 hr prior to presentation. On clinical examination, the patient was diagnosed with a compound mandibular fracture. There was a noticeable downward deviation of the horizontal rami, accompanied by the presence of blood clots in the oral cavity. The animal was unable to consume solid food or water and exhibited pain on manipulation of the fractured mandibular segments. Vital parameters, including body temperature, heart rate, and respiratory rate, were within normal physiological limits.

Following initial stabilization with intravenous fluid therapy using Ringer's lactate and normal saline, along with haemocoagulants, the animal was administered antibiotics (ceftriaxone 20 mg/kg body weight, i.v.) and a non-steroidal anti-inflammatory drug (meloxicam 0.2 mg/kg, s.c.). Once stabilized, the animal was subjected to radiographic evaluation. Sedation was achieved using diazepam (0.1 mg/kg, i.v.) to facilitate the procedure. Radiographic findings revealed a bilateral compound fracture of the horizontal rami involving the mandibular symphysis (Fig. 1).

For surgical fixation, the animal was premedicated with atropine sulphate (0.04 mg/kg body weight, s.c.), followed 15 min later by xylazine HCl (1 mg/kg). General anaesthesia was induced using ketamine HCl (5 mg/kg) and diazepam (0.2 mg/kg), along with butorphanol tartrate (0.2 mg/kg) administered intravenously. Anaesthetic maintenance was achieved with intermittent boluses of ketamine and diazepam in a 1:1 ratio, administered intravenously as required to effect. An endotracheal tube was placed and the cuff was fully inflated to secure the airway. The oral cavity was thoroughly flushed with 0.5% povidone-iodine solution to reduce microbial contamination prior to the surgical procedure.

The fractured mandibular segments were reduced and aligned anatomically. A 1.5 mm K-wire, attached to a low-speed drill, was used to create pilot holes caudal to the canine tooth roots on both sides of the mandible, slightly ventral to the roots of the second premolar teeth.

A 20-G stainless steel wire was then passed through the predrilled hole caudal to the canine tooth and anchored posterior to the second premolar. Subsequently, the wire was redirected through the ventral hole near the second premolar and anchored cranial to the canine tooth. The wire ends were tightened using a wire tightener, applying controlled abductive traction to achieve stable fixation. To achieve apposition of the mandibular symphysis, an 18-G hypodermic needle was used to create a subcutaneous tunnel along the ventral aspect of the symphysis following a small skin incision at the planned exit point of the wire. Interdental cerclage wiring was then performed (Fig. 2A). The cut ends of the wire were bent inward to prevent injury to the oral mucosa, and the ventral loop was embedded within the skin fold to minimize irritation.

**Fig. 1:** Preoperative lateral radiograph of the animal showing bilateral horizontal rami fracture.

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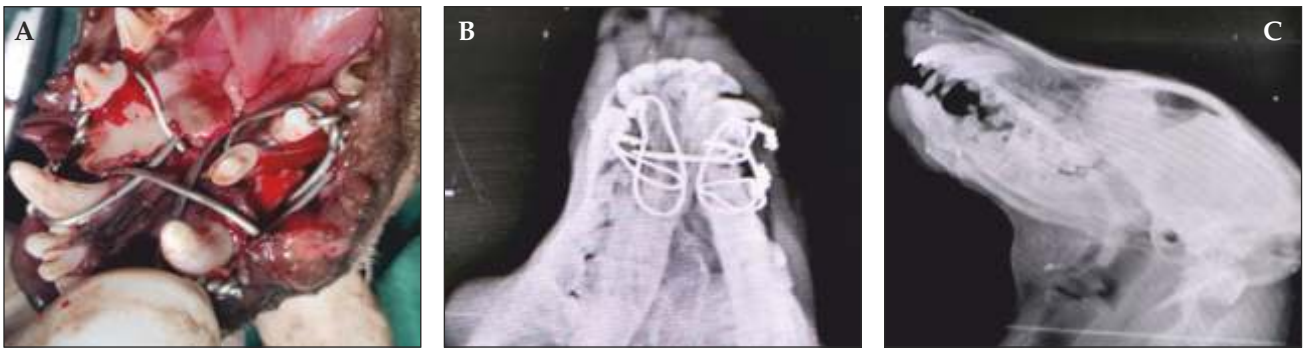


**Fig. 2:** (A) Interdental wiring and anchoring of the wire caudal to 2nd premolar and cranial to canine tooth along with symphysial cerclage wiring; (B) Postoperative radiography of the animal on day 28 with interdental wires; (C) Postoperative presentation of the animal on day 56 after removal of interdental wires and bone union.

Postoperatively, the animal was maintained on a strict liquid diet, and tape muzzle support was applied to prevent displacement of the reduced fracture fragments. The patient was managed with intravenous fluid therapy for up to 5 days, along with antibiotic ceftriaxone (20 mg/kg, i.v.) and analgesic meloxicam (0.2 mg/kg, s.c.) administered for 7 days.

The animal was subjected to radiographic evaluation to assess fracture healing on day 28 (Fig. 2B) and day 56 (Fig. 2C) postoperatively. Slight shortening of the mandible was observed immediately after surgery. However, owing to the growing nature of the animal, by the 8th week post-surgery, the occlusal surfaces of the maxillary and mandibular teeth were found to be in proper apposition.

Complications such as wire loosening, tooth loss, osteomyelitis, and sequestration have been reported in dogs with a prevalence rate of 34% (Sumnersmith and Dingwall, 1971); however, none of these complications were observed in the present case. The wires were removed on the 56th postoperative day. Following implant removal, the animal resumed normal feeding and water intake without any observable complications.

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