

Surgical treatment of a mandibular symphyseal fracture in a calf using a continuous wire-loop technique: a case report

R. YAYGINGUL*, N. KILIC, B. KIBAR

Faculty of Veterinary Medicine, Adnan Menderes University, Aydin, Turkey

*Corresponding author: ryayingul@adu.edu.tr

ABSTRACT: In this case report, we describe the clinical and radiological features of a calf mandibular symphyseal fracture and evaluate the treatment results. A 1.5-month-old male Holstein weighing 65 kg was presented to the Surgery Clinic, Faculty of Veterinary Medicine, Adnan Menderes University with a history of salivation and anorexia for three days. After clinical and radiographic assessments, a mandibular symphyseal fracture was determined. Stabilisation of the fracture region was achieved using cerclage wire with a continuous wire-loop technique under general anaesthesia. The cerclage wire was removed five weeks post-surgery. The calf was clinically healthy.

Keywords: cow; bovine; lower jaw; cerclage wire

Mandibular fractures in calves are rarely reported (Ducharme 2004; Rasekh et al. 2011). Severe contusions, traffic accidents and the use of snare for forced extraction of foetuses can cause mandible fractures (Dirksen 1978; Turner 1984; Nuss et al. 1991). Mandibular fractures usually occur in a unilateral form, but can also occur bilaterally. Fractures may occur in the symphysis, corpus and ramus of the mandible, and in the processus condylaris, which forms the temporomandibular joint (Dirksen 1978; Turner 1984; Fessler and Adams 1996). The fracture can be open or closed. In some animals, fractures may be associated with the dental alveolus and the loss of milk teeth. The most common symptoms of mandibular fractures are the dislocation of the lower jaw, increased salivation, difficulty feeding, food trapped between teeth and putrid breath. A detailed intraoral examination should be performed in any animal presenting such symptoms (Trent and Ferguson 1985). The aim of the current study was to treat a symphysis mandibular fracture in a 1.5-month-old calf using the continuous wire-loop technique and to use the results to incorporate this procedure into professional practice.

Case description

The subject was a 1.5-month-old Holstein calf admitted to the Surgery Clinic in the Faculty of Veterinary Medicine at Adnan Menderes University with a history of salivation and anorexia for three days. Clinical examination suggested normal rectal temperature (38.8 °C), respiratory rate (38 breaths/min) and heart rate (80 beats/min). Body weight was recorded to be 65 kg. Haematology and the biochemical profile were normal. Upon inspection of the oral cavity, a wound was observed in the area of the mandibular symphysis. Crepitation and instability were found on palpation of the mandibular symphysis. Radiographs were taken and a mandibular symphyseal fracture was detected following clinical and radiographic examination (Figure 1). The patient was then prepared for surgery. Following a 24-h fast; anaesthesia was induced with 4 mg/kg of propofol administered intravenously. The animal was intubated and the cuff inflated. Anaesthesia was maintained with oxygen and isoflurane at a maintenance level of 3.0%. The oral cavity was washed and cleaned properly with diluted povidone-iodine. The fracture was fixed externally with a cerclage

<https://doi.org/10.17221/119/2017-VETMED>



Figure 1. Preoperative radiographic view

wire placed around the base of the incisors, using the interdental continuous wire-loop technique described by Obwegeser (1952). Wire loops were inserted between the bases of each tooth from the lingual to the labial side. The long end of the wire was then inserted through each loop on the labial side (Figures 2A and 2B). Finally, the wire ends and each loop were gently tightened until the symphyseal fracture fragments were stabilised. The wire was made from surgical steel and had a diameter of 1.5 mm. The operation was followed by postoperative radiography (Figures 3A and 3B). The oral cavity was sterilised using a 3% glycerine-iodine solution (Ulkem Gliserin Iode, Ankara, Turkey). Sodium ceftiofur (Excenel[®]-Pfizer, 1 mg/kg/day intramuscular) was administered for seven days post-operatively and flunixin meglumine (Fulimed[®]-Alke, 2.2 mg/kg *i.m.*) analgesic for three days post-operatively.

Milk feeding was recommended for 10–15 days post-operatively. The cerclage of the patient was removed after five weeks by a local veterinarian.

DISCUSSION AND CONCLUSIONS

The main goals of mandibular fracture treatment are to provide anatomical reduction and rigid fixation, perform a correct occlusion and restore chewing functions. The treatment also aims to prevent excessive operative trauma in soft tissues and damage to teeth and neurovascular structures when using implants (DeBowes 1996; Beard 2009). The different techniques used to repair symphysis mandibular fractures include external fixators, using either Steinmann pins or clamps, internal fixation, using screws administered in lag fashion and use of cerclage wires (Nuss et al. 1991; Lischer et al. 1997; Johnson and Hulse 2002; Ducharme 2004; Harasen 2008; Middha et al. 2015).

The advantages of a cerclage fixation technique are easy application, no requirement for special surgical equipment, low implant cost, no damage to tooth roots and no penetration into the medullar canal, which creates minimal trauma in the mandible (Ducharme 2004; Taguchi and Hyakutake 2012).

In the present case report, stabilisation of the fracture region was carried out using cerclage wire with a continuous wire-loop technique (diameter 1.5 mm). A continuous wire-loop technique is usually adequate for repair of symphysis mandibular fractures. Postoperatively, liquid diets for the first 10–15 days, then soft food feeding, were recommended. It was reported that the healing process

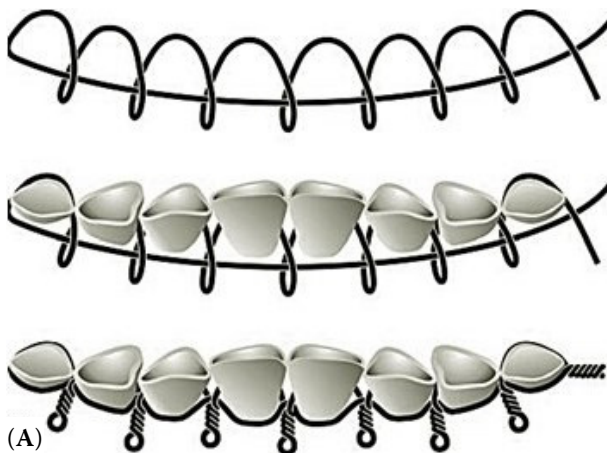


Figure 2. (A) Interdental continuous wire-loop technique (Rasekh et al. 2011), (B) intraoperative view

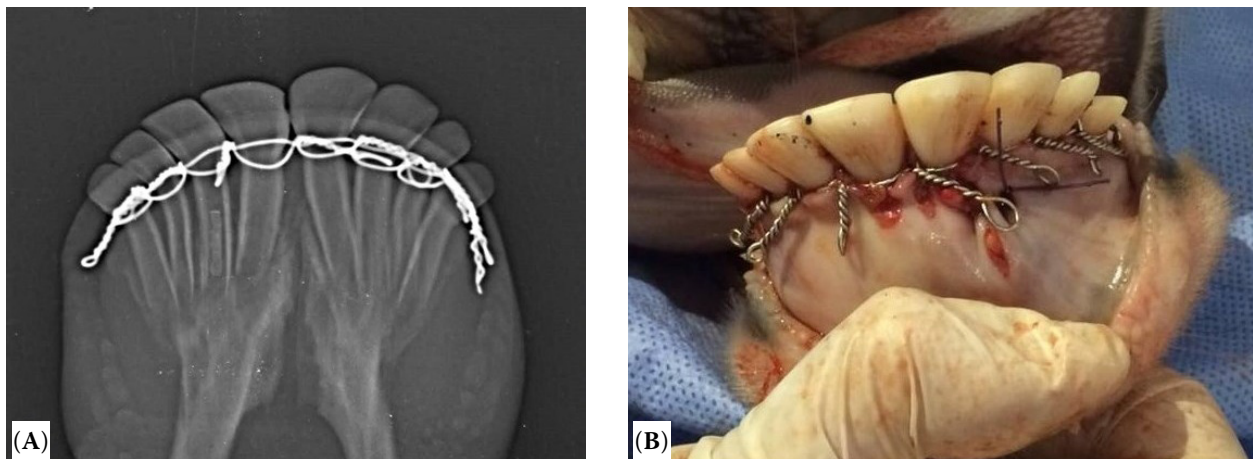


Figure 3. (A) Postoperative radiographic view, (B) postoperative view

in mandibular fractures may take up to three to six weeks, while cerclage wires used in mandibular symphysis fractures can be removed after six to eight weeks (Dirksen 1978). In the present study, the cerclage wire was removed five weeks post-surgery. The most common postoperative complications reported are implant loosening, osteomyelitis, sequestration and tooth abscess and gingivitis (Turner 1984; Fessler and Adams 1996; Ducharme 2004; Rasekh et al. 2011). In our case, no postoperative complications were observed.

In conclusion, the continuous wire-loop technique can be applied quickly and easily, and is a low-cost atraumatic procedure that provides sufficient stabilisation for bone healing. This case report describes the successful surgical treatment of a mandibular symphysis fracture using cerclage wires with the continuous wire-loop technique in a calf.

REFERENCES

- Beard W (2009): Fracture repair techniques for the equine mandible and maxilla. *Equine Veterinary Education* 21, 352–357.
- DeBowes RM (1996): Fractures of the mandible and maxilla. In: Nixon AJ (ed.): *Equine Fracture Repair*. Saunders, Philadelphia. 323–335.
- Dirksen G (1978): Disease of the digestive system. In: Rosenberger G (ed.): *Disease of the Bovine*. Verlag Paul Parey, Berlin. 190–192.
- Ducharme NG (2004): Surgical diseases of the oral cavity. In: Fubini SL, Ducharme NG (eds): *Farm Animal Surgery*. Saunders, Philadelphia. 161–175.
- Fessler JF, Adams SB (1996): Decision making in ruminant orthopedics. *Veterinary Clinics of North America: Food Animal Practice* 12, 1–18.
- Harasen G (2008): Maxillary and mandibular fractures. *Canadian Veterinary Journal* 49, 819.
- Johnson AL, Hulse DA (2002): Maxillary and mandibular fractures. In: Fossum TW (ed.): *Small Animal Surgery*. 2nd edn. Mosby. 901–913.
- Lischer CJ, Fluri E, Auer JA (1997): Stabilisation of a mandibular fracture in a cow by means of a pinless external fixator. *Veterinary Record* 140, 226–229.
- Middha A, Gahlot TK, Kachwaha K, Tanwar M, Gahlot M (2015): Interdental wiring technique for mandibular fracture in a buffalo—a case report. *Veterinary Practitioner* 16, 136.
- Nuss K, Kostlin R, Elma E, Matis U (1991): Mandibular fractures in cattle—treatment and results. *Tierärztliche Praxis* 19, 27–33.
- Obwegeser HA (1952): Simple method of off-hand wiring of jaw fractures. *Oesterreichische Zeitschrift fuer Stomatologie* 49, 652–670.
- Rasekh M, Devaux D, Becker J, Steiner A (2011): Surgical fixation of symphyseal fracture of the mandible in a cow using cerclage wire. *Veterinary Record* 169, 252.
- Taguchi K, Hyakutake K (2012): External coaptation of rostral mandibular fractures in calves. *Veterinary Record* 170, 598.
- Trent AM, Ferguson JG (1985): Bovine mandibular fractures. *Canadian Veterinary Journal* 26, 396–399.
- Turner AS (1984): Large animal orthopedics. In: Jennings PB (ed.): *The Practice of Large Animal Surgery*. 2nd edn. Saunders, Philadelphia. 768–949.

Received: September 14, 2017

Accepted after corrections: March 25, 2018