

MANAGEMENT OF ATYPICAL MANDIBULAR FRACTURES BY CERCLAGE AND STANDARD INTERDENTAL WIRING TECHNIQUE IN THE DROMEDARY CAMEL (A REPORT OF FOUR CASES)

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ABSTRACT

Four cases of atypical mandibular fractures in the dromedary camel were treated by Cerclage and standard interdental wiring technique. All the animals had an uneventful recovery except development of submandibular abscess in one animal. No slipping or loosening of the fixation wires was noted in any case and all the fractures healed at variable time intervals ranging from 2.5 to 3 months period.

Key words: Atypical mandibular fracture, cerclage wiring, interdental wiring

Typical mandibular fractures in the camel occur across first premolars and are usually bilateral, transverse and compound in nature. High incidence of these fractures is reported in the intact male camels in the breeding or rut season due to fights and biting resulting in undue stress over the bone with consequent fracture at the usual site. Presence of mental canal and alveoli of the first premolars render this part of the bone quite weak and prone to easy fracture. Fractures elsewhere in the bone may be called atypical mandibular fractures and generally result due to road side accidents, blow against a fixed object or falling during a race. The typical mandibular fractures can be successfully immobilised by the standard interdental wiring technique using 1.0 mm stainless steel, copper or silver wire (Gahlot *et al*, 1984; Gahlot and Chouhan, 1992), whereas atypical fractures may require other techniques such as bone plating (Kumar *et al*, 1979) and transfixation pins along with plaster of Paris bandage (Bhatia *et al*, 1978). A modification in the standard technique by passing the lateral limbs of the wires through the spaces in between the corner, lateral and central incisor teeth prevents downward slipping of the lateral limbs of the wires and ventral deviation of the cranial fracture fragment (Siddiqui *et al*, 2012). A field oriented technique using Plaster of Paris bandage with wooden splints to treat these fractures has also been described (Lavania, 1998). Accelerative effect of feeding of fenugreek seeds on the healing of mandibular fractures in the male dromedary camels

has been monitored by Bone Biomarkers (Sobayil, 2008). The mandibular fractures are less common in the females (Gahlot, 1990; Tyagi and Singh, 1993 and Ahmed, 2011) and when occur, are usually a result of falling, blow by a solid object, violent hitting of the head against the fence and trauma in the young animals (Zamos *et al*, 1992, Tyagi and Singh, 1993; Ahmed and Sobayil, 2012). Avulsion fractures of the mandible in the equines are usually the result of kicks by another horse or self inflicted trauma against a fixed object (Henninger and Beard, 1997). Fractures of the mandibular symphysis and vertical ramus are rare in the camel due to protection by the masseter and pterygoid muscles (Tyagi and Singh, 1993), but these are the common fracture sites in the cattle (Rasekh *et al*, 2011). The present case reports provide information about successful management of avulsed incisor teeth by standard interdental wiring technique and treatment of fractures of the rostral part of the mandible and separation of the mandibular symphysis by cerclage wires with slight modification of the technique described for the horses (Henninger and Beard, 1997 and Beard, 2009) and cattle (Rasekh *et al*, 2011).

Materials and Methods

Case No. 1:

An eleven year old female camel with the lower jaw hanging on one side and drooling of blood mixed

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saliva was presented in surgery section of Central Veterinary Hospital, Al-Qattara, Al-Ain, United Arab Emirates. The camel got injury while trying to pull her head trapped in the front leg rope (hobble). The animal had temperature within normal limits, was alert, bright and without any signs of stress. Examination of the oral cavity revealed fracture line running from in between the central incisors along the course of symphysis dividing the mandible into right and left equal halves, depicting fracture of the mandibular symphysis (Fig 1).

Case No. 2:

A seven year old female was brought to the surgery section of Central Veterinary Hospital, Al-Qattara, Al-ain, United Arab Emirates 8 days post-injury with the complaint that the animal was completely off feed. History revealed that the animal suffered from a head injury as a result of stumbling and falling on the ground while running. At the time of presentation, the animal was dull and anorectic with a rectal temperature of 41.5°C. The examination of the oral cavity revealed fracture line running obliquely caudal from in between the left central and lateral incisor to the mid symphysis (Fig 2). The oral cavity had foul smell with necrotic debris.

Case No. 3:

A three and a half year old dromedary heifer was brought to the Surgery Section of Central Veterinary Hospital, Al-Wathba, Abu Dhabi, United Arab Emirates. According to history, the animal fell down during a racing exercise and suffered from avulsion of the central incisors with loss of left lateral incisor. At the time of presentation, the avulsed central incisors were hanging down attached only with the soft tissue of the gums (Fig 3).

Case No. 4:

A three year old dromedary heifer suffering from fracture of the mandible; treated by a quack with a tight bandage wound around both the jaws, was presented for treatment in Surgery Section of Central Veterinary Hospital, Al-Wathba, Abu Dhabi, United Arab Emirates 28 days after the accident. The animal was being maintained on oral liquids (milk and water) given through the right or left commissure caudal to the bandage. Hence, the health of the animal was deteriorating with the passage of time and she was in a miserable condition with a very foul smell from the oral cavity at the time of examination. Removal of the bandage revealed fracture of rostral part of the mandible with the fracture line running from caudal

border of the left canine tooth to the interdental space between the right central and lateral incisor (Fig 4).

Control and Anaesthesia

Animals were restrained in the sternal recumbency and were deeply sedated with Xylazine Hydrochloride and Ketamine Hydrochloride, each at the dose rate of 0.4mg per kilogram of body weight given intravenously. Both the drugs were mixed in the same syringe. The fracture sites in all the animals were cleaned and debrided as needed.

Operative Steps:

Case No. 1:

The fracture was manually reduced and a 14 gauge needle was passed between the left central and lateral incisor through the gum line and 1.0mm diameter stainless steel orthopaedic wire was threaded through its lumen and the needle was withdrawn. The other end of the wire was passed through the space between the right central and lateral incisor tooth. The ends of the wire were twisted on one another; the twisted end was cut about 1 cm away from the base and bent upwards. Another wire of 0.7mm diameter was anchored around corner incisors of both sides as an overlapping wire in a figure of '8' pattern which also passed through spaces between the other incisors (Fig 5). A notch was created with a small file at the caudal bases of both the right and left corner incisors to prevent slipping of the wires. The wire was kept tight and any kinks in it were avoided during the procedure. The repair was completed by twisting the wire ends on one another.

Case No. 2:

Stainless steel orthopaedic wire with a diameter of 1.0 mm was anchored between the left lateral and right corner incisor. Another wire of 0.7 mm diameter was woven through left and right corner incisors in a figure of '8' fashion which also passed through the interdental spaces between all the incisors. An additional wire of 1.0 mm diameter was anchored between first premolar and central incisor on the right side to avoid deviation of the mandible towards the left side (Fig 6).

Case No. 3:

The avulsed teeth were replaced in their original position and securely fixed with the standard interdental wiring technique using 1.0 mm diameter stainless steel orthopaedic wire. The injured soft tissues were sutured with USP1 Polyglycolic acid suture material (Fig 7).



Fig 1. Fracture through the mandibular symphysis separating the right and left halves of the bone.



Fig 2. Fracture of the rostral part of the mandible from left central and lateral incisor to mid-symphysis

Case No. 4:

As the fracture was old, a thorough but careful debridement of the fracture line was done to get proper alignment of the fracture fragments. The fracture was reduced and a 0.9 mm diameter stainless steel interdental wire was passed on the left side to stabilise the fracture. Some movement at the fracture site was still noticed and therefore, an additional support was given by passing a cerclage wire of the



Fig 3. Avulsion of the central incisors with loss of left lateral incisor.



Fig 4. Fracture of the rostral part of the mandible from caudal border of the left canine tooth to interdental space between the right central and lateral incisor tooth.

same size from the right canine tooth to the left lateral incisor (Fig 8). A small notch at the cranial and caudal base of the right canine tooth was made with a small file to avoid slipping of the wire.

Postoperative Care

Oral cavity was daily flushed by standard aqueous solution of Potassium Permanganate for 5 days. All the animals were given streptopenicillin (pen-strep Norbrook, UK) injection intramuscularly at the dose rate of 1ml / 20 Kg of body weight for a period of one week along with intravenous injection of Phenylarthrite (Vetequinol) at the dose rate of 1ml / 44 Kg of body weight for 5 days. The owners were advised to give soft food (wheat gruel mixed with seedless dates) to the animals for the first two weeks and then gradually shift to semisolid and normal food (dry roughages). The fixation wires were removed at different time intervals in different animals on the basis of clinical evidence of fracture healing which ranged between 2.5 to 3 months.

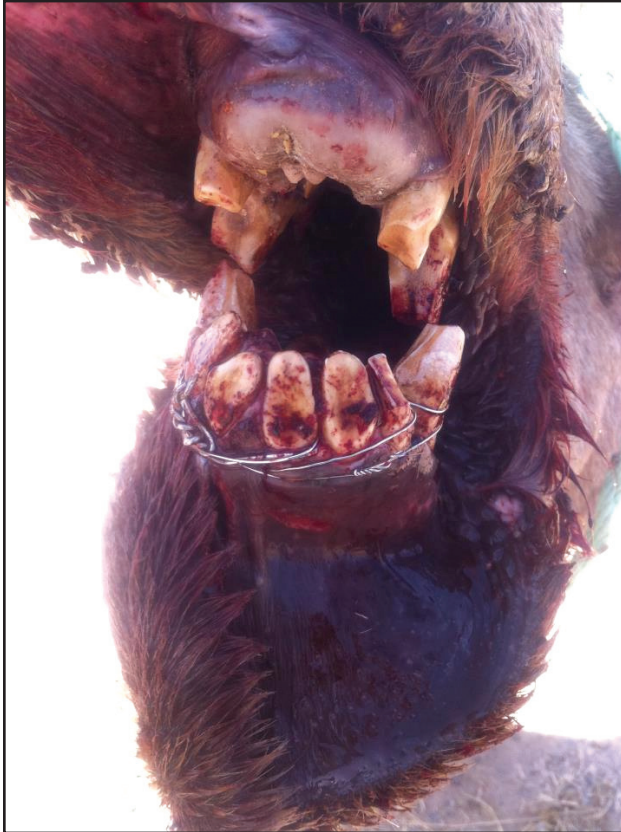


Fig 5. Fixation of the mandibular symphysis fracture by double cerclage wiring.



Fig 6. Fixation of fracture in Fig 2 by double cerclage and standard interdental wiring technique.



Fig 7. Fixation of avulsed central incisors by standard interdental wiring technique.

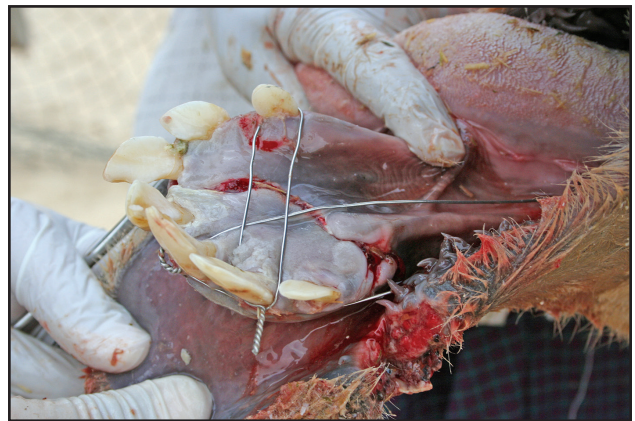


Fig 8. Fixation of fracture in Fig 4 by a combination of standard interdental and cerclage wiring technique.

Results and Discussion

The present case reports describe fixation of atypical mandibular fractures with Cerclage and standard interdental wiring techniques which are quite inexpensive and do not require specialised skills and equipments. The incidences of such type of fractures are rare and these are generally caused by trauma or road side accidents. Various techniques such as interdental wiring (Gahlot *et al*,1984), bone

plating (Kumar *et al*, 1979), transfixation pins along with Plaster of Paris bandage (Bhatia *et al*, 1978; Gahlot and Chouhan, 1992) and plaster of Paris bandage with wooden splints (Lavania, 1998) have been described for the repair of typical mandibular fractures in the camel. In the present report, single or multiple Cerclage wires were used to immobilise the fractures that do not fall in the conventional category as also suggested by Henninger and Beard (1997) while treating fractures involving the incisor teeth and the associated alveolar bone in the equines.

None of the cases had a complication of instability of the fracture fragments due to loosening or slipping of the fixation wires during the postoperative period, as the wires passed through the interdental spaces of the incisor teeth. Hence, repeated readjustment of the wires was not needed as reported in the modified interdental wiring technique (Siddiqui *et al*, 2012). There was development of sub-mandibular abscess in case No. 1 and a purulent

draining tract in case No. 2. These complications have been documented due to embedding of the wires in the soft tissues of the oral cavity (Gahlot and Chouhan, 1992). Accelerative effect of feeding of fenugreek seeds on fracture healing was noted (Sobayil, 2008); however, in the present study the healing period ranged between 2.5 to 3 months and there were no complaints of digestive disturbances or health deterioration in any of the animals due to a change in the feed regimen in the postoperative period as also documented by Lavania (1998). The benefits of double Cerclage wiring as suggested by Henninger and Beard (1997) and Beard (2009) were reproduced in the presented study.

All the animals recovered uneventfully. Therefore, in our opinion, most if not all; atypical mandibular fractures in the rostral part of the bone can be successfully managed with Cerclage wires with or without being supplemented by the standard interdental wiring technique.

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