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Modified Interdental Wiring Technique for Mandibular Fractures in Camels: A Clinical Study

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ABSTRACT

Typical mandibular fractures in camels are normally the result of camel bites and usually occur across the first premolars. Majority of these fractures are bilateral, compound and transverse in nature and can routinely be immobilized with the standard inter-dental wiring technique. However, it has been observed that at variable time intervals in the postoperative period, the lateral limbs of the wires slip down in majority of cases. This results in loosening of the wires with consequent movement at the fracture site and ventral deviation of the cranial fracture fragment necessitating their repeated re-adjustment and re-tightening. A slight modification in the standard technique has proven quite useful to overcome this problem. However, intactness of all the incisor teeth is a prerequisite to this modification.

Key Words: Mandibular Fracture, Interdental wiring, Premolar, Incisor.

INTRODUCTION

Mandible or the lower jaw in camel is an elongated bone like that of horse and consists of two halves which fuse together during the first few months of life. Each half of the incisive part of the body harbors three incisors and one canine tooth. There are four cheek teeth on each side of the mandible namely premolar 2 and molars 1, 2 and 3. The tusk like premolar 1, also called Wolf's tooth, lies almost in the middle of the inter-dental space between the canine tooth and premolar 2 (Smuts and Bezuidenhout, 1987). Fracture of the mandible is by far the most commonly observed fracture in camels. Bilateral or very rarely unilateral mandibular fractures are common in male camel, that occur across the first premolars or quite cranial or caudal to this point in inter-dental space. Presence of mental canal and alveoli of the first premolars render this part of the bone quite weak and prone to easy fracture. These fractures are usually seen in the rutting season. In this season, males become quite active, vicious and tend to bite each other, leading to abnormal stress on the mandible which can cause fracture. Fractures due to camel bites are invariably bilateral, compound and transverse in nature. Standard interdental wiring technique using 1.0 mm diameter stainless steel, silver or copper wire is the method of choice to repair such fractures (Gahlot et al., 1984). The technique is simple, convenient and economical. However, in the postoperative period, the lateral limbs of the wires slip downward in line with the normal slope of the incisive part of the mandible, a complication commonly observed in the old individuals as the incisor teeth take an outward slope with the advancing age (Hanuman and Gahlot, 2001). This result in movement at the fracture site which needs repeated re-adjustment of the

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wires to keep the fractured segments in normal alignment; otherwise it may lead to delayed union with downward mal-alignment or even non-union of the fracture. Embedment of the lateral limb of the wire in the gums also results in loosening of the wire with consequent ventral deviation of the cranial fracture fragment (Siddiqui and Telfah, 2010). An almost similar technique with the same postoperative complication has also been described by Henninger and Warren (1997) for rostral fractures of the mandible and maxilla in the equines. All these factors offer a mechanical disadvantage to the standard interdental wiring technique. The other reported postoperative complications of the mandibular fractures are buccal infections and osteomyelitis (Al-Dughaym et al., 2003). Development of sub-mandibular abscesses is a very common postoperative complication of these fractures and can lead to osteomyelitis if not drained and treated in time (Gahlot et al., 1984). Oblique and multiple mandibular fractures in the camels (Kumar et al., 1979) and in the equines (Kuemmerle et al., 2009) are mainly due to direct trauma, may occur at any point of the bone and require other methods of repair like transfixation techniques and bone plating. In the present study, the standard technique was modified to counteract downward slipping of the lateral limbs of the wires.

MATERIALS AND METHODS

This report covers 62 (57 males and 5 females) cases of transverse, bilateral, compound mandibular fractures in the camels across the first premolars (Figure 1), or cranial or caudal to this point in the inter-dental space. These cases were received at the Central Veterinary Hospital, Al-Wathba, Abu Dhabi, United Arab Emirates or were attended in the field under the domain of the hospital from January 2001 to December 2009. These cases were immobilized with the modified inter-dental wiring technique, using 1.0 mm diameter stainless steel orthopedic wire, to avoid downward slipping of the lateral limbs of the wires. The modification comprised passing the ends of the lateral limbs of the wires on both sides from lateral to medial through the space between the corner and lateral incisor and then out from medial to lateral through the space between the lateral and central incisor tooth (Figure 2), instead of taking them straight as is done in the standard procedure. The fracture was then reduced and firmly held in place by an assistant. The medial limbs of both the wires were passed through the space between the central incisors and were pulled taut to give the required tension to both the lateral and medial limbs of the wires before twisting them on each other, till movement at the fracture site was eliminated. The twisted ends of the wires were cut about 1 cm from the base and bent towards the central incisors to avoid injury to the lower lip.

RESULTS AND DISCUSSION

The objectives of the surgical treatment of mandibular fractures were to restore normal occlusion and provide stability that can support fracture healing and allow normal eating and drinking simultaneously. The problem of downward slipping of lateral limbs of the wires with resultant ventral deviation of the cranial fracture fragment in the camels (Gahlot et al., 1984; (Siddiqui and Telfah, 2010) and rostral mandibular and maxillary fractures in the equines (Henninger and Warren, 1997) was not observed in the cases treated, except in 3 animals (2 males and 1 female). In these animals, at different time intervals in the post-operative period, either the left or right lateral limb of the wires, slipped out of the incisors, which resulted in slight ventral deviation of the cranial fracture fragment. This was most probably due to short size of the incisors in these animals. The wires were however, readjusted, going slightly deep into

the gums. The fracture healed in these animals but with visible ventral mal-alignment. Postoperative buccal infections and/or osteomyelitis (Al-Dughaym et al., 2003) were not seen in any of the fractures stabilized with the modified technique except development of submandibular abscesses in 20 (32%) cases. The three animals in which the lateral limbs of the wires slipped out of the incisors and the fractures healed with slight ventral mal-alignment were among these 20 animals (Figure 2). The development of sub-mandibular abscesses in these fractures is common; however, this did not affect the healing process in the present study, as abscesses were drained in time (Gahlot et al., 1984). The lateral limbs of the wires, never slipped down, as these were firmly fixed among the incisors. Hence, repeated readjustment of the wires was not needed in the postoperative period. This also led to uninterrupted healing of the fractures in due course of time. The problem of wire loosening noted in the standard technique was successfully resolved with the modification described above and hence, it offered a good solution to eliminate any chances of ventral deviation of the cranial fracture fragment and the associated problems.

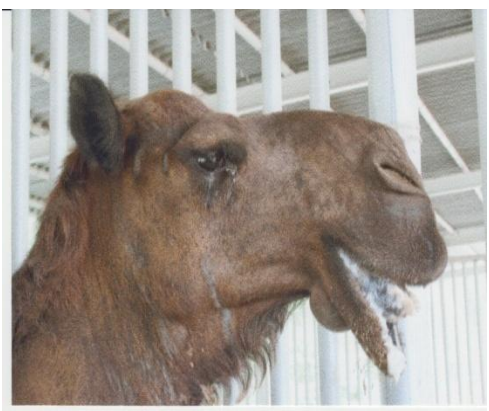

Figure 1 Mandibular Fracture in Camel

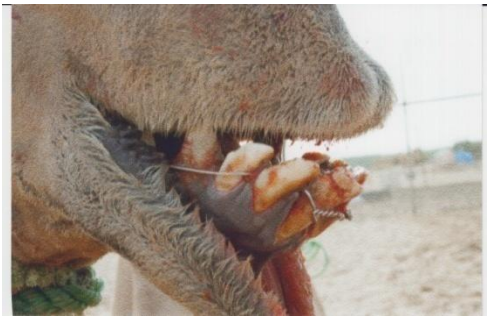

Figure 2 Modified Inter-dental Wiring Technique for Correcting Mandibular Fracture

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