RADIOGRAPHIC FINDING OF METATARSAL FRACTURES IN A MALE GERMAN SHEPHERD DOG

Case report submitted in partial fulfillment of the Masters of Veterinary Surgery of the University of Nairobi.

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Summary

A 5-year-old entire German sharphard male dog was presented to the university of Nairobi small animal clinic after sustaining fracture of all the metatarsal bone on the right hindlimb and metatarsal bone II on the left hindlimb. Dorsoplanter and mediolateral radiographic evaluation confirmed presence of the fractured metatarsal bone.

Introduction

Dogs sustain metatarsal fractures (Phillips 1979), due to high-energy trauma (Wernham and Roush, 2010). Metatarsal fractures are often open because of the limited amount of surrounding soft tissue and delayed or non-union of these fractures has been ascribed to the paucity of periosteal soft tissues (Seibert et al, 2011). Trauma to the regional soft tissues, both incurred at the time of injury or as a result of surgical intervention, can delay or prevent such fractures from obtaining union (Kapatkin et al. 2000). The diagnosis of metatarsal fractures is based on the history, physical examination findings, and radiographs (Wernham and Roush, 2010). This report describes the radiographic findings of metatarsal fracture of both the left and right hind limb that is scantily reported in the literature.

History and clinical findings

A 5-year-old, 23.6 kgs entire male German Shepherd dog named Tim and belonging to Mrs. Ann Musyoki (Case number 36120) was presented to the University of Nairobi Small animal clinic a few hours after a fierce fight with a hyena. On examination, patient was dull and depressed and had bite wounds all over the body. Temperature was 39.5°C while other vital parameters were within normal range. The dog would not bear weight on the hindlimbs. The medioplanter aspect of the right metatarsus had an avulsed dirty and contaminated wound with the proximal fracture fragment of the metatarsal bone II protruding from the wound. There was palpable dorsoplantar
and mediolateral instability, in the mid-metatarsal region of the right hindlimb. Pain and crepitation were elicited during palpation and manipulation of the right and left mid-metatarsal region. A tentative diagnosis of open metatarsal fracture was made and radiography taken on the same day (23rd February 2012) to determine the nature of the fractures and the bones involved.

**Radiography**

Dorsoplanter and mediolateral radiographic views of the right and left metatarsus were taken both at 3.2 M.As and 50 KvPs. Radiological evaluation of the right pes identified an open, complete, irregularly marginated, oblique mid-diaphyseal fractures of metatarsal bones II–IV and distal metatarsal bone V as well as soft tissue swelling. The fractures were displaced planteromedially, resulting in valgus angulation of the right digit (Figure 1 and 2). Radiographs of the left pes revealed a complete, oblique mid-diaphyseal fractures of metatarsal bones III (Figure 3).

![Image of radiograph showing fractures](image_url)

**Figure 1:** Craniopalmar radiograph showing complete, oblique mid-diaphyseal and displaced fracture of metatarsal bone II, III, and IV and a complete oblique distal and displaced fracture of metatarsal bone V.
Figure 2: Mediolateral radiograph showing planteromedial displacement of fractured metatarsal bone on the right hindlimb and soft tissue swelling.

Figure 3: Craniopalmar radiograph with a complete oblique mid-diaphyseal fracture of metacarpal bone III.
Discussion

Metatarsal fractures are common in small animal practice and account for 8.1% to 11% of total fractures in dogs (Ness et al, 1996). Diagnosis of fractured metatarsus is typically based on history, physical examination and radiographic evaluation. Trauma accounts for most of metatarsal fractures in dogs (Phillips 1979; Ness et al, 1996; Wernham and Roush, 2010). Different authors have reported varying causes of metatarsus fracture which include motor vehicle trauma, jumping or falling, trauma from a kick or being stepped on, trauma from a foot being caught in an object, dog bite, gunshot and a direct blow to the foot (Muir and Norris 1997; Okumura et al. 2000). Racing greyhounds are prone to stress fracture due to excessive weight borne by metatarsal bones (especially the 3rd metatarsus) while negotiating bends in racing tract (Bellenger et al, 1981). However, no study that has reported hyena bite as the cause/predisposing factor of metatarsal fractures in dogs as it was in this case.

In a study done by Muir and Norris (1997), the age of the dogs with metacarpal and metatarsal fractures was variable ranging from 2 months to 10 years, most males were entire with a mean body weight of 20.1 +/- 10.6. Okumura et al, (2000) reported a case of a male mongrel dog, aged 12 years weighing 23.5 kgs while Seibert et al, (2011) reported a case of a 4-year-old, 37-kg spayed female American Pit Bull Terrier with metatarsal fracture of the right hind limb. In this case report, the patient was 5-year-old entire German shepherd male weighing 23.6 kgs. The physical findings in this report that included pain, crepitation, swelling, and presence of wound on the tarsus are consistent with those reported by (Okumura et al, 2000; Fitzpack et al. 2011 and Seibert et al, 2011).

Radiographic evaluation of metatarsus is best performed when a is patient sedated using fine detail films and high-detail screens (Anderson et al, 1993). Lateral and dorsoplanter projection
should be assessed for location and type of fractures, degree of displacement, and articular involvement and can assist in determining if an open or closed fracture is present (Probst and Millis, 2003). In this case, there was no need to sedate the patient as he was in a state of depression and was easy to handle. Multiple metatarsal bones may be fractured, with fracture of all 4 metatarsal bones reported in 41–56% of dogs (Kapatkin et al, 2000). Muir and Norris (1997) reported that the prevalence of displaced metatarsal fractures were more in dogs that had all the four metatarsal bones fractured. However, majority of displaced fractures did not lead to deviation of digit distal to the fracture.

The proximal metatarsal region is frequently affected (De La Puerta et al, 2008). In this report, the patient had both the left and right metatarsus involved. All the four bones on the right metatarsus were involved and had displaced complete, oblique mid-diaphyseal fracture leading to medial deviation of the digit distal to the fracture site. Only metatarsal bone II was involved in the left hindlimb and had a complete, oblique mid-diaphyseal fracture.

In dogs with fractures of three or four bones, metatarsal fractures were predominantly of a transverse pattern, indicative of bending overload to the paw (Tencer and Johnson 1994). However, other patterns have been reported before and include short oblique fracture (Fitzpack et al. 2011) and comminuted fracture (Okumura et al, 2000; Seibert et al, 2011). In this case, the fracture patterns were oblique. Presence of an open fracture was due to limited amount of surrounding soft tissue in metatarsal region. Seibert et al, (2011) has also reported an open metatarsal fracture in a male mongrel dog.
Recommendations

Dorsoplanter and mediolateral radiographic views should be taken when assessing fractures of the metatarsus. This helps in determining the fractured bone as well as assesses the nature of the fracture. Correct diagnosis will consequently help in determining fracture reduction technique and prognosis.

Acknowledgement

The author wishes to thank Dr. J.D Mande for his invaluable supervision as well as the staff at the Department of Clinical Studies, Faculty of Veterinary Medicine for there assistance.

Reference


