

## Radiographic findings of some metacarpophalangeal and metatarsophalangeal joints disorders in donkeys

Mehdi Tavana \*, Seyedeh Zeinab Peighambarzadeh

*Department of Veterinary Medicine, Faculty of Agriculture, Shoushtar Branch, Islamic Azad University, Shoushtar, Iran*

**Abstract:** To describe the radiographic changes in the metatarsophalangeal and metacarpophalangeal joints disorders in donkeys. Twenty donkeys with clinical, radiographic evidences of metatarsophalangeal and metacarpophalangeal disorders and lameness were used in this study. Clinical, radiographic studies for donkeys have metacarpophalangeal and metatarsophalangeal disorders and lameness was evaluated. Five radiographic views were performed and evaluated. Transverse and longitudinal scans of the palmar/plantar metacarpophalangeal and metatarsophalangeal region were obtained. The radiographic findings were studied and correlated with clinical signs. All donkeys had marked painful metacarpophalangeal and metatarsophalangeal swelling and lameness. Radiography showed chronic tendonitis with soft tissue calcification. Sesamoiditis with osteophytes formation and osteolysis were detected. Transverse mid body and lateral abaxial fractures of the proximal sesamoid bones were diagnosed. Thickening and adhesions with increased echogenicity of the digital flexor tendons were observed. Mechanical trauma, over work long hours in harsh condition, over strain, neglected hoof care and management might be attributed to hard and soft tissue changes and metatarsophalangeal and metacarpophalangeal disorders in the donkeys. Radiography and ultrasonography evaluation of metacarpophalangeal and metatarsophalangeal lameness in donkeys provides a useful aid in detecting the pathological changes in hard and soft metatarsophalangeal and metacarpophalangeal tissues in donkeys.

**Key words:** *Donkey; Metatarsophalangeal and metacarpophalangeal Disorders; Proximal sesamoid bone fractures*

### 1. Introduction

Donkeys have been employed as working animals and played an important role in the provision of energy for agriculture production over 5,000 years. The world population of donkeys have ranged to 44 million and have tendency to increase.1 little is known about surgical affections among donkeys. Laminitis, chronic pedal bone sepsis, sarcoids and colic were the more surgical affections described.2 Diseases of the metatarsophalangeal and metacarpophalangeal region in the horse have been studied both radiographically3 and ultrasonographically.4,5 The incidence of donkey lameness in the surgery clinic was represented 38.6%. In addition, the incidences of metacarpophalangeal and metatarsophalangeal joint and tendon disorders among other affections causing lameness were 36.4% and 48.8% respectively.6 Recently, ultrasonographic has allowed better definition of injuries to metacarpophalangeal and metatarsophalangeal soft tissues in the horse. The aim of this study was to describe the radiographic findings of some metacarpophalangeal and metatarsophalangeal disorders in donkeys.

### 2. Materials and Methods

Twenty adult donkeys (10 males and 10 females) ranging in age from 3 to 6 years (mean 4 years) and body weight from 150 to 350 kg. (Mean of 240 kg) were referred to the surgery clinic for investigation of metacarpophalangeal and metatarsophalangeal lameness. These donkeys were used for draught pulling of the cart. The duration of clinical signs of lameness prior to the presentation was 3 to 60 days. The severity of lameness was graded on a scale from 1 to 5 grades.7 The metatarsophalangeal and metacarpophalangeal region was examined thorough palpation or metacarpophalangeal and metatarsophalangeal flexion test. Any painful response to metacarpophalangeal and metatarsophalangeal manipulation was recorded.

Radiography was performed upon admission in all cases using mobile X-ray machine. The radiographic setting factors ranged from 50 to 55 kvp, 8 mAs and 100 cm FFD. Each radiographic examination was comprised of 5 projections, dorso-palmar/plantar, lateromedial, flexed latero-medial, lateral oblique and medial oblique projections.

### 3. Results

The findings of the clinical and radiographic examinations showed that chronic tendonitis was diagnosed in 14 cases, fractures of the proximal sesamoid bones in 10 animals and sesamoiditis in 5 cases. The palmar/plantar aspects of the

\* Corresponding Author.

metacarpophalangeal and metatarsophalangeal joint were diffusely swollen, painful and a sort of hotness was detected. Some animals were non weight bearing on the affected limb at the time of presentation. Chronic tendonitis showed enlargement and thickening of the superficial (SDFT) and deep (DDFT) flexor tendons with no discrimination between them. Metatarsophalangeal and metacarpophalangeal flexion test exacerbated lameness. Radiographic changes have soft tissue thickening with calcification at the palmar/plantar aspects of the metacarpal/metatarsal and the proximo-dorsal aspect of the proximal phalanx were detected in chronic tendonitis. The proximal sesamoid bones fractures were recorded in 10 cases and were attributed to traumatic kicking especially in the hind limbs or motor car accident in the fore limbs.

Transverse mid body (Fig.1) and abaxial lateral seamed fractures (Fig. 2) were the main findings in the present study. These animals admitted with non-weight bearing in the affected limb. The palmar/plantar SDFT, DDFT and suspensory ligaments showed hard painful swelling at the metatarsophalangeal and metacarpophalangeal region.

#### 4. Discussion

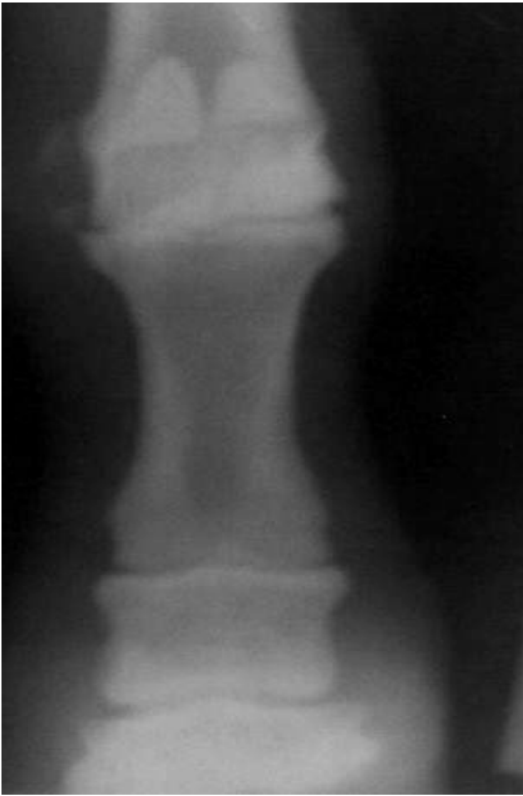
The metatarsophalangeal and metacarpophalangeal region in equine has a fairly rich and somewhat a complex anatomy. These areas are common sites for a multiple injuries and lameness. Lameness of this area can be sometimes difficult to diagnosis. Ultrasonography and radiography have become an integral part of equine lameness diagnosis.<sup>5</sup>

There is direct relationship between the shape of the hoof and the condition of the tendon.<sup>6,8</sup> The overgrown hoofs, boxy hoofs and curled out hoofs will disturb the normal foot axis and the dynamics of the affected foot resulting in chronic pathological changes at the supportive apparatus. Additionally, local micro vascular stasis at the metacarpophalangeal and metatarsophalangeal joint capsules and the superficial digital flexor tendons were detected in overgrown hoofs in donkeys.<sup>8</sup> The decreased angle of the foot axis and increased in the length of the hoof wall at the toe played an important role in increased incidence of irreversible pathological and radiographic changes in the phalangeal region.<sup>9</sup> Consequently, soft tissue swelling and dystrophic calcification at the palmar/plantar aspects of donkey metacarpophalangeal and metatarsophalangeal region were observed. The ultrasonographic evaluation of chronic tendonitis has been studied extensively in the horse.<sup>5,10</sup> Marked thickening, increased in size and presence of dystrophic calcification, associated with loss of normal structural integrity in digital flexor tendonitis in the horse were attributed to chronic inflammation and recovery. Therefore, overuse of these animals and

neglected hoof care could be attributed to pathological changes seen. The proximal sesamoid bones are part of the suspensory apparatus of the metacarpophalangeal and metatarsophalangeal joint that prevents hyperextension during strenuous exercise. Increased tensile forces and direct trauma have been attributed to proximal sesamoid fractures.<sup>7</sup> The most sesamoid body fractures in the horse occurred during fatigue and related to hypertension of the metacarpophalangeal and metatarsophalangeal joint.<sup>11</sup> Therefore, transverse mid body fractures and abaxial lateral sesamoid fractures in donkeys could be attributed to mechanical trauma in the present study. Soft tissue swelling, desmitis and preligamentous fibrosis with surrounding tissues have been detected in sesamoid bone fractures.<sup>12</sup> Sesamoiditis in the horses were related to mechanical factors or circulatory disturbances.<sup>13</sup> However; sesamoiditis in donkeys were mainly due to mechanical trauma. The ultrasonographic scans showed, desmitis, irregularity in the contour and cleft like tear in the lateral suspensory branch. These findings in sesamoiditis suggested excessive strain of the suspensory ligament branches at insertion around the metacarpophalangeal and metatarsophalangeal including the sesamoid bones.<sup>5</sup>



**Fig. 1:** Latero-medial projection of 4 year old male Donkey. There is comminuted abaxial fracture of lateral sesamoid bone



**Fig. 2:** Dorso-palmar projection of 4 year old male Donkey (left is medial) a basilar fracture. In the lateral sesamoid bone there is a well-defined transverse fracture line at the mid body of the bone

In conclusion, radiographic and ultrasonography studies proved to be valuable tools in diagnosis of metacarpophalangeal and metatarsophalangeal disorders in donkeys. Chronic tendonitis, fractures of the proximal sesamoid bones and sesamoiditis associated with soft tissue changes were the most frequently conditions diagnosed. Over strain of tendinous and ligamentous structures associated with over work long hours in harsh condition, in addition to neglected hoof care and managements play an important role in donkey metacarpophalangeal and metatarsophalangeal disorders.

## References

- Barr ARS, Dyson SJ, Barr FJ, O'Brien JK. Tendonitis of the deep digital flexor tendon in the distal metacarpal/metatarsal region associated with tenosynovitis of the digital sheath in the horse. *Equine Veterinary Journal*. 1995, 27: 348-355.
- Cornelissen BPM, Rijkenhuizen ABM, Buma P, Barneveld A. study on the pathogenesis of equine sesamoiditis: the effects of experimental occlusion of the sesamoid artery. *Journal of Veterinary Medicine Series A- Physiology pathology clinical Medicine*. 2002, 49: 244-250.
- Dyson S. Diagnosis and prognosis of suspensory desmitis. In : *Proceedings Dubia International*

- Equine Symposium*. Bonsall, C.A., Matthew R. Rantanen design. 1996:207-225.
- El-Husseny IN. Studies on tendon injuries in equine. M.V.Sc. Thesis Cairo University. 1996.
- FAO, 1995. FAO Production year book, volume 48 (1994) Food and Agriculture Organization, Roma, Italy.
- Farrow CS. The metacarpophalangeal and metatarsophalangeal joint. In. Farrow, C.S. (Ed.), *Veterinary Diagnostic Imaging in the horse*. Elsevier, St. Louis, 2006: 128- 305.
- Genovese, R.L., Rantanen, N.W., Hauser, M.L., Simpson, B.S. Diagnostic ultrasonography of equine limbs. *Veterinary Clinics of North America- Equine Practice* 2, 145-226.
- Mostafa MB, Katitaita DO. Donkey foot axis measurements in overgrown hoof. *Indian journal Veterinary Surgery* 2003, 24; 50.
- Reef VB. Musculoskeletal ultrasonography. *Equine Diagnostic Ultrasound*. Saunders, Philadelphia, PA, 1998: 39-186.
- Soliman AS, Mostafa MB, Ragab GA. Vascular changes in the soft tissues of the metacarpophalangeal and metatarsophalangeal joint of donkeys undergoing various hoof deformities. *Alexandria journal of Veterinary Science*. 1992, 8: 7-12.
- Stashak TS. *Admas' lameness in horses*. 5th ed. Lippincott, Williams and wilkens, Philadelphia PA. 2002.
- Svensden MBE. *The professional hand book of the donkey*, compiled for the donkey Sanctuary. Whitter books limited, 18 Anley Road, London W14 0BY- printed by Midas. 1997.
- Vanderperren K, Saunders JH. Diagnostic imaging of the equine metacarpophalangeal and metatarsophalangeal region using radiography and ultrasonography. Part2: The bony disorders. *The veterinary Journal*. 2008 doi:10.1016/j.tvj.2008.01.017.