

Clinical study on the occurrence pattern of equine lameness at Referral Veterinary Hospital

Kush Karan¹, Ashwani Kumar^{1*}, Arun Anand¹, Pallavi Verma¹, Vandana Sangwan¹, Neelam Bansal²

¹Department of Veterinary Surgery and Radiology, ²Department of Veterinary Anatomy, College of Veterinary Science, Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana-141004, Punjab, India

Abstract

This study was planned with an objective to investigate the occurrence pattern of equine lameness associated with bones, joints and soft tissues at University Veterinary Hospital. This study included 67 clinical cases of equine lameness presented during 12 months of the study. Detailed signalment (age, sex and breed, history (onset and progression of lameness, purpose of keeping equine, any recent history of injury/trauma and duration of illness) were recorded. All cases were subjected to systematic evaluation including radiograph to diagnose lameness lesions associated with bones, joints, spine, soft and hard tissues. The occurrence of lameness arising from various regions of the fore and hindlimb were recorded. Out of 136, 67 equines were lame; thus the hospital occurrence of equine lameness was calculated as 1.11% (67/5925) among total large animals enrolled and 49.26% (67/136) among all equine patients presented for different clinical ailments. Marwari (32.83%), female (55.22%), aged more than 5 years (50.75%) used for athletic purpose (40.30%) were most affected. Unknown history of trauma (31.34%) and chronic onset of lameness since > 30 days (35.82%) was recorded in majority cases. There was an equal occurrence of lameness (28.36%) originating from bone, joint and soft tissues. Out of 43 equines that undergone radiography, most (74.42%) had single lesion, whereas the remaining (25.58%) had multiple lesions involving one limb (6.98%) or more than one limb (18.60%). Lameness of right forelimb (35.14%) with joint lesions (56.75%) was most common. The delayed presentation of lameness cases in equines with multiple lesions is of serious concern for the welfare and prognosis point of view. The study recommends initiating awareness program on equine lameness to educate poor farmers.

Keywords: Arthropathy, Fracture, Horse, Musculoskeletal Disorders, Incidence, Radiography

Horses, primarily being used for athletic/drought purpose, are prone to limb lameness. The limb regions distal to carpus and tarsus, particularly foot, are vulnerable to equine lameness (Redding and O'Grady, 2012). In developing countries like India, equine lameness is one of the most economically important medico-surgical conditions and frequent cause of suboptimal performance, pain and progressive deterioration of health and permanent disability in chronic untreated cases. Exact identification/localization of lameness is a crucial step for recommending appropriate medicinal or surgical treatment (Pfau *et al.*, 2014).

Unlike Western World, the field of equine lameness in India is in developing stage. Fazili and Kirmani (2011) reviewed demography and current status of welfare and research prospects of working ponies in Kashmir, India which are owned primarily by the weaker sections of the society. Another research paper found

farriery and lack of adequate trained manpower as the most ignored areas in equine husbandry practices in the developing countries like India (Mohite *et al.*, 2019). Recent studies emphasized to conduct focused research on working equines so as to educate poor farmers of the developing nations about good husbandry practices including nutrition, healthcare, hoof care and shoeing, lameness and overall welfare in general (Whay *et al.*, 2015).

Prevalence studies play a vital role in understanding relative frequency and severity of various disease conditions causing equine lameness that may vary from region to region due to variations in agro-climatic conditions, demographic factors and owner awareness. Such studies provide a comprehensive insight into the current situation and it aids in chalking out future strategies. Keeping in view the lack of studies on the occurrence of equine lameness in Indian Veterinary literature, this study was planned with an objective to investigate the occurrence pattern of equine lameness

*Corresponding author: drashwanikumar@rediffmail.com

associated with bones, joints and soft tissues at University Veterinary Hospital.

Materials and Methods

This clinical study was duly approved by Institutional Animal Ethics Committee. The study included 67 clinical cases of equine lameness that were presented at the university veterinary hospital during the period of 12 months (February 2020 to June 2021; excluding March, April, May and June months due to Covid-19 lock down period). The overall incidence of equine lameness was calculated in relation to total equines and total number of large animals presented during 1 year of study.

Detailed signalment i.e. age, sex and breed were recorded in all animals at the time of initial presentation. History pertaining to onset and progression of lameness, purpose of keeping equine, any recent history of injury/trauma and duration of illness (days) were also recorded.

All cases were subjected to systematic evaluation including radiograph to diagnose lameness lesions associated with bones, joints, spine, soft and hard tissues. The occurrence of lameness arising from various regions of the all the four limbs such as hoof, pastern and fetlock, carpal, metacarpal, elbow, shoulder of forelimb and hoof, pastern, fetlock, tarsus, metatarsus, stifle region of hindlimb were recorded.

Results and Discussion

A total of 5925 large animals (including bovines, equines and caprines) were enrolled at the University Veterinary Hospital and it included 136 clinical cases of equines suffering from various disease conditions such as lameness, colic, respiratory disorders, pharyngitis, dystocia etc thus equines constituted 2.30% (136/5925) of total annual clinical cases load. Out of 136, 67 equines were lame; thus the hospital occurrence of equine lameness was calculated as 1.11% (67/5925) among total large animals enrolled and 49.26% (67/136) among all equine patients presented for different clinical ailments during one year of study at university veterinary hospital. Besides, Himani *et al* (2019) reported an annual incidence of equine lameness as 66.67% (78 out of 117 total equine cases). On the contrary, Mohsina *et al* (2014) reported a very high occurrence of equine lameness i.e. as 21% among all the animals presented at another referral institute in India. This could be due to variable

demographic composition of farm animals at a particular region of study.

The detailed distribution and occurrence pattern of lameness is presented in Table 1 and is discussed further under various subheads:

Breed wise distribution: Among various equine breeds presented for lameness, the Marwari was maximum presented (32.83%) followed by the thoroughbreds (25.37%), Nukra (19.40%), non-descript/crossbred (16.44%), mule (4.47%) and a Kathiawari (1.49%). The variation in relative frequency of lameness based on breed might be due to people's preference to a particular breed(s). The common local breed of the area is Marwari so this could be the reason for its most presentation. The thoroughbred horses are usually kept by the government organizations like ITBP, BSF and Police which are used for patrolling along borders areas. In contrast, Mistry *et al.* (2012), observed highest incidence of lameness in non-descript followed by Marwari, Kathiawari and thoroughbred.

Gender wise distribution: The females were slightly higher in presentation 55.22% (n=37) than males 44.78% (n=30). The local people mostly prefer keeping females, as these are easy to manage than Stallions. The study conducted by Varshney (1997) and Himani *et al.* (2019) also showed higher incidence of equine lameness in females as compared to males.

Age wise distribution: Most lameness affected equids were more than 5 years of age (50.75%) followed by 1-5 years (26.86%), young equines of <1month of age (10.45%), 1-6 months (5.97%) and 6-12 months of age. The mean age of equine presented was 68.23 ± 54.46 months ranging from 4 days to 204 months (16 years). These findings corroborate to Himani *et al.* (2019) but Cogger *et al.* (2008) reported high prevalence of lameness in less than 2 year old equines.

Work/purpose wise distribution: Based on the work assigned/purpose of using equines, these were mostly racing or sports events for Thoroughbred equines (40.30%) followed by 23.88% young equines. The Marwari horses used for breeding were 22.38%, while mules or non-descript were kept for draught purposes (11.94%). The study conducted by Himani *et al.* (2019) showed most of equine lameness in racing horses (35%), followed by pleasure riding, draft, breeding and young. The thoroughbred equines presented in the study were kept by BSF, ITBP for patrolling.

Table 1: Analysis of various factors associated with equine lameness

| Parameter | Group | Number | Per cent |
|----------------------|-------------------------|-------------|----------|
| Breed | Thoroughbreds | 17 | 25.37 |
| | Marwari | 22 | 32.83 |
| | Nukra Marwari | 13 | 19.40 |
| | Kathiawari | 1 | 1.49 |
| | Mule | 3 | 4.47 |
| | Crossbred | 11 | 16.4 |
| Gender | Male | 30 | 44.77 |
| | Female | 37 | 55.22 |
| Age (Month) | ≤ 1 month | 7 | 10.45 |
| | >1- 6 month | 4 | 5.97 |
| | >6-12 month | 4 | 5.97 |
| | >12-60 months | 18 | 26.86 |
| | >60 months | 34 | 50.75 |
| Work | Racing | 27 | 40.30 |
| | Draught | 8 | 11.94 |
| | Breeding | 15 | 22.38 |
| | Young | 17 | 25.38 |
| Duration of illness | <3 days | 19 | 28.35 |
| | 3-10 days | 8 | 11.94 |
| | 10-30 days | 16 | 23.88 |
| | >30 days | 24 | 35.82 |
| Diet | Mix | 54 | 80.59 |
| | Whole grain | 2 | 2.98 |
| | Milk | 11 | 16.42 |
| History / Etiology | Fall | 11 | 16.42 |
| | Unknown | 21 | 31.34 |
| | Miscellaneous | 20 | 29.85 |
| | Self trauma | 3 | 4.48 |
| | Trauma | 7 | 10.45 |
| | Congenital | 5 | 7.46 |
| | | | |
| Diagnosis | Bone | 19 | 28.36 |
| | Joint | 19 | 28.36 |
| | Soft tissue | 19 | 28.36 |
| | Hard tissue | 7 | 10.45 |
| | Spine | 3 | 4.47 |
| Diagnosis as per age | ≤1 month (n=6) | Bone | 2=28.57% |
| | | Joint | 2=28.57% |
| | | Soft tissue | 2=28.57% |
| | | Hard tissue | 0 |
| | | Spine | 1=14.28% |
| | >1- 6month (n=4) | Bone | 3= 75% |
| | | Joint | 0 |
| | | Soft tissue | 1=25% |
| | | Hard tissue | 0 |
| | | Spine | 0 |
| | >6-12 month (n=4) | Bone | 1=25% |
| | | Joint | 1=25% |
| | | Soft tissue | 1=25% |
| | | Hard tissue | 0 |
| | | Spine | 1=25% |
| | >12-60 months (n=18) | Bone | 3=16.67% |
| | | Joint | 5=27.78% |
| | | Soft tissue | 7=38.89% |
| | | Hard tissue | 2=11.11% |
| | | Spine | 1=5.55% |
| >60 months (n=34) | Bone | 10=29.41 | |
| | Joint | 11=32.35 | |
| | Soft tissue | 8=23.53 | |
| | Hard tissue | 5=14.70 | |
| | Spine | 0 | |

Duration wise distribution of lameness in equines

■ <3 DAYS ■ 3-10 DAYS ■ 10-30 DAYS ■ >30 DAYS

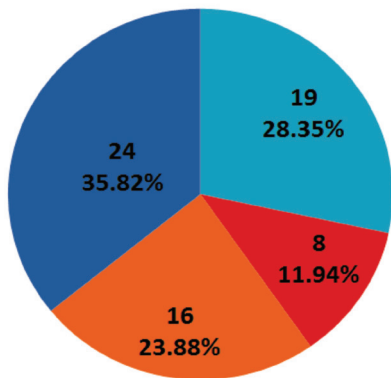


Fig. 1

Duration wise distribution (Fig. 1): Most of the equine were chronically lame, with 35.82% cases presented after >30 days of onset of lameness, followed by young equines or fracture cases which were presented within 3 days of illness, 23.88% were presented within 10-30 days of illness period and 11.94% in 3-10 days period. Similarly, the study conducted by Himani *et al.* (2019) also reported maximum lameness cases presented in 1-3 months of duration (9/20, 45%) indicating the chronic nature of cases resulted in more severity of lesions.

Aetiology wise distribution: The initial reason for lameness in presented cases was unknown in maximum number of cases (31.34%), followed by miscellaneous in 29.85%, fall in 16.42%, trauma in 10.45%, congenital in 7.46% and the least due to self-trauma while running or jumping in 4.48%.

Distribution of lameness according to region/tissue affected: The total lameness cases in equines (n=67) were classified into bone, joint, soft tissue, hard tissue and spine. The hospital occurrence for equine lameness associated with bone tissue (n=19), joint (n=19) and soft tissue (n=19) was almost equal (28.36% each), followed by hard tissue (n=7) (10.45%) and spinal affections (n=3) (4.48%) (Fig 2). Hoof abnormalities of chronic nature (hard tissue) are highly reported for lameness in equines followed by joints, soft tissue and spinal lesions (Broster *et al.*, 2009; Himani *et al.*, 2019).

Radiographic occurrence of single versus multiple lesions causing lameness in equines:

In the current study out of 67, 59 lame horses were subjected to radiographic examination and were detected with 78 lesions involving same or different limbs.

■ No.of Equine

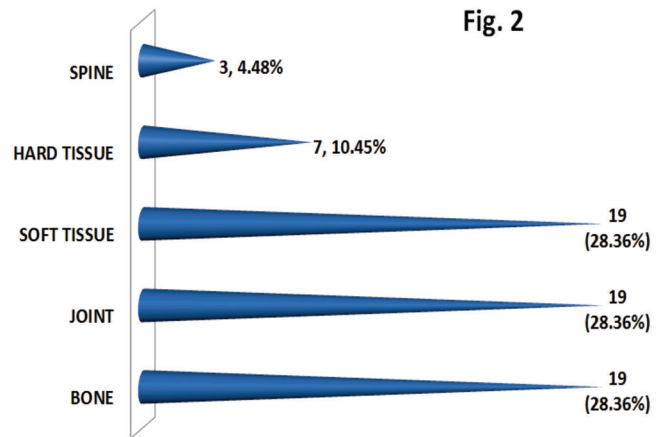


Fig. 2

Radiography alone detected 54 lesions in 43 horses while the remaining 13 cases had soft tissue lesions in which radiography ruled out bone and joint involvement. Out of 43, most cases of equine lameness (74.42%, n=32) had single radiographic lesion, whereas the remaining (25.58%, n=11) had multiple lesions involving one limb (6.98%, n=3) or more than one limb (18.60%, n=8) (Fig. 3). The earlier study on the clinical occurrence of equine lameness conducted by Himani *et al.* (2019) also reported similar trend and concluded the high prevalence of multiple lesions involving one or more limbs as serious diagnostic challenge.

Occurrence of lameness with regard to involving joints of fore and hind limbs:

The study showed that majority of lameness cases, arising from joint affections, was from forelimbs (n=21; 56.75%) as compared to hind limb (n=16; 43.25%). Out of all four limbs, right forelimb was mostly frequently affected (n=13; 35.14%), followed by right hind limbs (n=10; 27.03%), left forelimb (n=8; 21.62%) and least the left

■ radiographic lesions as per single or multiple limbs

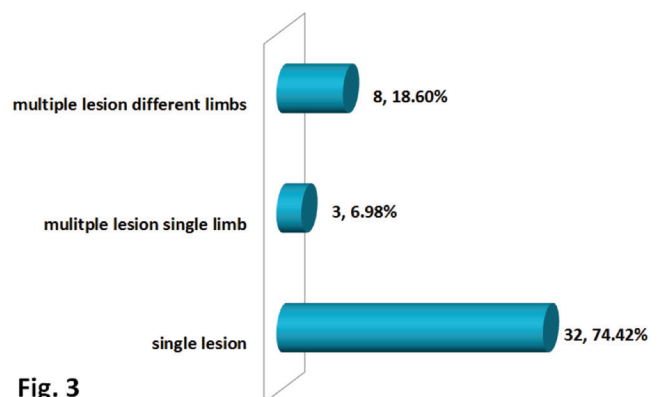


Fig. 3

Table 2: Distribution of lameness involving joints of forelimbs and hind limbs

| Limb | Joint | Number | Per cent | Limb affected | |
|--------------------------------|---------|--------|----------|---------------|------|
| | | | | Right | Left |
| Fore limb (n=21; 56.75%) | Coffin | 10 | 27.03 | 7 | 3 |
| | Pastern | 4 | 10.81 | 3 | 1 |
| | Fetlock | 1 | 2.70 | 0 | 1 |
| | Carpal | 5 | 13.51 | 3 | 2 |
| | Elbow | 1 | 2.70 | 0 | 1 |
| Hind limb (n=16; 43.25%) | Coffin | 0 | 0 | 0 | 0 |
| | Pastern | 0 | 0 | 0 | 0 |
| | Fetlock | 7 | 18.92 | 4 | 3 |
| | Tarsal | 6 | 16.22 | 4 | 2 |
| | Stifle | 3 | 8.11 | 2 | 1 |
| Total | | 37 | 100 | 23 | 14 |

hind limb (n=6; 16.22%). Right forelimb lameness also been reported maximum in the equine (Dabareiner *et al.*, 2005; Mohsina *et al.*, 2014) followed by the left forelimb, the left hind limb and the right hind limb.

Based on radiographic occurrence (Table 2), the coffin joint of forelimbs was most frequently affected (27.03%) followed by hind limb fetlock joint (18.92%), Tarsal (16.22%) and carpal joint (13.51%). Himani *et al.* (2019) reported that hoof had highest per cent lesions (25.81%), with high predisposition to fore feet (68.75%) and in mares (54.54%). It followed tarsal and fetlock regions of the hindlimb.

Radiographic occurrence of bone lesions (n=17): It included most commonly fractures of metatarsal bone (n=6) which also included a bilateral metatarsal bone, tibia (n=3), humerus (n=2) and metacarpal (n=2). The hoof wall with fracture or dislocation was found involved in 4 equines. There was side bone, sesamoid fracture in one equine each and phalanx fracture in 2 cases each. There was open dislocation of fetlock joint in 2 equines. Verschooten *et al.* (1984) recorded high prevalence of splint bone fracture in thoracic limb (n=31) in relation to pelvic limb (n=13).

Joint Affections (n=25)

Coffin joint (n=10; 27.03%): The coffin joint of right forelimb (n=7) was most commonly affected followed by left forelimb (n=3) that corroborated with Menarim *et al.* (2012). It included majority cases of side-bones fractures followed by low ring bone and navicular disease.

Pastern joint (n=4; 10.81%): It included most frequently high ring bone and non-displaced fracture. Semieka and Ali (2012) also stated ringbone to be the major cause affecting foot of donkeys, and concluded to be more common in the fore limbs than hind limbs.

Fetlock joint: (n=8; 21.62%): Out of 8 cases with fetlock joint affections, 7(18.92%) seen in hind limb and 1(2.70%) in forelimb. The various affections of this joint included osselets, compound dislocation and mild periosteal reaction and sesamoiditis.

Carpal/knee joint (n=5; 13.51%): It was the second most common joint affected in forelimb after coffin joint. The affections were severe arthritis involving periosteal reaction of all carpal bones. Osteoarthritis is the most commonly reported affection of carpal joint (Dabareiner *et al.*, 2005).

Tarsus/hock joint (n=6; 16.22%): Tarsus joint was the second most affected joint in hind limb after fetlock. The affections of hock joint with maximum occurrence were bone spavin of chronic nature. Other affections recorded were DJD of proximal tibiotarsus joint. Degenerative joint disease of hock was observed as the most commonly reported affection in equines (Barcelos *et al.*, 2016).

Elbow joint: A single case of OCD was reported in the elbow which comprises of 2.70% of total joint affections.

Stifle joint: Three cases of stifle region were recorded which constitute 8.11% of total joint affections. It included bilateral patellar luxation and another case of severe septic arthritis.

Lameness due to contracted tendon, laxity of tendon, proud flesh, laminitis, SDF tear, hoof abscess, tenosynovitis did not show any bony abnormality on radiograph. One equine with laminitis showed rotation of 3rd phalanx.

In conclusions, this study found a very high (49.26%) occurrence of equine lameness at university veterinary hospital. Marwari, females, aged more than 5 years used for athletic purpose were most affected from right forelimb. Unknown history of trauma and chronic onset were of most concern. Bone, joint and soft tissue were equally involved in lameness. Lameness in majority equines (74.42%) was associated with single radiographic lesion, whereas the remaining (25.58%) had multiple lesions involving one or more limbs. The delayed presentation of lame equines with multiple lesions is of serious concern for the welfare and prognosis point of view. Further, it is recommended to initiate awareness program on equine lameness to educate poor farmer.

Acknowledgement

The authors thank the Indian Council of Agricultural Research, New Delhi for providing financial support under the All India Network Program (ICAR-22) and Guru Angad Dev Veterinary and Animal Sciences University for providing the necessary facilities for conducting this study.

References

- Barcelos, K. M. D. C., Rezende, A. S. C. D., Biggi, M., Lana, A. M. Q., Maruch, S. and Faleiros, R. R. 2016. Prevalence of tarsal diseases in champion Manglarga Marchador horses in the Marcha Picada modality and its association with tarsal angle. *J. Equine Vet. Sci.*, **47**, 25-30. <https://doi.org/10.1016/j.jevs.2016.07.012>
- Broster, C. E., Burn, C. C., Barr, A. R. S. and Whay, H. R. 2009. The range and prevalence of pathological abnormalities associated with lameness in working horses from developing countries. *Equine Vet. J.*, **41(5)**: 474-81. <https://doi.org/10.2746/042516409X373907>
- Cogger, N., Evans, D., Hodgson, D., Reid, S. and Perkins, N. 2008. Incidence rate of musculoskeletal injuries and determinants of time to recovery in young Australian Thoroughbred racehorses. *Austral. Vet. J.*, **86(12)**: 473–80. <https://doi.org/10.1111/j.1751-0813.2008.00359.x>
- Dabareiner, R. M., Cohen, N. D., Carter, G. K., Nunn, S. and Moyer, W. 2005. Musculoskeletal problems associated with lameness and poor performance among horses used for barrel racing: 118 cases (2000–2003). *JAVMA*, **227(10)**: 1646–50. Doi: 10.2460/javma.2005.227.1646.
- Fazili, M. R. and Kirmani, M. A. 2011. Equine: the ignored working animal of Kashmir: status, constraints, research areas and ways for improvement. *Asian J. Anim. Sci.*, **5(2)**: 91-101.
- Himani, Kumar, A., Arun, A., Singh, N., Uppal, V. and Mohindroo, J. 2019. Clinical occurrence and radiographic diagnosis of distal limb lameness in equine. *Indian J. Anim. Sci.*, **89(1)**: 15-24.
- Menarim, B. C., Machado, V. M. V., Alvarez, L. E. C., Carneiro, R., Busch, L. and Vulcano, L. C. 2012. Radiographic Abnormalities in Barrel Racing Horses with Lameness Referable to the Metacarpophalangeal Joint. *J. Equine Vet. Sci.*, **32(4)**: 216-21.
- Mistry, J. N., Nirurkar, S. S., Patel, P. B., Chaudhary, S. R. and Dabas, V. S. (2012). Equine Lameness-A Retrospective Study of 176 Animals. *Intas Polivet*, **13(2)**: 187–91.
- Mohite, D. S., Sheikh, C. S., Singh, S., Kalita, J., Williams, S. and Compston, P. C. (2019). Using qualitative methods to explore farrier-related barriers to successful farriery interventions for equine welfare in India. *Animals*, **9(5)**: 252. Doi: <https://doi.org/10.3390/ani9050252>.
- Mohsina, A., Zama, M. M. S., Tamilmahan, P., Gugjoo, M. B., Singh, K., Gopinathan, A., & Karthik, K. 2014. A retrospective study on incidence of lameness in domestic animals. *Vet. World*, **7(8)**: 601-04. doi.org/10.14202/vetworld.2014.601-604.
- Pfau, T., Spicer-Jenkins, C., Smith, R. K., Bolt, D. M., Fiske-Jackson, A. and Witte, T. H. 2014. Identifying optimal parameters for quantification of changes in pelvic movement symmetry as a response to diagnostic analgesia in the hindlimbs of horses. *Equine Vet. J.*, **46(6)**: 759-63. [doi: 10.1111/evj.12220](https://doi.org/10.1111/evj.12220).
- Semieka, M. A. and Ali, M. M. 2012. Radiography of manus and pes in hard working donkeys. *J. Adv. Vet. Res.* **2(1)**: 32-37.
- Varshney, J. P. 1997. Equine lameness: A retrospective study. *Indian J. Vet. Surg.*, **18(1)**: 27–28
- Whay, H. R., Dikshit, A. K., Hockenhull, J., Parker, R. M., Banerjee, A., Hughes, S. I. and Reix, C. E. 2015. Evaluation of changes in equine care and limb-related abnormalities in working horses in Jaipur, India, as part of a two year participatory intervention study. *PLoS One*, **10(5)**: e0126160. [doi: 10.1371/journal.pone.0126160](https://doi.org/10.1371/journal.pone.0126160).

Received : 22.06.2021

Accepted : 29.11.2021