

Incidence of hoof affections in equine

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This study was conducted on 1178 lamed animals of equine species. Cases were classified according to the species, affected part of the foot, and nature of the affection. Hoof affections represented in about 722 animals with 61.3 % of total lame animals. The percentages of hoof affections were higher in forefeet than hind feet. The present study revealed that sandy cracks, toe-in and long toe were the predominant hoof wall affections. The corn was the highest sole affections followed by white line disease and the lowest percentages were flat foot and bruised sole. The highest affection percentage in frog was thrush followed by picked up nail and the lowest was in under run heel.

Equine lameness is a condition where the animal fails to walk in a regular and sound manner on all four feet (Johnson, 2007). The main cause of equine lameness is hoof affections which considered as the main part of the limb that connect between animals and the ground, so it exposed to many disease lead to the animal out of the work or lead to death (Bowker, 2003). The sole and frog affections considered one of the primary causes of lameness in equine (Adams, 2002; El-Maghraby, 2004; and Kenneth et al., 2004).

The objective of the present work has been directed toward their incidence and diagnosis in horses, donkeys, mules and ponies in Beni Suef, Fayoum and Giza provinces.

Materials and methods

The present study was conducted on 1178 lamed equines (668 donkeys, 395 horses, 101 mules and 14 ponies) in Beni-suef, El-Fayoum and Giza provinces, during the period from December 2006 to December 2008 (Table 1). Diagnosis of cases of hoof lameness was performed after Adams (2002) and it included;

History. It included questioning about age, breed, presence of congenital anomalies, type of work, type of food, nature of environment, when was the horse last shod or trimmed, information about the previous history of the foot problems, how the affection began, duration of the affection, and the previous treatment (El-Keiey, 1979 and Richard and Floyd, 2007).

Clinical examination. Affected animals were inspected for the presence of any abnormalities in the standing position, or presence of any

lesions above the hoof wall. Then after controlling the affected animal by using of twitch and/or sedated using IM 1.0 mg/kg b.wt xylazine Hcl 2% (Hall and Clarke, 1983). The clinical examination of sole, frog, bars, and wall was performed by inspection, palpation, percussion, paring and thinning, compression and hoof extension test according to Saleh (1982), Adams (2002), and Richard and Floyd (2007).

Special examination. Special examination of some affected animals' includes measuring of hoof angle, diagnostic analgesia of foot, radiological examination, and ultrasonographic examination. The recorded cases were classified according to the site of lesions into hoof wall, sole and frog.

Results

The results revealed that the prevalence of hoof affected animals were in ponies (50 %), horses (67.6 %), donkeys (61.08 %) and mules (39.6 %). The prevalence of hoof affected animals in relation to total affected were 34.63%, 22.66%, 3.4% and 0.6% in donkeys, horses, mules and ponies respectively (Table 2).

Hoof wall injury constituted the greatest proportion of hoof affection in all breeds 57.4 %, 57.3 %, 40 %, and 57.1 % in donkeys, horses, mules and ponies respectively (Table 3).

The hoof wall affections represented by congenital affections as toe-in was observed in (33), (36), and one, donkeys, horses, and ponies respectively, with percentages of the affected animals were 8.17 %, 13.48 %, and 14.28 % in donkeys, horses, and ponies respectively (Table 4) (Fig. 1).in Toe-out were observed in (12) donkeys and (12) horses with percentages of the

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affected were 2.94 % in donkeys and 4.49 % in horses (Table 4) (Fig. 2). Club foot was recorded in two mules only with percentage of the affected mules was 5 % (Table 4) (Fig. 3).

Table (1): Prevalence of hoof affections among lamed equines in relation to provinces.

Species	Province			
	Beni-Suef	El-Fayoum	Giza	Total
Donkeys	269	399	0	668
Horses	146	217	32	395
Mules	36	65	.	101
Ponies	.	.	14	14
Total	451	681	46	1178

Table (2): Prevalence of hoof affections among lame equines.

	Lamed animals	Hoof affected animals	% from lame breed	% from total lame animals
Donkeys	668	408	61.08 %	34.63 %
Horses	395	267	67.6 %	22.66 %
Mules	101	40	39.6 %	3.4 %
Ponies	14	7	50 %	0.6 %
Total	1178	722		61.3 %

Table (3): Total number of hoof affected animals and percentage in hoof affected animals of the same breed and relation to lame animals respectively.

Affections	Species														
	Donkeys			Horses			Mules			Ponies			Total		
	No.	A%	B%	No.	A%	B%	No.	A%	B%	No.	A%	B%	No.	A%	B%
Hoof wall	234	57.4	35	153	57.3	38.7	16	40	15.8	4	57.1	28.6	407	56.4	34.5
Hoof sole	39	9.6	5.8	27	10.1	6.8	10	25	9.9	2	6	14.3	78	10.8	6.6
Hoof frog	105	25.7	15.7	42	15.7	10.6	14	35	13.7	0	0	0	161	22.3	13.7
Internal structure	30	7.3	4.5	45	16.8	11.4	0	0	0	1	14.3	7.1	76	10.5	6.4
Total	408	100	61.1	267	100	67.6	40	100	39.6	7	100	50	722	100	61.3

A% and B%: Percentages in relation to hoof affected animals and lame animals of the same breed respectively

Mediolateral imbalance was recorded in nine donkeys only with Percentage of the affected donkeys was 2.2 % (Table 4). This affection appeared when an imaginary line drawn at the hairline of the dorsal coronet which not parallel to the ground and warring to one arm of the shoe more than the other (Fig. 4, 5 and 6).

Contracted heel were recorded in six donkeys and one pony, with percentages of the affected animals were 1.47 % and 14.28 in donkeys and ponies respectively (Table 4). In present study, the affected animals with contracted heel have the foot was narrower than normal especially at posterior half of the foot, and the sole appeared as dished sole due to increased concavity of the sole (Fig. 7 and 8).

Broken backward were appeared in 12 donkeys and 24 in horses with percentages of the

affected animals were 2.94 %, and 8.99 % in donkeys and horses respectively (Table 4). Clinically, the hoof wall longer than normal and the affected animals walk on heel (Fig. 9).

Broken forward were recorded in (15), (9), and two, in donkeys, horses, and ponies respectively, with Percentages of the affected animals were 3.68%, 3.37 % and 28.57 %, in donkeys, horses, and ponies respectively (Table 4). The affected horses have short toe and high heel and in advanced cases (hoof knuckling) the dorsal hoof wall to become the weight-bearing surface of the foot (Fig 10, 11 and 12). Radiographic examination in advanced case of broken forward appear as separation between the dorsal hoof wall and third phalanx which appear as black area due to presence of gases (Fig 13). Acquired affections as Sandy cracks were

observed in 48 donkeys and 45 horses respectively, with percentages of the affected animals were 11.76 % and 16.85 %, in donkeys and horses respectively (Table 4). Sandy cracks, the affected hoof contain single or multiple longitudinal cracks which started from the coronet and progress downward for variable distance at toe region or quarter region may be complete or incomplete (Fig. 14 and 15), on the other hand, the grass cracks started from the ground surface and progress upward (Fig. 16), while bowl-out is a transverse hoof wall cracks (Fig. 17). In advanced cases of hoof wall cracks, presence of multiple cracks either longitudinal and/or transverse and it become easily broke; it can be considered as brittle hoof (Fig. 18).

Regarding seedy toe was recorded in (9) donkeys and three horses, with percentages of the affected were 2.2 % and 1.12 % in donkeys and horses respectively (Table 4). The affected hoof wall separated from the sub corneal tissue and this space filled with brown, pumice stone like masses which easily broken down with the hoof knife. This lesion mainly occupied the toe region and in some cases extent to the quarter (Fig. 19 and 20),

Hoof avulsion was noticed in six donkeys only with percentage of the affected donkeys was 1.47 % (Table 6). In this affection, the hoof is avulsed and the animals show lameness due to the animals cannot loaded its weight on it or but it on the land (Fig. 21).

Bull nosed was present in six horses and eight mules with percentages of the affected animals were 2.25 % and 20 %, in horses and mules respectively (Table 4). This affection appeared due to warring of hoof toe and appeared as bull nose (Fig. 22).

Long toe were observed in (45), (15), and six, donkeys, horses, and mules respectively, with percentages of the affected animals were 11.03 %, 5.62 %, and 15 %, in horses, donkeys, and mules respectively (Table 4). The affected animals have long toe and in advanced cases the hoof wall turn upward and animals walk on the heel (Fig. 23).

Over wearing hooves were recorded in 36 donkeys and three horses with percentages of the affected animals were 8.82 % in donkeys and 1.12% in horses (Table 6). The affected hoof showed over warring and hoof appeared shorter than normal (Fig. 24).

The sole affections recorded and represented by Flat foot was recorded in six horses only with percentage of the affected horses was 2.25 %

(Table 5). In this affection, the sole present in level higher than the frog (Fig. 25).

White line disease was observed in nine, three, two, and two, in donkeys, horses, mules, and ponies respectively, with percentages of the affected animals were 2.21 %, 1.12 %, 5 % and 28.57 %, in donkeys, horses, mules, and ponies respectively (Table 5). White line disease appeared as separation at white line and the space filled with white chalky horny material easy removed by hoof knife (Fig. 26).

Bruised sole was observed in six horses with percentage of the affected horses was 2.25 % (Table 8). Bruising occurred in toe and quarter region of the sole rather than bars and discoloration associated with it which resulted from rupture of blood vessels in the dermis beneath the sole (Fig. 27, 28, and 29).

Corn was recorded in (30), (12), and (8), donkeys, horses, and mules respectively with percentages of the affected animals (in relation to hoof affected animals of the same breed) were 7.35 %, 4.5 %, and 20 %, in donkeys, horses, and mules respectively (Table 5). Corn was appeared as a hall present in bars (Fig. 30).

Analysis of data clarified that the corn was a common affection of the sole in donkey, horses and mules while flat foot was not a common affection and it observed in six horses only (Table 5). Most of donkeys and mules suffered from corn had forefeet involvement on the contrary to horses that had predominant hind feet involvement (Table 6).

The frog affections recorded and represented by thrush was recorded in (71), (15), and two, in donkeys, horses, and mules respectively, with percentages of the affected animals were 17.4 %, 5.62 %, and 5 % in donkeys, horses, and mules respectively (Table 7). Presence of degenerative condition of the central and collateral sulci of the frog characterized by disintegrating horn and presence of grayish to blackish material of offensive odor (Fig. 31).

Canker was observed in (15) horses only, with percentage of the affected horses were 5.62 % (Table 7). Clinical signs which appear in affected animals as a proliferative granulation tissue hypertrophied papillae covered with foetid white caseous materials, white in color; easily bleed on manipulation and animal walk on the toe and treated be surgical removal to granulation tissue (Fig. 32).

Picked up nail affected animals were (25), (12), and (12), horses, donkeys, and mules respectively, with Percentages of the affected

animals were 6.17 %, 4.5 %, and 30 % in donkeys, horses, and mules respectively (Table 7). The apex of the frog is the most frequently affected part and after removed the nail it appears as holly area (Fig. 33). Radiographic examination revealed that the hard metal object enter in the foot appear by plain radiography as white line and detect its extent and its injury to any structure within the foot (Fig. 34 and 35).

Under run heel was noticed in 10 donkeys only, with percentage of the affected donkeys was 2.45 % (Table 7). The frog is run cranially may be reach to the white line (Fig. 36).

Thrush was observed to be a common affected affection of the frog in donkeys and horses, while picked up nail was the most

predominant affection in mules and represented the second most common affections in horses and donkeys (Table 7). Moreover, thrush affected hind feet more than forefeet in the three breeds on the contrary to picked up nail that involved in forefeet more than hind one (Table 8).

The prevalence in forefeet, hind feet and both feet (Table 9) clarified that wall, sole and frog of the forefeet are more reliable to be affected in donkeys than hind or both feet, at the same time, mules and ponies showed the same. While in horses, the wall and the sole of forefeet affected more than hind or both feet but the frog of the hind feet affected more than the forefeet or both feet.

Table (4): Number of hoof wall affected animals and percentage in relation to hoof affected animals and lame animals of the same breed respectively.

Affection	Species												Total		
	Donkeys			Horses			Mules			Ponies					
	No	%		No	%		No	%		No	%		No	%	
Congenital															
Toe-in	33	8.2	4.9	36	13.5	9.1	0	0	0	1	14.3	7.1	70	9.7	5.9
Toe-out	12	2.9	1.8	12	4.5	3	0	0	0	0	0	0	24	3.3	2
Club foot	0	0	0	0	0	0	2	5	2	0	0	0	2	0.23	0.2
Mediolateral imbalance	9	2.2	1.4	0	0	0	0	0	0	0	0	0	9	1.2	0.8
Contracted heel	6	1.5	0.9	0	0	0	0	0	0	1	14.3	7.1	7	1	0.6
Broken backward	12	2.9	1.8	24	9	6.1	0	0	0	0	0	0	36	5	3.1
Broken forward	15	3.7	2.2	9	3.4	2.3	0	0	0	2	28.6	14.3	26	3.6	2.2
Acquired															
Sandy cracks	48	11.8	7.2	45	16.8	11.4	0	0	0	0	0	0	93	12.9	7.9
Seedy toe	9	2.2	1.3	3	1.1	0.8	0	0	0	0	0	0	12	1.7	1
Hoof avulsion	6	1.5	0.9	0	0	0	0	0	0	0	0	0	6	0.8	0.5
Bull nosed	0	0	0	6	2.2	1.5	8	20	7.9	0	0	0	14	1.9	1.2
Long toe	45	11	6.7	15	5.6	3.8	6	15	5.9	0	0	0	66	9.1	5.6
Over warring	36	8.8	5.4	3	1.1	0.8	0	0	0	0	0	0	39	5.4	3.3
Keratoma	3	0.7	0.4	0	0	0	0	0	0	0	0	0	3	0.4	0.2
Total	234	57.3	35	153	57.3	38.7	16	40	15.8	4	57.1	28.6	407	56.4	34.5

A% and B%: Percentages in relation to hoof affected animals and lame animals of the same breed respectively.

Table (5): Number of hoof sole affected animals and percentage in relation to lame animals and hoof affected animals of the same breed.

Affection	Species												Total		
	Donkeys			Horses			Mules			Ponies					
	No	%		No	%		No	%		No	%		No	%	
White line disease	9	2.2	1.3	3	1.1	0.8	2	5	2	2	28.6	14.3	16	2.2	1.4
Flat Foot	0	0	0	6	2.3	1.5	0	0	0	0	0	0	6	0.8	0.5
Bruised sole	0	0	0	6	2.2	1.5	0	0	0	0	0	0	6	0.8	0.5
Corn	30	7.4	4.5	12	4.5	3	8	20	7.9	0	0	0	50	6.9	4.2
Total	39	9.6	5.9	27	10.1	6.8	10	25	7.9	2	28.6	14.3	78	10.8	6.6

A% and B%: Percentages in relation to hoof affected animals and lame animals of the same breed respectively

Table (6): Number of animals with hoof sole affections, in relation to affected limb, in different breeds

Affection	Species												Total		
	Donkeys			Horses			Mules			Ponies					
	F	H	B	F	H	B	F	H	B	F	H	B	F	H	B
White line disease	9	.	.	3	.	.	2	.	.	2	.	.	16	.	0
Flat foot	.	.	.	4	.	2	.	.	.	.	.	.	4	.	2
Bruised sole	.	.	.	4	2	.	.	.	.	.	.	.	4	2	.
Corn	18	12	.	2	8	2	6	2	.	.	.	.	26	22	2
Total	27	12	0	13	10	4	8	2	0	2	0	0	50	24	4

F: Forelimb, H: Hind limb and B: Both limbs

Table (7): Number of frog affected animals and percentage in relation to lame animals and hoof affected animals of the same breed.

Affection	Species												Total		
	Donkeys			Horses			Mules			Ponies					
	No.	%		No.	%		No.	%		No.	%		%	%	
		A	B		A	B		A	B		A	B		A	B
Thrush	70	17.2	10.5	15	5.6	3.8	2	5	2	.	0	0	87	12	7.4
Canker	.	0	0	15	5.6	3.8	.	0	0	.	0	0	15	2.1	1.3
Picked up nail	25	6.2	3.7	12	4.5	3	12	30	11.9	.	0	0	49	6.8	4.2
Under run heel	10	2.4	1.5	.	0	0	.	0	0	.	0	0	10	1.4	0.8
Total	105	25.7	15.7	42	15.7	10.6	14	35	13.9	0	0	0	161	22.3	13.7

A% and B%: Percentages in relation to hoof affected animals and lame animals of the same breed respectively

Table (8): Number of animals with frog affections, in relation to affected limb.

Affection	Species												Total		
	Donkeys			Horses			Mules			Ponies					
	F	H	B	F	H	B	F	H	B	F	H	B	F	H	B
Thrush	23	39	8	4	11	.	.	2	.	.	0	0	27	52	8
Canker	.	.	.	2	13	.	.	.	.	.	0	0	2	13	0
Picked up nail	18	7	.	8	4	.	12	.	.	.	0	0	38	11	0
Under run heel	7	3	.	.	.	.	.	.	.	.	0	0	7	3	0
Total	48	49	8	14	28	0	12	2	0	0	0	0	74	79	8

F: Forelimb, H: Hind limb and B: Both limbs

Table (9) Total number of animals with hoof affections, in relation to different feet, in different animals.

Affections	Species												Total		
	Donkeys			Horses			Mules			Ponies					
	F	H	B	F	H	B	F	H	B	F	H	B	F	H	B
Hoof wall	155	66	13	97	47	9	10	6	.	3	1	.	407		
Hoof sole	27	12	0	13	10	4	8	2	.	2	.	.	78		
Hoof frog	55	44	6	14	28	.	12	2	.	.	.	.	161		
Internal structure	20	8	2	13	23	9	.	.	.	1	.	.	76		
Total	257	130	21	141	104	22	30	10	.	6	1	.	722		

F: Forelimb, H: Hind limb and B: Both limb

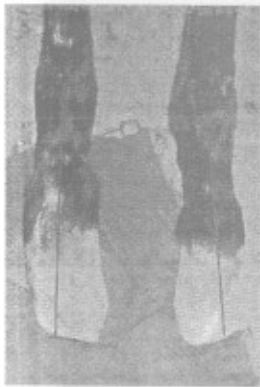


Fig. 1



Fig. 2



Fig. 3



Fig. 4



Fig. 5



Fig. 6

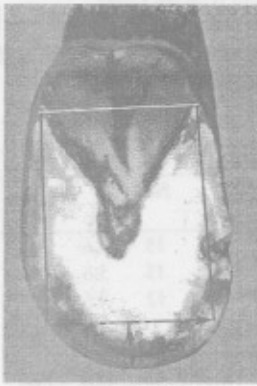


Fig. 7



Fig. 8



Fig. 9



Fig. 10



Fig. 11



Fig. 12

Fig. 1: Presence of toe in both forefeet of donkey.

Fig. 2: Presence of toe out in both hind foot of horse.

Fig. 3: Showing club foot which appears as increasing in hoof angle (81°) and hoof pastern axis is normal in right forefoot in mules.

Fig. 4: Showing mediolateral balance which appears as transverse line at the coronet parallel the ground surface and the longitudinal line bisects the hoof wall in to two equal parts.

Fig. 5: Showing mediolateral imbalance which appear as transverse line at the coronet not parallel the ground surface.

Fig. 6: Showing mediolateral imbalance which appear as warring of one arm of the hoof shoe (head of arrow) than the other (black arrow) and presence of thrush (A).

Fig. 7: Showing normal hoof from ventral view, the distance between the two buttress of the heel equal the distance between the hoof wall back to the toe about one inch in donkey.

Fig. 8: Showing contracted heel which appear as the ratio between length of bulb of heel and the length at the widest part of the sole and increase the concavity of the sole appeared as dished sole and present dry corn which appeared as red area (black arrow) at the bars in donkey.

Fig. 9: Showing broken backward hoof pastern axis with hoof angle (37°) lower than normal in left forefoot of horse.

Fig. 10: Showing broken forward hoof pastern axis and hoof angle (89°) in forelimb in donkey.

Fig. 11: Showing broken forward hoof pastern axis and hoof angle (90°) in left hind foot in mule.

Fig. 12: Showing advanced case of broken forward hoof pastern axis (knuckling) and the hoof wall become the weight bearing surface in left hind foot of donkey and hoof angle can not be measured.

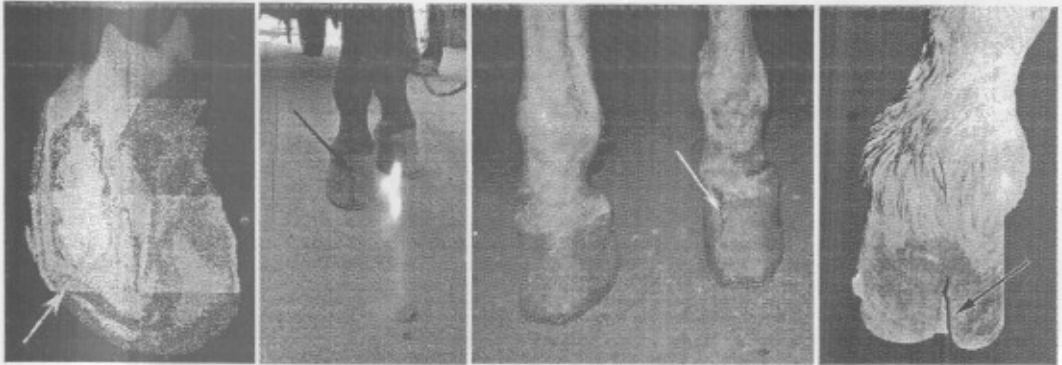


Fig. 13

Fig. 14

Fig. 15

Fig. 16

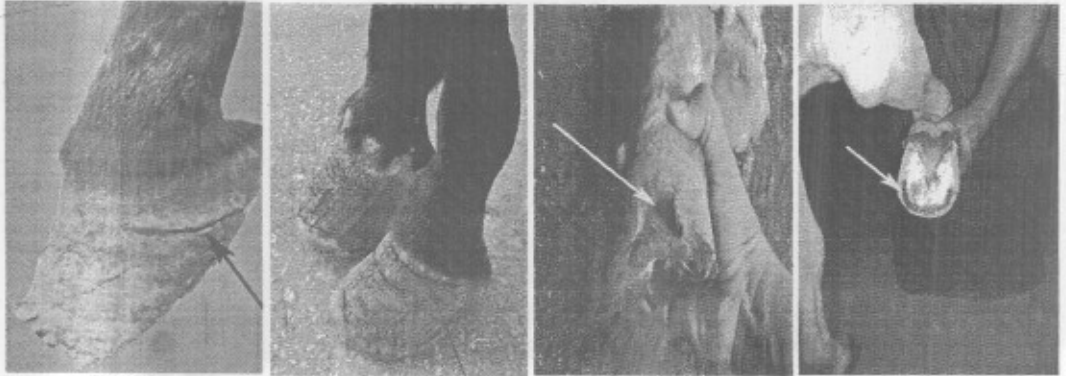


Fig. 17

Fig. 18

Fig. 19

Fig. 20

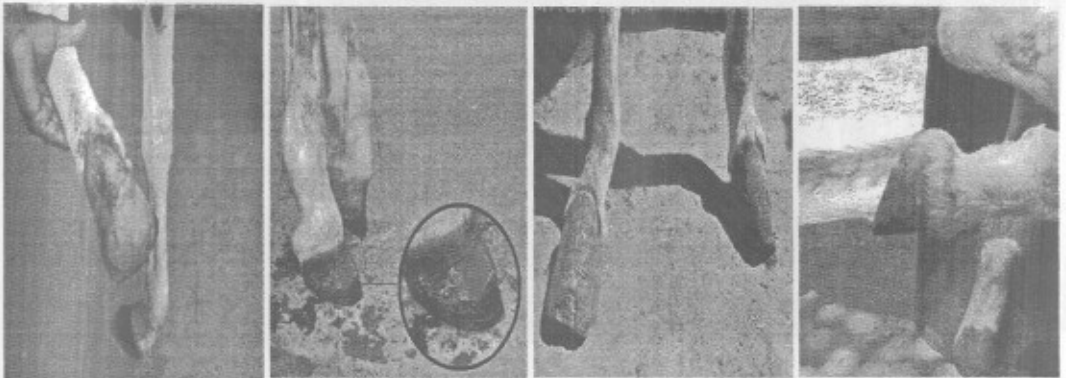


Fig. 21

Fig. 22

Fig. 23

Fig. 24

Fig. 13: Radiographic picture of the foot showing black area at the hoof wall due to entrance of air from the separation between the hoof wall and 3rd phalanx in case of advanced case of broken forward.

Fig. 14: Showing deep complete sandy crack started from the coronet to the ground surface in toe region (black arrow) in right hind foot of horse.

Fig. 15: Showing deep incomplete sandy crack started from the coronet in toe region (white arrow) in right forefoot of horse.

Fig. 16: Showing deep incomplete grass crack started from the ground surface at toe region in right hind foot in donkey (black arrow).

Fig. 17: Transverse crack (bowl-out) parallel to the coronet in left forefoot of donkey

Fig. 18: Showing multiple transverse cracks parallel to the coronet and is considered as a brittle hoof wall which easily broken in both forefeet of horse.

Fig. 19: Showing seedy toe which appear as separation of hoof wall in white line at toe region and presence of brown material easily broken by hoof picker in right forefoot in donkey.

Fig. 20: Showing seedy toe and appear dark brown area between the hoof wall at toe region which filled with pumica like stone and treated by removed all necrotic tissue and filled the space with medicated tar in right forefoot of donkey (white arrow).

Fig. 21: Showing hoof avulsion in left forefeet in donkey.

Fig. 22: Showing bull nosed hoof which appear as rasped toe and the shoe is longer than the toe to avoid warring to the toe in left forefoot of horse.

Fig. 23: Showing over growth of the hoof wall (long toe) and low heel and lowering the hoof angle in left forefoot of horse.

Fig. 24: Over warring to the hoof wall in donkey due to the animals unshod and work on the paved roads.



Fig. 25



Fig. 26

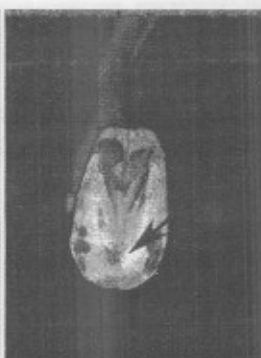


Fig. 27



Fig. 28



Fig. 29



Fig. 30



Fig. 31

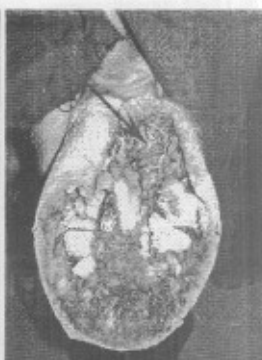


Fig. 32



Fig. 33



Fig. 34

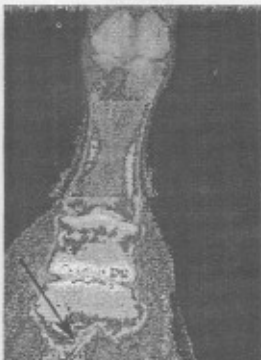


Fig. 35



Fig. 36

Fig. 25: Showing flat foot which appears as sole level (B) is higher than frog level (A) in left hind foot of horse.

Fig. 26: Showing white line disease in left forefoot in pony (six years) which appear as separation of hoof wall at white line region and present white chalky material which easily removed by hoof knife.

Fig. 27: Showing bruised sole at the toe region and sole cracks as sequel from dropped sole in right forefoot of donkey.

Fig. 28: Bruised sole at the toe region which appear as red area in right forefoot in horse.

Fig. 29: showed long standing (infected) bruised sole (white arrow)

Fig. 30: Showing corn at the bars of the foot.

Fig. 31: Showing thrush which appear as degeneration to the frog with presence of grayish to blackish material in right hind foot of donkey.

Fig. 32: Showing canker which appear as finger like projections with white color with offensive odor and easily bleeding after incision in left hind foot of horse.

Fig. 33: Showing picked up nail which appear as black hole at the apex of the frog (B) and sole cracks (C) and bruised sole which appear as red area (A) in left forefoot of horse.

Fig. 34: Radiographic picture of the foot mediolateral in position which show presence of metal nail penetrate the foot at the apex of the frog and reach to navicular bone and 2nd phalanx in left forefoot of donkey.

Fig. 35: Radiographic picture of the foot dorsopalmar in position which show presence of metal nail penetrate the foot at the frog and reach to 3rd phalanx right forefoot of horse.

Fig. 36: Showing under-run heel and the apex of the frog reach to white line; A: frog and B: sole

Discussion

Hoof affections are main causes of lameness in equines; therefore our study was designed to screen the most common hoof affections in equines in Beni-Suef, El-Fayoum and Giza provinces by using conventional as well as special methods for lameness diagnosis.

The observed higher prevalence of the hoof affections in donkeys (34.63 %) was in agreement with that presented by Saleh (1982), and it could be attributed to the inferior care of their owners, premature forcing of them to hard work on hard roads, and the owner usually seeks veterinary advice after the affection greatly progressed.

At the same time the recorded higher prevalence of affections in forelimb (36.8 %) than hind limb (20.8 %), and its lowest representing in both limbs (3.6 %) coincides with that obtained by Saleh (1982) and this might be due to that most of the body weight (60 %- 65%) of the animal is loaded on forelimb (Adams, 2002).

Regarding congenital hoof affections, result showed that Toe-in had the highest prevalence (9.7 % of total hoof affected animals). Its high incidence in donkeys and horses (8.2% and 13.5% from hoof affected animals) indicated that the animal forced to work at young age, and he carries heavy weight (Pollitt, 1995 and Adams, 2002). Moreover it predispose to formation of side bone. Club foot was noticed only in hind feet of two mules with a hoof angle between 65°-68° and this coincides with Pollitt (1995) and Adams (2002) who attributed its occurrence to congenital predisposition, injuries that interfere with the proper use of the foot, or nutritional deficiency. The broken backward foot pastern axis was recorded in 5 % of total hoof affected animals with hoof angles between 25°-42°, and it is an indication of genetic predisposition, presence of long toe, faulty trimming and shoeing, excessive trimming of the heel to reach the desired ground surface. Lowering of the hoof angle more than normal, causes caudal foot pain and lameness, this is in agreement with Frank *et al.* (1980), Barrey (1990), Booth (1998), Daniel (2000), Adams, (2002) and O'Gardy and Poupard (2003). Advanced cases of hoof broken forward (Knuckling) forced the animals to walk on the dorsal hoof wall that became the weight bearing surface of the foot. Radiographically, black areas appeared as a result of separation of the hoof wall from 3rd phalanx and this coincides with Pollitt (1995) who attributed this affection

to inferior hoof care, or severe contraction of deep digital flexor tendon. Mediolateral imbalance was noticed in donkeys only (2.2% of total hoof affected animals). Moyer and Anderson (1975- a and b) and Redden (2004) attributed that to the inferior care to this breed, faulty trimming and shoeing of the hoof, toe-in, or sheared heel.

With respect to acquired affections of the hoof, Sandy cracks were the most common type of hoof affections as it was observed in 12.9 % of total hoof affected animals. These results are consistent with that observed by Evans, *et al.* (1966), Leach and Zoerb (1983), Kempson (1990); Buffa, *et al.*, (1992), Josseck, *et al.* (1995), Reilly (1995), Zenker, *et al.*, (1995), Adams (2002), Stashak (2002), Frandson, *et al.*, (2003), Ross (2003), El-Maghraby (2004) and Bigham and Tabatabaei (2007), and they referred the higher incidence of sandy cracks to genetic predisposition, poor hoof quality, excessive dryness of the hoof wall by rasping of periople layer, injury to the coronary band, lack of hoof trimming, alternative moisture and dryness of the hoof horn, and biotin and mineral deficiencies. Quarter cracks were more frequent (55 animals) than toe cracks (38 animals), this finding is consistent with that recorded by Emery, *et al.* (1977), Trussel (1977), Lahunta and Habel (1986), Frust, *et al.* (2006), and Bigham and Tabatabaei (2007) who stated that the quarter region is the thinnest region of the hoof wall so any injury or trauma leads to extensive damage to it, on the other hand, toe cracks had higher incidence in the hind feet, this finding is consistent with that stated by El-Guindy (1981) and Bigham and Tabatabaei, (2007) and it might be due to that the sample of the study was draught horses that carry heavy weight and walk on unpaved roads. It was noticed that vertical cracks easily increased more than horizontal cracks; this finding is consistent with that recorded by Stashak (2002), and it might be due to that the hoof wall consists of modified cornified epithelium cells that are solidly cemented with keratin. These keratinized cells are arranged in tubules which run perpendicularly from the coronary band to the ground surface and parallel to each other so, the cracks are easily progress between these tubules (Adams, 2002). Concerning seedy-toe, higher prevalence was found in forefeet. The lesion began from the ground surface to various degree of depth with presence of space between the hoof wall and under lying tissue that may be filled

with stone or muddy material. Hollow sound emitted on percussion on hoof wall and this coincides with Saleh (1982), and Ball (2000). The affection might be due to improper hoof trimming, severe concussion due to work on hard roads, irregular shoeing, poor management, and/or collection of environmental contaminants within stratum medium. Long toe had high prevalence (9.1 %) in compare with hoof wall affections after sandy cracks and it might be due to early forcing of animal to hard work or inferior awareness to the hoof trimming importance. Long toes may lead to under run heel, hoof cracks, white line disease, hoof wall separation, and lowering of hoof angles (Stashak, 2002; Ronney, 1999 and Lyle, 2003).

Corn was recorded in 6.92% of affected animals, with higher frequency in forefeet than hind feet, and this coincides with Saleh (1982), Hickman (1984), Adams (2002) and Kenneth, et al. (2004) who summarized causes of corn as being related to higher bearing of body weight on the forelimbs, hard work on unpaved roads, improper shoeing and accidental forcing of the stone, unfitted short shoe which leads to entering the buttress of the shoe in the angle of the hoof, and improper trimming of the hoof which leads to low heel and increased pressure on the seat of the corn or excessive thinning of the sole.

Thrush was more common in donkeys than horses (10.63 % and 3.8 %, respectively), and had higher prevalence in hind feet than forefeet. The affected sulci appear deeper than normal during cleaning and large area can be detached from the frog with presence of grey to black material of offensive odor and this is consistent with the observations of Saleh (1982), Reeves, et al. (1984), Atsuko (1999), and Adams (2002) they attributed it to poor hoof care and unhygienic measures in animal houses including mud soaked bedding saturated with urine and high moisture leading to severe maceration of the horny frog and infections that reach to the sensitive frog.

Canker had the same clinical signs mentioned by Reeves et al. (1984), Wilson (1995), and Kenneth, et al. (2004), including proliferative granulation tissue (finger like projections) usually white in color, easily bleed on manipulation, and of characteristic foetid odor. Canker had higher prevalence in hind feet (1.68 %) than forefeet (0.28 %) and this could be attributed to unhygienic measures in animal's houses, high moisture, poor hoof care and infection, this is in agreement with Prescott

(1970), Wilson et al. (1989), and Sherman et al., (1996).

Picked up nail had higher prevalence in forefeet (4.85%) among the recorded hoof affections in compare with hind feet, and frog is frequently more affected than other parts of the hoof and bleeding may be ensue from the nail hole. This finding coincides with that of Adams (2002), and Trotter (2004) who attributed this to heel-first landing. The nail could be seen clearly by radiography at the distal phalanx, and this coincides with Farrow (2006) who noticed that metallic foreign bodies show clearly but wooden splinters are radiographically invisible.

Affected animal exposed to high risk to be infected with tetanus, fracture to 3rd phalanx, and navicular disease. Foot palpation revealed hotness, pain, and bleeding ensues from the nail hole (Richardson, et al., 1986 and Adams, 2002). Authors noticed that the effective treatment was providing adequate drainage, removal of all infected and necrotic tissue and protecting the wound by applying heart bar shoe or shoe with rubber pad to avoid contamination and prevent the occurrence of this affection again, so the shoe play an important role because it considered as therapeutic and preventive shoe.

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معدل حوث إصابات الحافر في الخيول

أجريت هذه الدراسة على ١١٧٨ حالة عرج في الفصيلة الخيابة. وتم تقسيم الحالات على حسب نوع الحيوان. مكان الإصابة في القدم وطبيعة هذا المرض. تمثل إصابات الحافر ٧٢٢ حالة بنسبة ٦١,٣% من إجمالي حالات العرج. نسبة إصابات الحافر في القدمين الأماميين أكثر من القدمين الخلفيتين.

أوضحت هذه الدراسة أن تششق الحافر تسوس الحافر وطول الحافر الزائد عن الطبيعي من أكثر الإصابات الموجودة في الحافر. و أوضحت الدراسة أيضاً أن لعل الحافر من أكثر الإصابات الموجودة في نعل الحافر يليه مرض الخط الألبيض ويأتي الفلات فوت و التهاب نعل الحافر أخيراً كآكل نسبة إصابية في نعل الحافر. بينما يعتبر عفن الحافر من أعلى الإصابات الموجودة في نسر الحافر يليه مرض المسمار الملتقط وأخيراً مرض إنخفاض شديد لكعب القدم.