

CLINICAL AND RADIOGRAPHIC EXAMINATIONS OF FORE FETLOCK AND PASTERN JOINTS IN WORKING POLO PONIES

BASHIR, A.

*Department of Veterinary Clinical Studies
Universiti Pertanian Malaysia
43400 UPM Serdang, Selangor.*

SUMMARY : Thirty three working polo ponies were subjected to clinical and radiographic examinations. Fourteen (42.4%) were fetlock joint swellings, 9 (27.3%) restricted joint flexion, 13 (39.4%) pain on flexion, and 13 (39.4%) positive flexion test. It was also found that 23 (69.7%) had various periosteal roughening and new bone growth in the distal third metacarpus (30.3%), first phalanx (33.3%), and second phalanx (15.1%). Other lesions seen were ossification of suspensory ligament (21.2%) and distal sesamoidean ligament (6.1%), chip fracture (24.2%), splints (9.1%), and sesamoid bone fracture (18.2%). Age, frequency of games and training, years of use and, conformation are associated with clinical findings (fetlock swelling, flexion angle, flexion pain and flexion test) and with lesions in distal third metacarpus and second phalanx, and with chip fracture and osselets.

INTRODUCTION

Polo is a unique equine sport during which horses are involved in a combination of walking, trotting, sudden bursts of speed, long gallops, turning at acute angles at high speed, sudden stops, backing and other possible gaits. Although in a polo game, horses are played only for 7 1/2 minutes in each half, they are subjected to frequent sudden changes in gaits. These gaits, especially sudden stops at full speed and sharp turns during fast gallops are stressful to the limbs. The limbs most affected are the fore joint extremities, that is the fetlock and pastern. The limb extremities are also prone to injury from hits by the polo sticks and the ball. This is indicated by high incidence of clinical cases of joint conditions in polo ponies. These conditions became more obvious because polo in Malaysia is played all year round, whenever weather permits. Furthermore, the cost of maintenance is high, thus the number of polo horses owned are limited. As a result, polo horses are used throughout the year without spelling, thereby increasing the incidence of joint injuries.

The purpose of this investigation was to evaluate the incidence of conditions of the forelimb extremities in horses used for polo.

MATERIALS AND METHODS

Clinical examination

Thirty three playing polo ponies were selected for the study. These horses were volunteered by their owners and they constitute 40% of the total population of polo ponies in Selangor Polo and Riding Club.

The age, height, nature of work, duration of use, and history of previous injuries were recorded prior to examination. All horses were subjected to routine physical examination with

emphasis on the musculoskeletal system. The horses were trotted to exclude lame horses from the investigation. Strict examination of the limb with emphasis on leg conformation, joint swelling, pain pastern and fetlock flexion, and flexion test were conducted.

Radiographic examination

The fetlock and pastern were examined radiographically. Both joints were radiographed at four projections, namely the Lateral, Anterior-Posterior, Anterior-Posterior Lateral Medial Oblique and Anterior-Posterior Medial Lateral Oblique. The exposure rate was 70 kV and 3.0 mAs using a portable X-ray machine. The radiograph was examined for presence of changes. Radiographic description was made based on changes involving the bones and soft tissue. Osselet is defined as traumatic arthritis of the fetlock joints which includes the inflammation of the periosteum of distal third metacarpus and proximal first phalanx and its peripheral soft tissues. Ringbone is defined as new bone growth of the first, second or third phalanx. Classification of the radiographic changes were made such that, minimal changes that did not involve the joint were graded as mild. Obvious changes not involving the joint were graded as moderate and changes involving the joints were graded as severe.

Statistical analysis

Statistical analysis was done using the Chi-square test at 5% significance level.

RESULTS

Clinical findings related to conditions of the joints tested were 14 (42.4%) fetlock joint swelling, 9 (27.3%) restricted fetlock joint flexion, 13 (39.4%) pain on fetlock and pastern joint flexion, and 13 (39.4%) positive fetlock and pastern flexion test. The number and percentage of horses with positive clinical findings to factors of age, size, frequency of games played per week, hours of training per day, years of use, and conformation is shown in Table 1. Percentage of positive clinical findings and clinical test were found to increase with increase in age, frequency of games played per week, hours of training per day, and years of use. Percentage of these clinical factors were also found to be higher in horses that are not of standard size and those with poor conformation. It was found at clinical examination that horses with fetlock joint swelling and restricted flexion angle were significantly associated ($p < 0.05$) with age, years of use, and conformation. Horses which showed pain during fetlock and pastern flexion and those with positive flexion tests were found to be significantly associated ($p < 0.05$) with age, frequency of games played per week, hours of training per day, years of use, and conformation.

Radiographic examination of 33 horses showed 23 (69.7%) with various types of radiographic changes. These changes were 15 (45.4%) osselets and 8 (24.2%) ringbones. They were located in various sites namely the bone, soft tissues, and joints. Periosteal roughening or new bone growth were the major lesions of which 10 (30.3%) were located in the distal third metacarpus (MC3), 11 (33.3%) on both or either proximal or distal first phalanx (P1) and 5 (15.1%) on the proximal second phalanx (P2). Ossification was seen in the ligaments of which 7 (21.2%) were in the suspensory ligament and 2 (6.1%) were in the distal sesamoidean ligament. Chip fractures observed in 8 (24.2%) horses were all located in the fetlock joints. Others lesions were 6 (18.2%) sesamoid bone fracture and 3 (9.1%) splints.

Radiographic changes according to the sites of lesions when compared to age, size, frequency of games, played per week, hours of training per day, years of use and conformation is shown in Table 2. There is a significant association ($p < 0.05$) between radiographic changes and these factors. Distal third metacarpal lesions were found to be significantly associated

TABLE 1: Association of clinical findings with characteristics of the horse

Clinical Findings	Age (yrs)		Height		Games/wk		Hrs trained/wk			Yrs used			Conformation	
	6-10	11-15	Std*	nonstd	1	2	1-3	4-6	1-5	6-10	Good	Poor		
swelling	14	3(9.1)	11(33.3)	8(24.2)	6(18.2)	5(15.1)	9(27.3)	5(15.1)	9(27.3)	3(9.1)	11(33.3)	8(24.2)	6(18.2)	
Restricted flexion angle	9	1(3.0)	8(24.2)	5(15.1)	4(12.2)	2(6.1)	7(21.2)	4(12.1)	5(15.1)	1(3.0)	8(24.1)	4(12.1)	5(15.1)	
+ve flexion pain	13	2(6.1)	11(33.3)	7(21.2)	6(18.2)	3(9.1)	10(30.3)	3(9.1)	10(30.3)	3(6.1)	11(33.3)	6(18.2)	7(21.2)	
+ve flexion test	13	2(6.1)	11(33.3)	7(21.2)	6(18.2)	3(9.1)	10(30.3)	3(9.1)	10(30.3)	3(6.1)	11(33.3)	6(18.2)	7(21.2)	

*Standard height is 14 h 2" to 15 h 3"

Values in parenthesis are in percentages of total number of horses

TABLE 2: Association of radiographic changes with characteristics of the horse

Radiographic changes	Age (yrs)		Height		Games/wk		Hrs trained/wk			Yrs used			Conformation	
	6-10	11-15	std*	nonstd	1	2	1-3	4-6	1-5	6-10	Good	Poor		
MC3	2(6.1)	8(24.2)	5(15.1)	5(15.1)	2(6.1)	8(24.2)	2(6.1)	8(24.2)	2(6.1)	8(24.2)	4(12.1)	6(18.2)		
Splints	2(6.1)	1(3.0)	3(9.1)	0(0.0)	3(9.1)	0(0.0)	3(9.1)	0(0.0)	2(6.1)	1(3.0)	3(9.1)	0(0.0)		
Sesamoid	3(9.1)	3(9.1)	5(15.1)	1(3.0)	3(9.1)	3(9.1)	3(1)	3(9.1)	3(9.1)	3(9.1)	5(15.1)	1(3.0)		
P1	3(9.1)	8(24.2)	7(21.2)	4(21.1)	4(21.1)	4(12.1)	6(18.2)	5(15.1)	3(9.1)	8(24.2)	6(18.2)	5(15.1)		
P2	0(0.0)	5(15.1)	4(12.1)	1(3.0)	1(3.0)	4(12.1)	1(3.0)	4(12.1)	0(0.0)	5(15.1)	2(6.1)	3(9.1)		
Suspensory ligament	2(6.1)	5(15.1)	4(12.1)	3(9.1)	2(6.1)	5(15.1)	3(9.1)	4(12.1)	2(6.1)	5(15.1)	4(12.1)	3(9.1)		
Distal sesamoidean ligament	0(0.0)	2(6.1)	2(6.1)	0(0.0)	0(0.0)	2(6.1)	1(3.0)	1(3.0)	0(0.0)	2(6.1)	1(3.0)	1(3.0)		
Chip fracture	1(3.0)	7(21.2)	3(9.1)	5(15.1)	2(6.1)	6(18.2)	3(9.1)	5(15.1)	1(3.0)	7(21.1)	4(12.1)	4(12.1)		
Osselets	4(12.1)	11(33.3)	9(27.3)	6(18.2)	5(15.1)	10(30.3)	6(18.2)	9(27.3)	4(12.1)	11(33.3)	9(27.3)	6(18.2)		
Ringbones	3(9.1)	5(15.1)	6(18.2)	2(6.1)	3(9.1)	5(15.1)	4(12.1)	4(12.1)	3(9.1)	5(15.1)	5(15.1)	3(9.1)		

* Standard height is 4 h 2" to 15 h 3"

Values in parenthesis are in percentages of total number of horses

MC3 = Third metacarpus

P1 = First Phalanx

P2 = Second phalanx

TABLE 3: Association of clinical findings with radiographic changes

Clinical findings	Total	MC3	Splints	Sesamoid	P1	P2	Distal				
							Suspensory Ligament	Sesamoidean Ligament	Chip Fracture	Osselets	Ringbones
+ve swelling	14	9(64.3)	0(0)	3(21.4)	4(28.6)	2(14.3)	6(42.9)	2(14.3)	8(57.1)	12(85.7)	2(14.3)
Restricted flexion angle	9	6(66.7)	0(0)	2(22.2)	3(33.3)	2(22.2)	5(55.5)	1(11.1)	5(55.5)	9(100.0)	2(22.2)
+ve flexion pain	13	9(69.2)	0(0)	2(15.4)	6(46.1)	4(30.8)	5(38.5)	2(15.4)	8(61.5)	11(84.6)	4(30.8)
+ve flexion test	13	9(69.2)	0(0)	2(15.4)	6(46.1)	4(30.8)	5(38.5)	2(15.4)	8(61.5)	11(84.6)	4(30.8)

Values in parenthesis are in percentages of total number of horses

MC3 = Third metacarpus

P1 = First Phalanx

P2 = Second phalanx

with all except for size. Other significant association was between second phalanx lesions to age years of use. Chip fractures in the fetlock were found to be significantly associated with age, size, and years of use only. Grouping of the above lesions as either osselets or ringbones showed that only osselets were found to be significantly associated ($p < 0.05$) with age, years of use, and conformation.

The association of clinical findings to radiographic changes is shown in Table 3. High percentage of lesions associated with fetlock joints were mainly the distal third metacarpal lesion and chip fracture. These lesions were indicated by joint swelling, restricted flexion angle, pain on flexion, and positive flexion test. Clinical findings were found to be significantly associated ($p < 0.05$) with radiographic changes of distal third metacarpus (MC3), chip fracture, lesion involving joints, and osselets. Significant association ($p < 0.05$) was also observed between joints swelling and restricted joint flexion angle to the lesion of suspensory ligament.

Grading of radiographic changes showed 9 (27.3%) mild, 3 (9.1%) moderate and 11 (33.3%) severe lesions. The mild lesions were mostly restricted to slight roughening of either the distal third metacarpus, first phalanx or second phalanx. Moderate lesions were obvious new bone growth, mainly in the distal third metacarpus and proximal first phalanx which did not encroach into the joints. Three of the severe lesions (9.1%) involving the fetlock or the pastern joints were found cause complete ankylosis.

DISCUSSION

This study showed a high incidence of radiographic changes in playing polo ponies. A similar study by Jeffcott (1983) also showed that 72.2% of normal young working horses had radiographic changes, of which 27.8% were of possible potential clinical significance. Stromberg (1983) in another study also showed 33-66% radiographic changes of clinical significance. The percentage of severe and moderate radiographic changes (42.4%) in the present study is high and considered to be significant.

The high percentage of osselet and ringbone observed is considered to be clinically significant for polo horses. This condition may cause recurrent lameness whenever they are used for polo. Even horses with mild joint lesions may be affected, because these lesions may be aggravated whenever the horses are played without adequate rest. Furthermore the stress on the fibrous portion of the joint capsule may cause new bone growth on the distal third metacarpus and/or the first phalanx (Edwards, 1984). The situation is worsened, because in Malaysia, polo is played all year round. Using polo ponies throughout the year poses a major threat to their extended use. The situation becomes more serious since the horses were not allowed enough rest after each episode of lameness. These abuses are all due the number of horses owned by polo enthusiasts being limited.

The significant association of all clinical findings to age of the horse, frequency of games played, hours of training, years of use, and conformation indicates that each of these factors should be considered whenever polo ponies are to be selected for purchase. The size of the horses is found not to be an important criterion for purchase. Furthermore, the association of lesions in the distal third metacarpus to the above factors, except age, strongly supports the importance of these factors to clinical findings and new bone formation of the distal third metacarpus. The association of clinical findings to radiographic changes of the distal third metacarpus, suspensory ligament, distal sesamoidean ligament, chip fracture, and osselets showed that clinical findings should be used as a criterion for radiographic examination.

Therefore, it can be concluded that, due to the nature of work and use of polo ponies in

Malaysia, it is vital that the age, frequency of training and games played, duration of use, conformation, and clinical examination for fetlock swelling, flexion angle, flexion pain, flexion test be considered before horses are selected for purchase. Radiographic examinations for lesions in the bone associated with fetlock joints prior to purchase is also important. Although nonsignificant radiographic changes may be seen in working polo ponies, the location of these changes is very important. In fact, signs of secondary disease joint are prominent in fetlock joints with nonsignificant lesions as the contact of the condylar lesion will further stimulate enlargement of lesions (O'Brion *et al.*, 1981). There is also a possibility that certain radiographic changes may not cause obvious clinical signs, such as avulsion fractures of the sesamoid (Dik, 1985). Therefore any radiographic changes, with or without obvious clinical sign should be considered during examination for purchase, together with age, frequency of games and training, years of use, and conformation.

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RINGKASAN

PEMERIKSAAN KLINIKAL DAN RADIOGRAF SENDI FETLOK DAN PASTERNE DEPAN KUDA POLO KERJA.

Tiga puluh tiga kuda polo kerja telah dikenakan pemeriksaan klinikal dan radiograf. Empat belas (42.4%) adalah bengkok sendi fetlok, 9 (27.3%) lipatan sendi terhad, 13 (39.4%) sakit apabila sendi dilipat, dan 13 (39.4%) ujian lipatan positif. Dua puluh tiga kuda (69.7%) didapati mengalami berbagai kekasaran periosteum dan pertumbuhan tulang baru pada bahagian distal metakarpus ketiga (30.3%), falanks pertama (33.3%), dan falanks kedua (15.1%). Lesi-lesi lain termasuk penulangan ligamen suspensori (21.2%) dan ligamen sesamoid distal (6.1%), fraktur serpih (24.2%), splints (9.1%), dan fraktur tulang sesamoid (18.2%). Umur, kekerapan perlawanan dan latihan, jumlah tahun diguna, susuk badan, didapati terkait dengan penemuan klinikal (iaitu, bengkok fetlok, sudut lipatan, sakit lipatan, dan ujian lipatan) dan dengan lesi-lesi pada metakarpus ketiga distal dan falanks kedua, dan juga dengan fraktur serpih dan oselet.