JOURNAL OF VETERINARY AND APPLIED SCIENCES
2013 VOL. 3(1): 35 - 48
Manuscript No. JVAS/2013/019; Received: 30/07/2013; Accepted: 05/11/2013
Published by: Faculty of Veterinary Medicine, University of Nigeria, Nsukka, Nigeria

RADIOGRAPHICALLY CONFIRMED ORTHOPAEDIC CASES AT THE UNIVERSITY OF NIGERIA VETERINARY TEACHING HOSPITAL

*** Athanasius C. Eze, Celestine O. Ukwueze, Kenneth C. Ogbanya and Jonas A. Onah**

Department of Veterinary Surgery, University of Nigeria, Nsukka, Enugu State, Nigeria.

==========

Abstract
Radiography remains an essential tool in orthopedics for diagnosis and recommendation of the type of management of fracture cases both in human and animals. A retrospective study of confirmed fracture cases of animals presented to the University of Nigeria Veterinary Teaching Hospital between 1982 and 2008 was conducted using records obtained from the Radiology Unit of the Hospital. The diagnosed cases were traced back to hospital case files/records where the primary complaint and management details were recorded. The species of animal, sex, age, fracture type, radiographic view, management details and their outcome were investigated. A total of 115 cases were obtained within the study period including 24 (20.9%) fractures involving the femur; 13 (11.3%) of the radius and ulna; 9 (7.8%) of the humerus and 12 (10.4%) of the thorax. Fracture of more than one anatomical part was recorded in about 29% of the population. Canine cases (70.0%) were most prevalent followed by caprine (18.0%), feline (4.0%), primates (4.0%), bovine (2.0%), ovine (1.0%), and equine (1.0%) cases. Female (61.5%) and older (76.1%) animals of over one year had greater percentage of cases compared to male (38.5%) and young (22.6%) animals respectively. Lateral and ventral view radiographs were mostly employed in the diagnosis of the cases studied. Most of the fractures were managed by internal fixation and 96% success rate was recorded with wound infection as a common complication. It is concluded that fracture of axial skeleton- the femur, humerus, and radius and ulnar dominated the radiographic findings with canine and caprine species being most frequently involved.

KEY WORDS: Radiographs, Orthopaedic Cases, Bones, Nsukka

==========

INTRODUCTION

Diagnosis of fractures can begin at the time of physical examination, but it relies on radiographs to determine the nature of the injuries [1]. Surgical cases in animals presented to veterinary hospitals and

***Correspondence: Email:** chinedueze93@yahoo.com; **Tel.:** +234 803 549 1823
ISSN: 2315 - 6856

clinics are usually emergency cases that often demand urgent and immediate intervention. These cases usually need precise and proper diagnosis in order to proffer an effective surgical treatment. Among these cases are hernia, dystocia, prolapse, ligament rupture and bone injuries [1].

Traumatic injuries such as those due to animal bite, stepping on the animal, unintentional dropping of heavy object on the animal, animal falling from a height and accidental automobile knock down often end up in fractures of the bone(s) of the affected part [2]. Fractures of the hip bones, vertebral bones, femur, humerus, tibia, radius and ulnar and bones of distal extremities are usually presented in the hospitals and clinics for an effective surgical management.

Pelvic fractures (hip bone fracture) in dogs and cats are common, making up approximately 25% of all fractures seen in veterinary practice and among small animal practitioners [1]. It is a complex fracture seen always with other concurrent injuries including thoracic, neurologic, spinal, urinary, and vascular injuries. Diagnosis of pelvic fractures can begin at the time of physical examination, but it relies on hip-extended and lateral radiographs to determine the nature of the injuries [1]. However, oblique views may be helpful in some instances [3]. Treatment of pelvic fracture is always preceded by the treatment of other concurrent injuries that are life threatening, before decision is taken either to treat the fracture conservatively or by surgery depending on the nature of the fracture [3].

Humeral fractures in dogs are common and represent approximately 10% of all limb fractures [4]. There are three classic patterns for humeral fractures: physeal fractures in immature dogs; diaphyseal fractures resulting from a major trauma and half of these fractures are comminuted; condylar fractures in adult dogs, secondary to incomplete ossification of the humeral condyle [5]. Thorough physical examination is a tool for tentative diagnosis of surgical fracture while mediolateral and craniolateral radiographs of the humerus are used to confirm the cases [5].

Most humeral fractures need surgical repair [4]. Condylar fractures are ideally repaired with bone screws which provide interfragmentary compression. Stable diaphyseal fractures can be repaired with intramedullary pins and cerclage wires while unstable diaphyseal fractures are repaired with bone plates, interlocking nails, or external fixators. Early postoperative physical therapy helps maintain range of motion of the elbow and limb function [5]. In the fracture of radius and ulna, and bones of distal extremities, measures have to be taken for proper diagnosis and prompt treatment as in the fracture of the humerus and femur [5]. From all indications, to adopt appropriate treatment regimen that is surgically effective, the cases need to be radiographically confirmed.

The objectives of this study was therefore to evaluate radiographically confirmed surgical cases from the hospital records with a view determine the appropriateness of the technique, frequency of occurrence of such cases, the animals involved, their age and sex, and the success rate and common complications associated with the healing of the conditions.

MATERIAL AND METHODS

Retrospective study of radiographially confirmed fracture cases of animals presented to University of Nigeria Veterinary Teaching Hospital was carried out using records obtained from the radiology unit and case records/files of the hospital. All radiographs taken from 1982 to 2008 were reviewed and fracture cases selected for further and detailed examinations. Trauma cases that were not radiographically

diagnosed as fractures were excluded in the study. The case numbers of all selected cases were traced back to the hospital case file/records where the primary complaint and management details were recorded. The clinical details including the species, sex and age of the animal, the type of fracture, radiographic views and associated complications as recorded in the files were reviewed. At the hospital archives, files of the cases were cross-matched with radiological details. In addition to these radiographic details, the type of case management and the success rate of managed cases were also noted.

RESULTS

The distribution of the radiographiycally confirmed fracture cases including the species of animals involved and year of occurrence, were presented in the table 1. A total number of 115 cases were recorded for the period under review (1982 -2008). The highest number of cases was recorded in 2002. Most of the cases were recorded in canines (70%) followed by caprine (18%), felines (4%), primates (4%), bovine (2%), equines (1%) and ovine (1%) (Table1).

Out of the 115 cases recorded, the radiographic parts most frequently affected with fracture (as observed in the VTH case files) were femur (24 cases), radius and ulna (13 cases), thoracic bones (12 cases), head and neck regions (10 cases) each, lumbar (9 cases), tibia and fibula (7 cases), hip (4 cases), forelimb (4 cases), metacarpal (3 cases), digital bones and carpal bones (2cases each), elbow joint and maxilla bones (1 case each) in that order (Figure 1). Also about 29% of the total cases confirmed involved concurrent fracture of more than one anatomic part (Plates 1 – 5 show samples of the of different fracture cases as presented in the hospital during the period in review.

As shown in Fig. 2, fracture cases were more prevalent among the females than males of all species except the ovine and bovine species in which only males were involved in fractures. Adults of all species were more affected by the fractures than the young except in the bovine where fracture cases were equally distributed among the ages (Fig. 3).

Most of the cases (75%) were managed with intramedullary pin and cerclage wire. All the cases were successfully managed, with minimal complications such as septicemia and wound infections involving about 4% of the treated cases (Table 2). The rate of bone healing was fast as revealed by the case files.

DISCUSSION

The result of the study indicated that the highest prevalence of fracture was recorded in 2002 (Table 1). A similar observation of highest prevalence of fracture cases was made in 2002 by Abdulraman *et al.* [6], although the actual cause of the increase in the number of cases in that particular year remains unknown.
From records, canine species had the highest prevalence (70%) of fracture cases owing probably to the high population of dogs in the study area where they are predominantly used as pet, security and for hunting [7]. Dog breeding serves as source of income for many people in the study area [8]. These economic and social reasons favor the keeping of dogs and the presentation to the hospitals. The caprine species also recorded a high prevalence of fractures probably due to the fact that the goat is one of the major domestic animals usually kept for economic purposes and as source of meat in the study area [9,10,11,12]. These animals move freely and in some instances without check by their owners [12] which may predispose them to traumatic injuries.

Table 1: Yearly distribution of radiologically confirmed orthopeadic cases among species of animals presented at the Veterinary Teaching Hospital, Nsukka

Year	No. of cases	Canine	Feline	Caprine	Bovine	ovine	equine	primate
1982	2	2						
1983	2	1						1
1984	2	1		1				
1985	1	1						
1986	4	1						3
1987	1	1						
1989	1	1						
1990	1	1						
1991	3	3						
2000	5	5						
2001	13	10		1	1		1	
2002	22	16		5	1			
2003	1	1						
2004	16							
2005	21	10	2	9				
2006	13	9	3	1				
2007	4	3		1				
2008	3	1		1				
Total	115	67	5	19	2	1	1	
%	100%	70%	4%	18%	2%	1%	1%	4%

The most commonly affected radiographic part as revealed by the study was the femur. Previous studies revealed that the femur was the most frequently fractured bone in veterinary practice [13,14,15]. The 20% and 10% humeral and femoral fractures were in agreement with previous studies [1,5]. Most of the humeral fractures recorded in this study were either diaphyseal or condylar and mostly comminuted and these agree with Denis [5].

The correlation between sex and fracture cases showed that a relatively higher prevalence of fractures was recorded in females than males probably as a reflection of higher population of female than male animals in the study area. The breeding ratio for female to male animals in the study area is usually about 4:1 such

that more females are kept by the farmers [7]. However, this contrasts with previous reports that male animals, particularly dogs are more exposed to injuries due to their wandering habit in search of sex partners especially during their breeding season [6,14,16,17].

Table 2. Orthopaedic cases, management methods applied and complications recorded

Type of case	No. of cases	Management method applied	Complications	No. of cases
Fracture of upper jaw	1	Interdental wiring	Septicemia	1
Oblique diaphyseal fracture of humerus	7	Intramedullary pin and circulage wire	Wound infection	1
Incomplete diaphyseal fracture of humerus	2	Intramedullary pin and lag screw	_	_
Dislocation of the elbow joint	1	Closed reduction and replacement	_	_
Proximal fracture of radius and ulna	6	Intramedullary pin and circulage wire	_	_
Distal fracture of radius and ulna	7	Intramedullary pin and lag screw	_	_
Transverse fracture of olecranon process	1	Kirschen/tension wiring	_	_
Dorsal fracture of radial carpal bones	2	Lag screw	_	_
Dislocation of femoral head	2	Closed reduction		
	1	Open reduction	_	_
Oblique fracture of femoral bone	15	Intramedullary pin	Wound infection	2
Transverse fracture of femoral bone	9	Intramedullary pin	Wound infection	1
Oblique fracture of tibia bone	7	Intramedullary pin	_	_
Dorsal fracture of radial carpal	2	Lag screw	_	_
Transverse fracture of acetabulum	1	Bone plate/screw	Septicemia	1
Oblique fracture of ischium and acetabulum	1	Lag screw	_	_
Fracture of ischial tuberosity	1	Lag screw		

Fracture cases were recorded more in adult when compared to that of young animal. Similarly, Eze and Okoli [8] stated that cases of fracture and joint dislocations among dogs were found to be slightly more in dogs above one year of age. There were also reports that 69% of femoral fracture occurred at or below 2 years of age [2,18]. However previous studies reported greater percentage of fracture cases in animals below one year, thus explaining the situation as due to inexperience in avoiding dangers and fragility of the bones in younger animals than the older ones [6,14,19].

Some of the radiographs depicted the exact nature of the fractures, and the appropriate reduction methods applied, showing that the goal of fracture repair is to establish rigid fixation and perfect alignment of the bone to allow both timely and maximized return to function of the affected area (Tercanlioglu and

Sarierler, 2009). The high success rate recorded was an evidence of proper diagnosis, and effective management of the cases.

CONCLUSION

Most orthopaedic injuries, clinically and radiographically diagnosed in the hospital were more of femoral fractures and were dominated by canine species. Recording more cases in adult and female animals, suggested that owners keep more females than males. From this study radiographs remain an essential tool in orthopedic surgery for proper diagnosis, understanding and management of fracture cases. Therefore, early diagnosis and management enhance recovery and can drastically reduce post surgical complications.

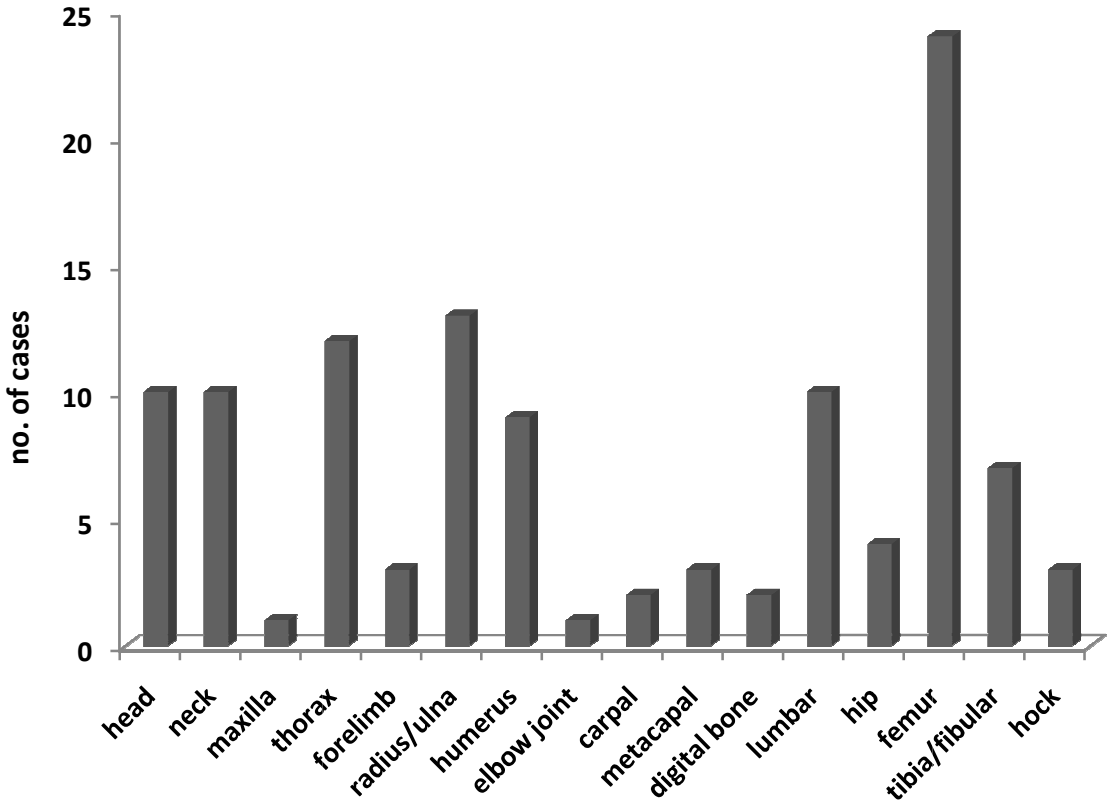

Fig. 1: Radiographic parts affected and the number of cases over the period (1982-2008).

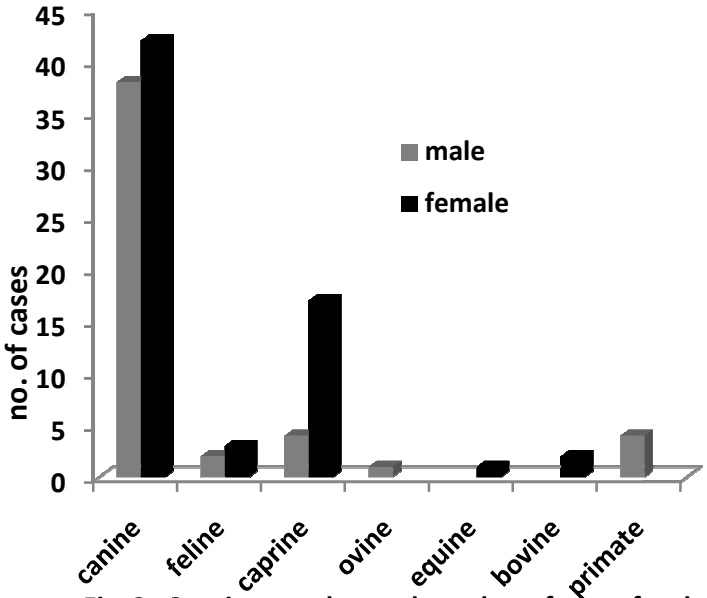

Fig. 2 : Species, gender, and number of cases for the period (1982-2008)

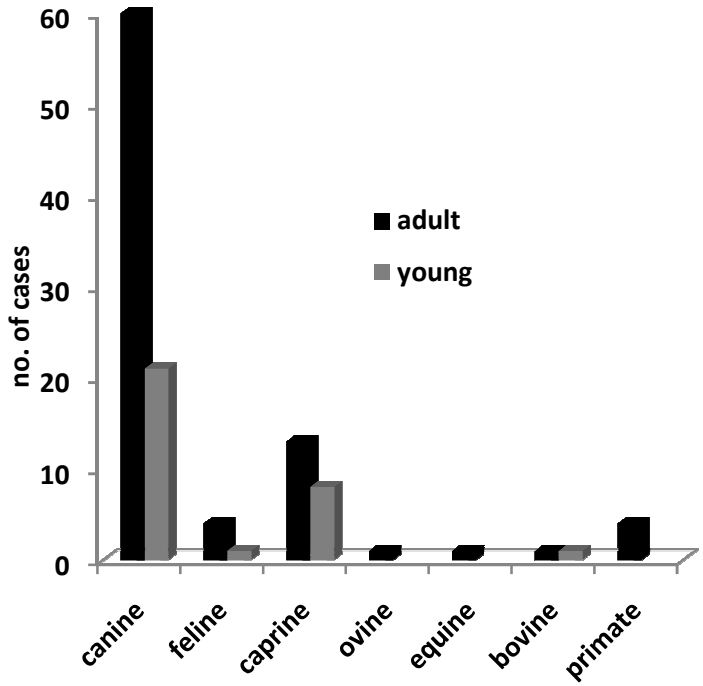

Fig. 3 : Species, age, and number of cases for the period (1982-2008)

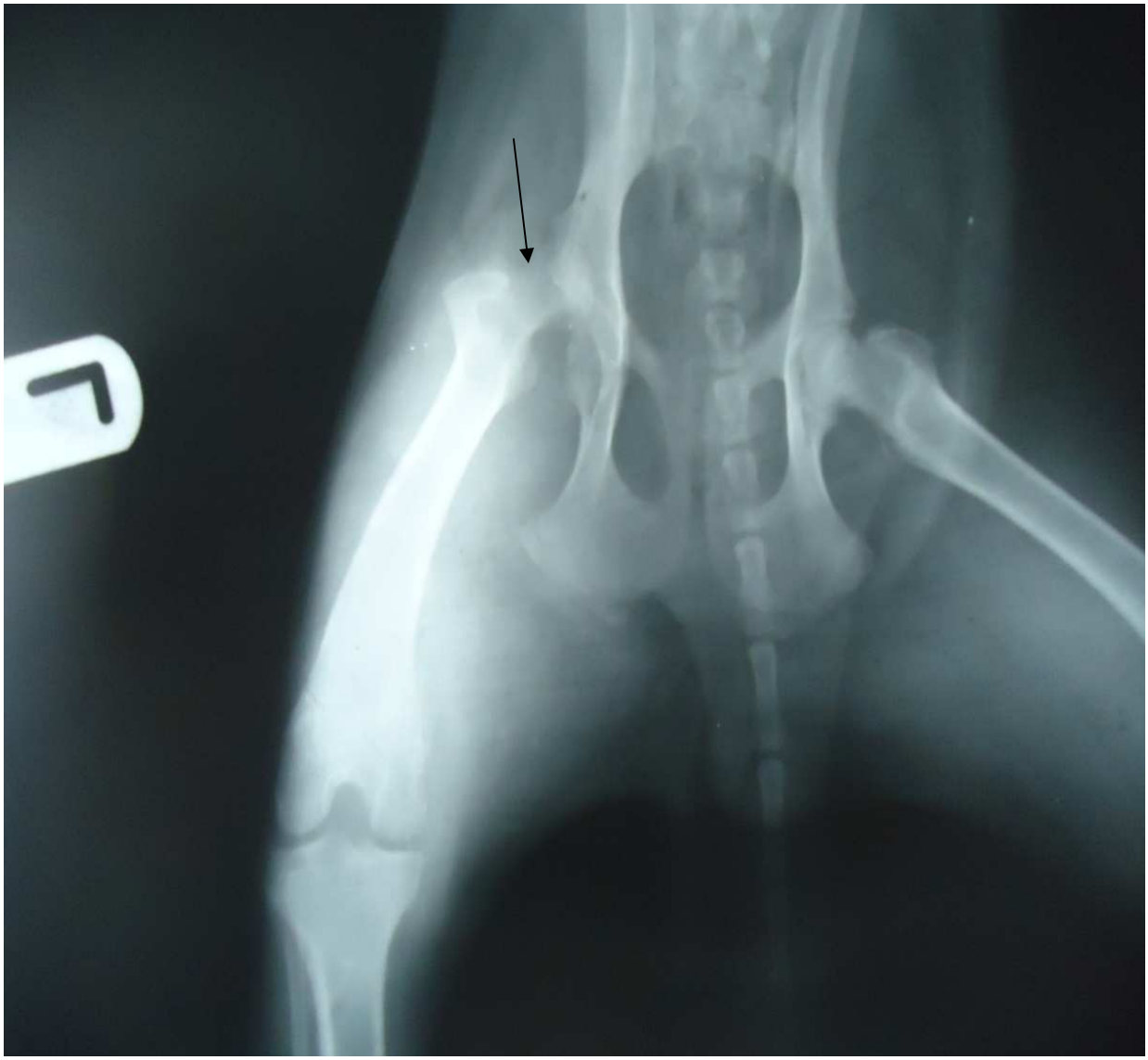

Plate 1. Ventro-dorsal view of dorsal cranial displacement of the femoral head (arrow) in an adult dog. (Traumatic dislocation of hip joint).

Plate 2: lateral view of a displacement and overriding fracture of distal head of humerus (arrow) with proximal head of ulna bone in an adult dog. (Traumatic dislocation of the elbow joint).

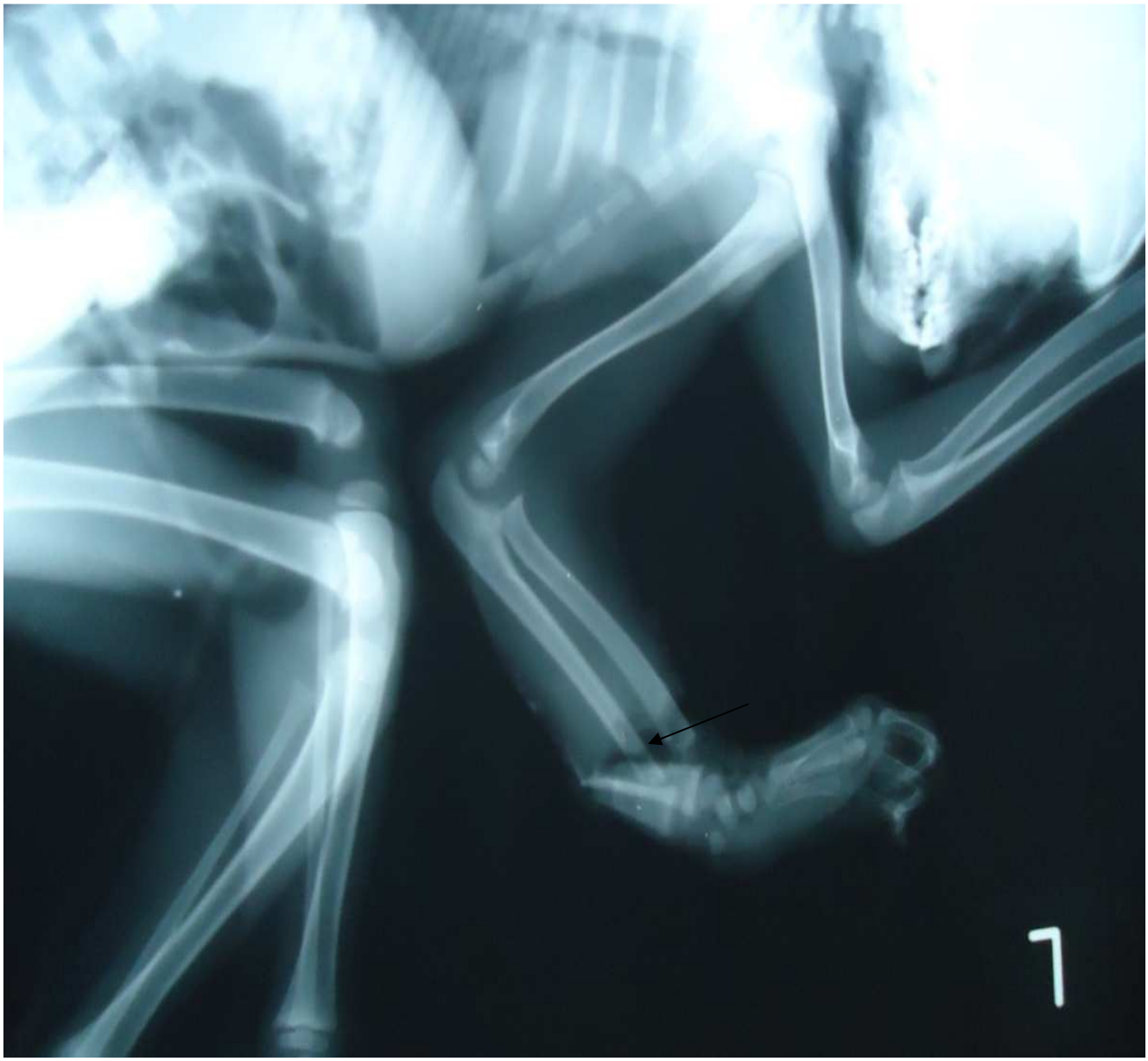

Plate 3: Monteggian fracture (due to trap cut) of the distal one-third of the left radius and ulna (arrow) in a primate.

Plate 4: Median view of a reduced comminuted fracture in a distal third of tibia bone.

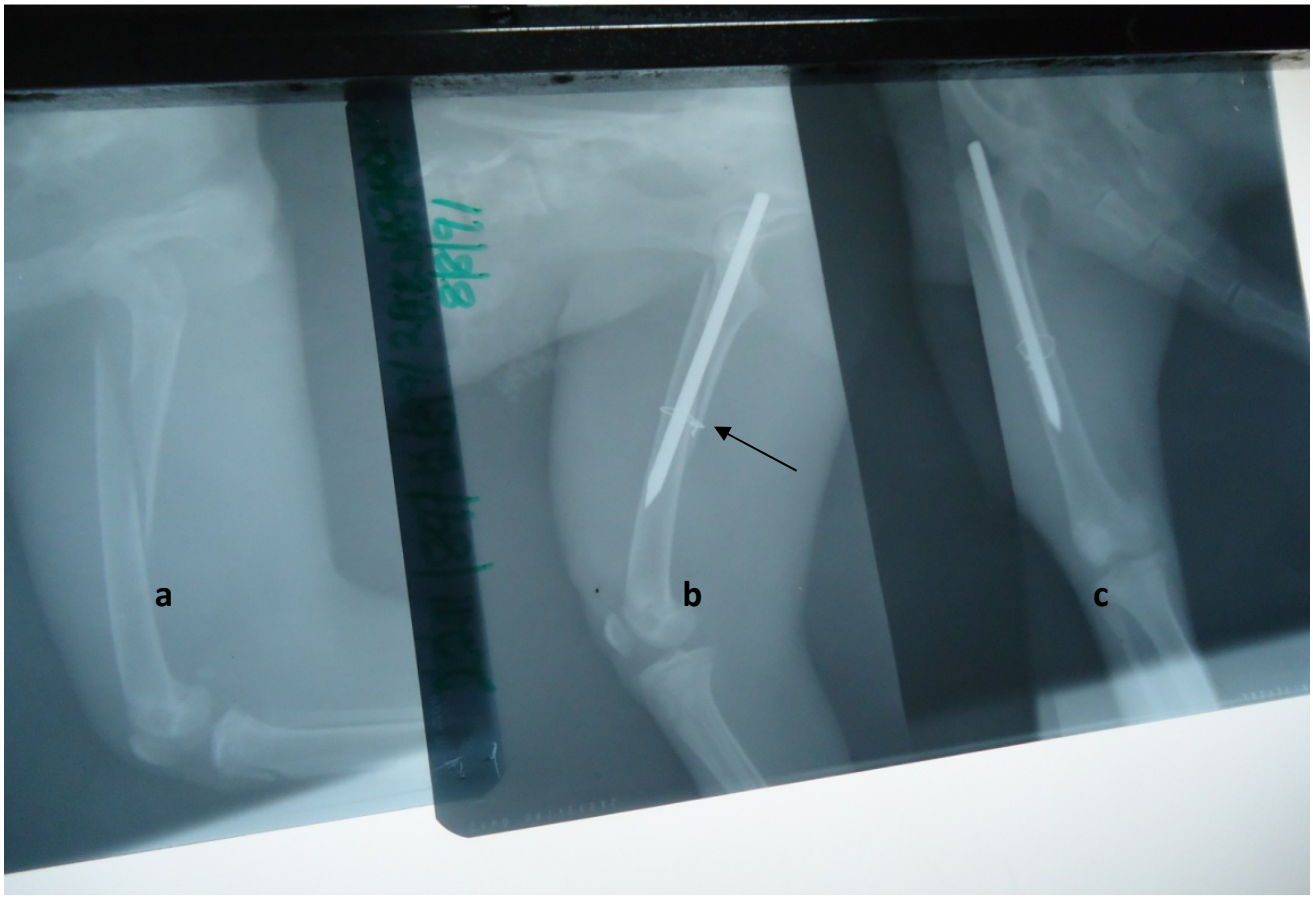

Plate 5: Median view of reduced oblique fracture in proximal one-third of the femoral Bone (arrow). (a=before reduction; b=after reduction and c=following healing)

Plate 6: Lateral view of monteggian fracture of the proximal aspect of both radius and ulna in dog (ready for reduction with intramedullary pin being measured).

REFERENCES

1. Greg, H. (2007). Pelvic fracture. Canadian Veterinary Journal, 48(4): 427 – 428.
2. Kolata, R. J., and Johnston, D.E (1975). Motor vehicle accidents in urban dogs: A study of 600 cases, Journal of the American Veterinary Medical Association, 165: 377-380.
3. Henry, W. B. (1985). A method of bone plating for repairing iliac and acetabular fractures. Comparative Continuous Education and Practice, 7: 924 - 938.
4. Slater, D. (2002). *Textbook of Small Animal Surgery*. 3rd ed., Vol. II, W. B. Saunders Co., Philadephia, Pp. 141-147.
5. Denis J .M, (1998). Humeral fracture in dogs. Waltham Focus, 8(3): 1 - 8.

6. Abdulrahman, H. I., Mohammed, A. and Bukar, M. M. (2006). A retrospective study of fracture cases presented to University of Maiduguri Veterinary Teaching Hospital. Nigerian Veterinary Journal, 27(3): 25 - 35.
7. Eze, C. A. and Eze, M. C. (2002). Castration, other management practices and socio-economic importance for dog keepers in Nsukka area of Enugu State. Preventive Veterinary Medicine, Anmsterdam, 55: 273 – 280.
8. Eze, C. A. and Okoli, C. O. (2007). Profile of Canine Cases in Government Veterinary Clinics in Imo State, Nigeria (1986-2000). Sahel Journal of Veterinary Science, 6(1): 27 - 34.
9. Devendra, C. and Burns, M. (1983). Goat production in tropics. Common wealth Agricultural Bureaux.
10. Eze, C. A. (2002). Lameness and reproductive performance in small ruminants in Nsukka Area of Enugu State, Nigeria. Small Ruminant Research, 44: 263 – 267.
11. Eze, C. A., Nweke, R. I. and Nwangwu, N. C. (2004). Comparison of Physiology and Analgesic Effects of xylazine/ketamine, xylazine/lignocaine and lignocaine anaesthesia in West African Dwarf Goat. Nigerian Veterinary Journal, 25(2): 39 - 47.
12. Adeloye, A. A. (1985). Water utilization by the goat fed with maize cob. Nutrition Report International, 32(6): 1461 - 1466.
13. Idowu, A. L., Adetunji, A., Atilola, M. A. O. and Babalola, G. O. (1984). A three years survey of fracture in dog. Tropical Veterinarian, 2: 200 - 206.
14. Udegbunam, S. O., Sokei, C., Udegbunam, R. I., Nnaji, T. O., Onuoha, A. C. and Aka, L. O. (2008). Prevalence of traumatic injuries in dogs presented at the Veterinary Clinics in Enugu and Anambra States of South-Eastern Nigeria. Nigerian Veterinary Journal, 29(3): 15.
15. Tembhurne, R. D., Gahlod, B. M., Dhakate, M. S., Akhare, S. B., Upadhye, and Bavaskar, S. S. (2010). Management of femoral fracture with the use of horn peg in canine. Veterinary World, 3(1): 37 - 41.
16. Adeyanju, J. B., Mohammed, G. and Amber, E. (2004). Diaphyseal fracture in small animals: management and complication at small Animal Unit, Veterinary Teaching Hospital, Ahmadu Bello University, Zaria. Tropical Veterinarian, 6: 95 - 103.
17. Shiju, S. M., Ganesh, R., Ayyappan, S. and Suresh K. (2011). Incidence of Pectoral limb fracture in dogs: A Survey of 331 cases. Tamilnadu Journal of Veterinary and Animal Sciences, 7(2): 94 - 96.
18. Braden, T. D., Eicker, S. W., Abdinoor, D., Prieur, W. D. (1994). Characteristics of 1000 femur fractures in the dog and cat. V.C.O.T, 8(4): 203 - 209.
19. Tercanlioglu, H. and Sarierler, M. (2009). Femur fractures and treatment options in dogs brought to our clinics. Luc.St.Med.Vet. 42 (2): 23 – 28.