Nigerian Veterinary Journal 27(3) : 25 - 35

A RETROSPECTIVE STUDY OF FRACTURE CASES PRESENTED TO UNIVERSITY OF MAIDUGURI, VETERINARY TEACHING HOSPITAL.

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SUMMARY

In a nineteen years survey, 70 fracture cases were presented to the University of Maiduguri Veterinary Teaching Hospital (UMVTH). The percentage distribution of the fracture cases was determined according to species, etiology, affected bone, sex, age and type of fracture. The canine specie had the highest number of cases (41.4%), followed by Antelope, Ovine, and Feline with 17.1%, 15.7% and 11.4 % respectively. Thirty four (48.5%) of the fracture cases were of unknown etiology, while 25 (35.7%) of the fracture of known etiology occurred as a result of automobile Road Traffic Accident (RTA). The tibia, humerus and femur accounted for the majority of cases in this study. 31 (44.3%) cases were females and 36 (51.4%) were males. It is suggested that roaming of animals in areas with high volume of motor-vehicle traffic and dense population may be responsible for the high incidence of automobile accidents and trauma to animals resulting in the high incidences of fractures with unknown etiology.

KEY WORDS: Survey, Fractures, Percentage Distributions.

INTRODUCTION

Fracture is dissolution of bony continuity with or without displacement of the fragments, (Jenny, 1970, Denny, 1993). Trauma is the most common cause of fractures in small and large animals and is usually due to direct impact from automobile injury, falling from height, bite or kick (Alexander, 1982; O'Connor, 2005; Harvey *et al.*, 1991; Denny, 1993; Hosgood and Hoskins, 1998). Fractures can also be caused by violent contraction of a muscle and it occurs frequently in small animals while the physeal plate remains open, resulting in Salter-Harris (MGP) fractures, (Leonard, 1971; Hosgood and Hoskins, 1998). In most instances, the clinical signs associated with fracture make diagnosis uncomplicated; early signs include: lameness, pain, local swelling, abnormal posture, crepitus, abnormal mobility of involved bone, fever, anemia, shock, neurological deficit, and in neglected open fracture, gangrene. Although all of the above signs do not always occur in all fractures, combinations of these signs are always present (DeYoung and Probst, 1985, Kumar, 2004; O'Connor 2005). Radiography is confirmatory (Denny, 1980; Denny, 1993).

Reduction and fixation are carried out under general or regional anesthesia in all cases and each case must be individually evaluated for the best method of management required. Incomplete or complete transverse, diaphyseal fracture of radius, ulna, fibula, tibia, metacarpus or metatarsus without marked displacement can be managed by closed reduction and external fixation. The fixation device required could be plaster of Paris, Vet Cast, carpal or metal splint (DeYoung and Probst, 1985; Adeyanju *et al.*, 1988; Denny, 1993; Kumar, 2004; O'Connor 2005). Open fractures of the limb and all unstable fractures along with all other types of fractures peculiar to diaphysis of femur and humerus should be managed by open reduction and internal fixation (DeYoung and Probst, 1985; Denny, 1993). Fixation devices used include intramedullary pin, rush pin, neutralization plates, dynamic compression plate and cerclage wire (Brinker, 1974; Denny, 1980; Alexander, 1982; DeYoung and Probst, 1985; and Adeyanju *et al.*, 1988 Denny, 1993; Kumar, 2004; O'Connor 2005).

This paper provides information on orthopedic cases presented to the University of Maiduguri Veterinary Teaching Hospital (UMVTH) for management between 1984 and 2002.

MATERIALS AND METHODS

Case records from the University of Maiduguri Veterinary Teaching Hospital (UMVTH) were used to obtain the data related to cases of fracture presented for management between 1984-2002. The data were analyzed with regards to distribution by month, year, sex, species, age and frequency of bones involved the type of fracture and the etiology. The percentage distributions were graphically presented.

RESULTS

The yearly distribution of cases of fracture is presented in Table I. The highest number of cases was recorded in 2002 with 12 cases or 17.14% of the total number of cases.

Of the 70 cases, 4 cases (5.71%) were recorded in the month of January, 4 cases (5.71%), 6 cases (8.57%), 11 cases (15.71%) , 7 cases (10.0%) , 6 cases (8.57%) , 8 cases (11.43%) , 5 cases (7.14%) , 5 cases (7.14%) , 7 cases (10.0%) , 3 cases (4.29%) and 4 cases (5.71%) were recorded in the months of February, March, April, May, June, July, August, September, October, November and December respectively. The pooled monthly frequency distribution of the fracture cases shows that the highest numbers of cases were recorded for the month of July (Fig. 1).

TABLE I: Yearly distribution of fracture cases

Year	Number of cases	Percentage distribution (%)
1984	1	1.43
1985	2	2.86
1986	4	5.71
1987	5	7.14
1988	3	4.29
1989	1	1.43
1990	2	2.86
1991	2	2.86
1992	3	4.29
1993	2	2.86
1994	1	1.43
1995	3	4.29
1996	1	1.43
1997	0	0.00
1998	5	7.14
1999	4	5.71
2000	8	11.43
2001	11	15.71
2002	12	17.14
Total	**70**	**100%**

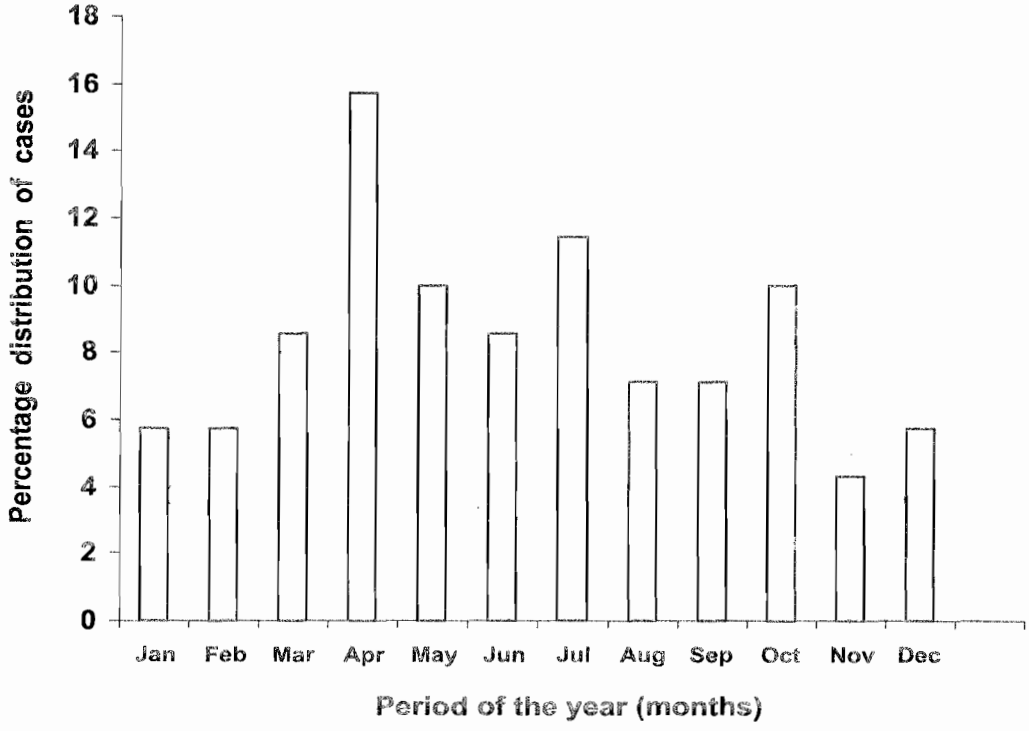


Fig.1 : Pooled monthly frequency distribution of cases

In the survey, 36 cases (51.4%) were males and 31 cases (44.3%) were females. The sex of 3 cases (4.3%) were not recorded, one each was avian and feline respectively. Both specie and sex of one fracture case was not recorded (Table II).

Of the 70 cases presented in the survey, 29 cases were canine representing (41.4%) of the total specie, feline represented cases (11.4%), ovine, 11 cases (15.7%), caprine, 6 cases (8.5%) antelope, 12 cases (17.1%), sub-human primate, I case (1.4%) lapine, 1 case (1.4%) and Avian, I case (1.4%). The age distributions of the fracture cases are shown in Fig .2. The age of 24 out of the 70 fracture cases were not indicated but the highest number of cases of the recorded cases occurred in animals below 3 years of age.

TABLE II: Specie distributions of 70 fracture cases presented to the University of Maiduguri Veterinary Teaching Hospital (UMVTH)

	Males		Females		Total	
Species	**Number**	**Percentage**	**Number**	**Percentage**	**Number**	**Percentage**
Canine	17	48.5	12	37.5	29	41.4
Feline	2	5.7	5	15.6	7(1)*	11.4
Ovine	8	22.8	3	9.4	11	15.7
Caprine	5	14.2	1	3.1	6	8.5
Antelopes	3	8.5	9	31.0	12	17.1
Lapine	1	2.8	-	-	1	1.4
Primate	-	-	1	3.1	1	1.4
Avian	-	-	-	-	(1)*	1.4
Unrecorded	-	-	-	-	(1)¥	1.4
Total	**36**	**(51.4%)**	**31**	**(44.3%)**	**70**	**100**

Numbers in parenthesis indicate * Unrecorded sex, ¥ Unrecorded sex and specie

Of the 70 cases recorded, 11 of the cases (15.7%) recorded were open fracture (compound fracture), 15 cases (21.4%) were close fracture (simple fracture), 3 cases (4.2%) were multiple fracture and the type of fracture of 41 cases (58.6%) were not stated in the records. The bones most frequently presented with fracture include Tibia (16 cases), Humerus (13 cases) and Femur (11 cases). (Fig. 3)

The associated causes of the trauma resulting in the fracture cases included; automobile accident, 25 cases (35.7%), falling from height, 2 cases (2.8%), hit by object 4 cases (5.7%), and trauma 5 cases (7.1%). The traumatic causes of 34 cases (48.5%) out of the total number of 70 cases were not recorded, but the nature and extent of the associated injuries i.e. bruises and lacerations, suggests trauma from automobile accidents or direct violence on the animals by people.

Fig. 4 shows a fracture on the proximal aspect of the left metacarpal bone in a 1-year-old dog while Fig. 5 shows a fracture of the tibia in a 2 years old goat.

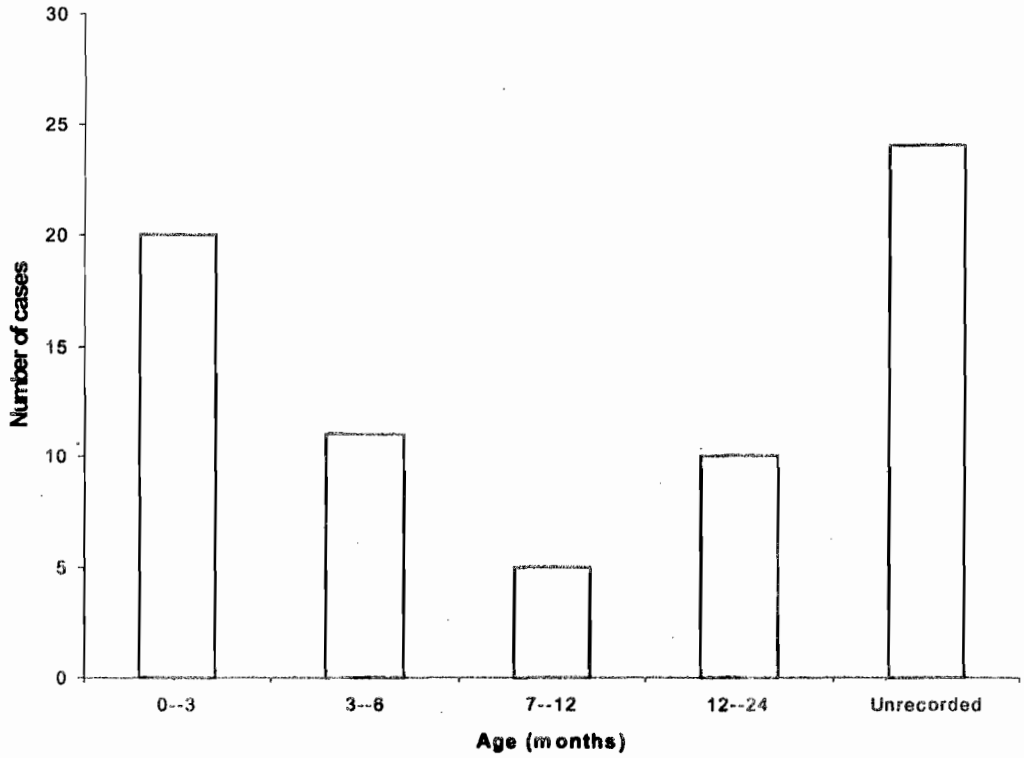


Fig. 2: Age distribution of fracture cases

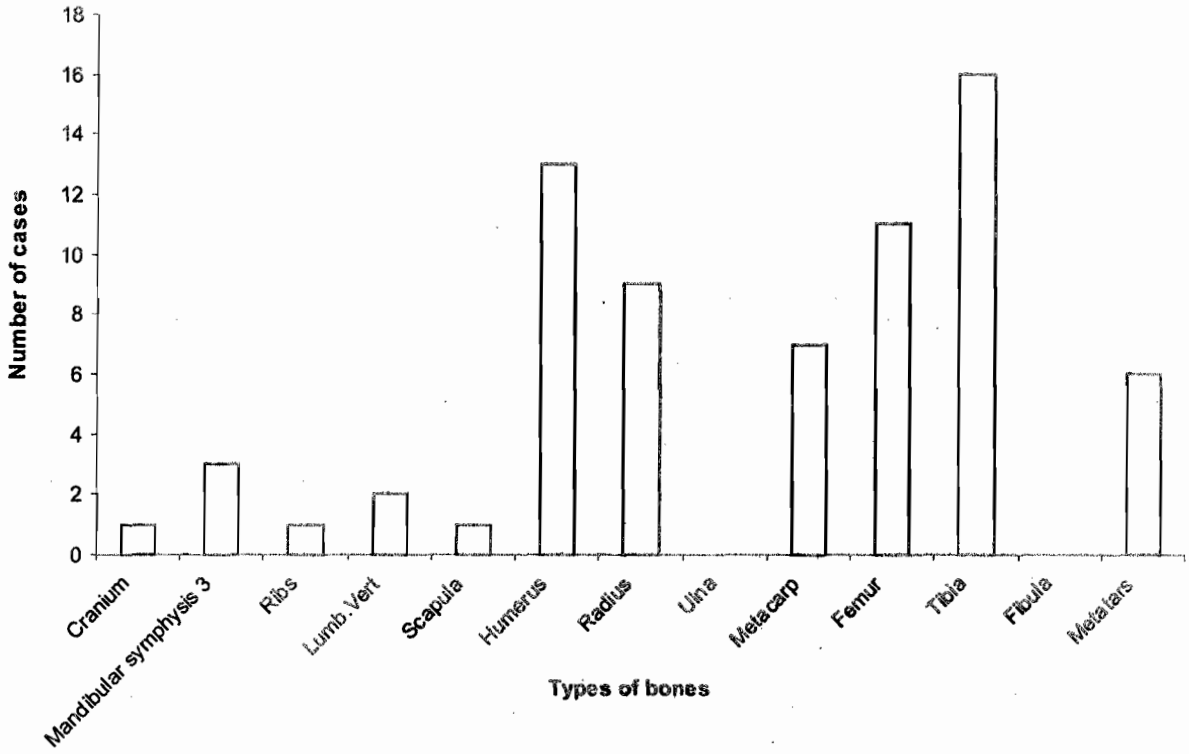


Fig. 3: Frequency of bones involved in fractures

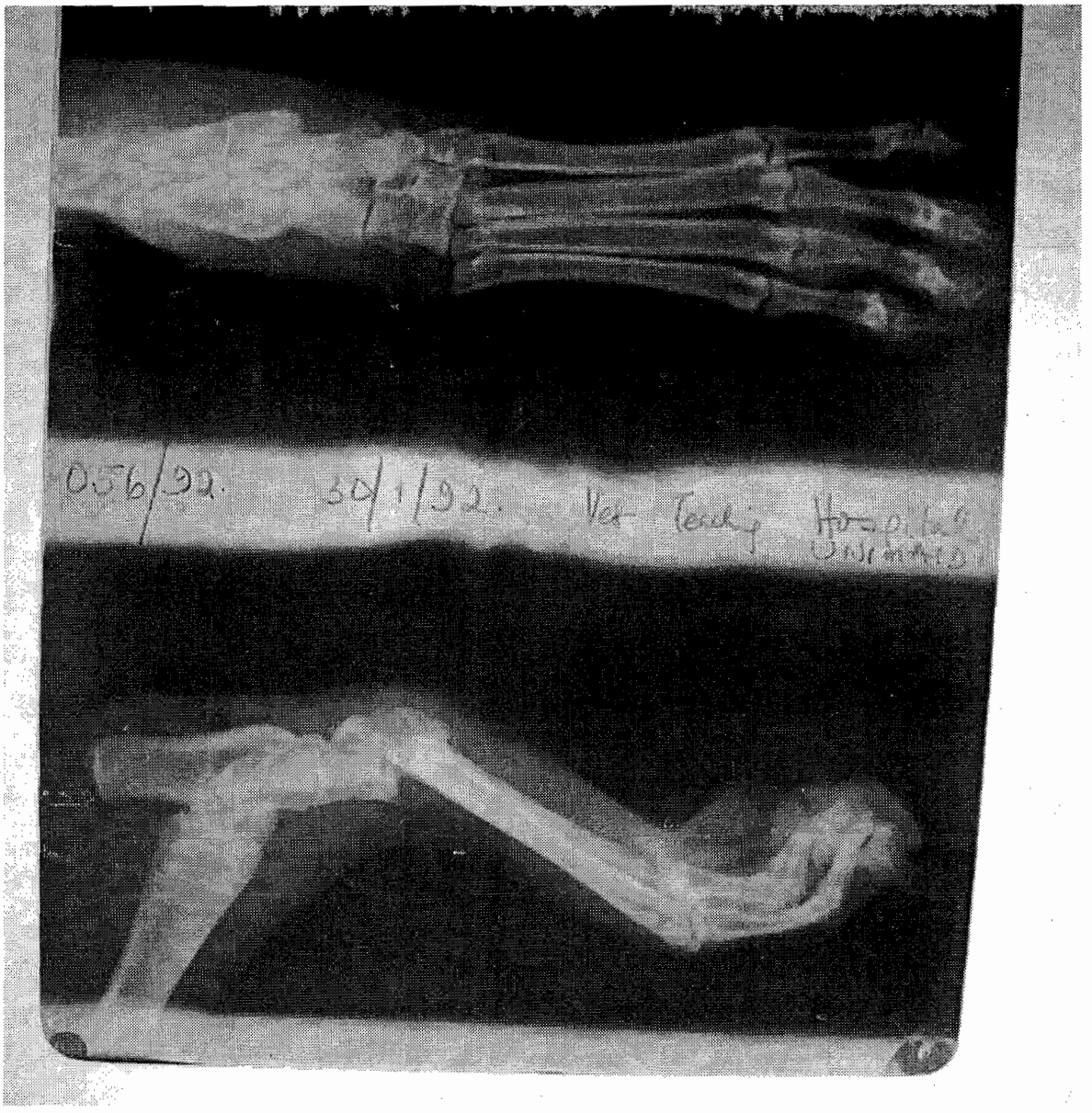
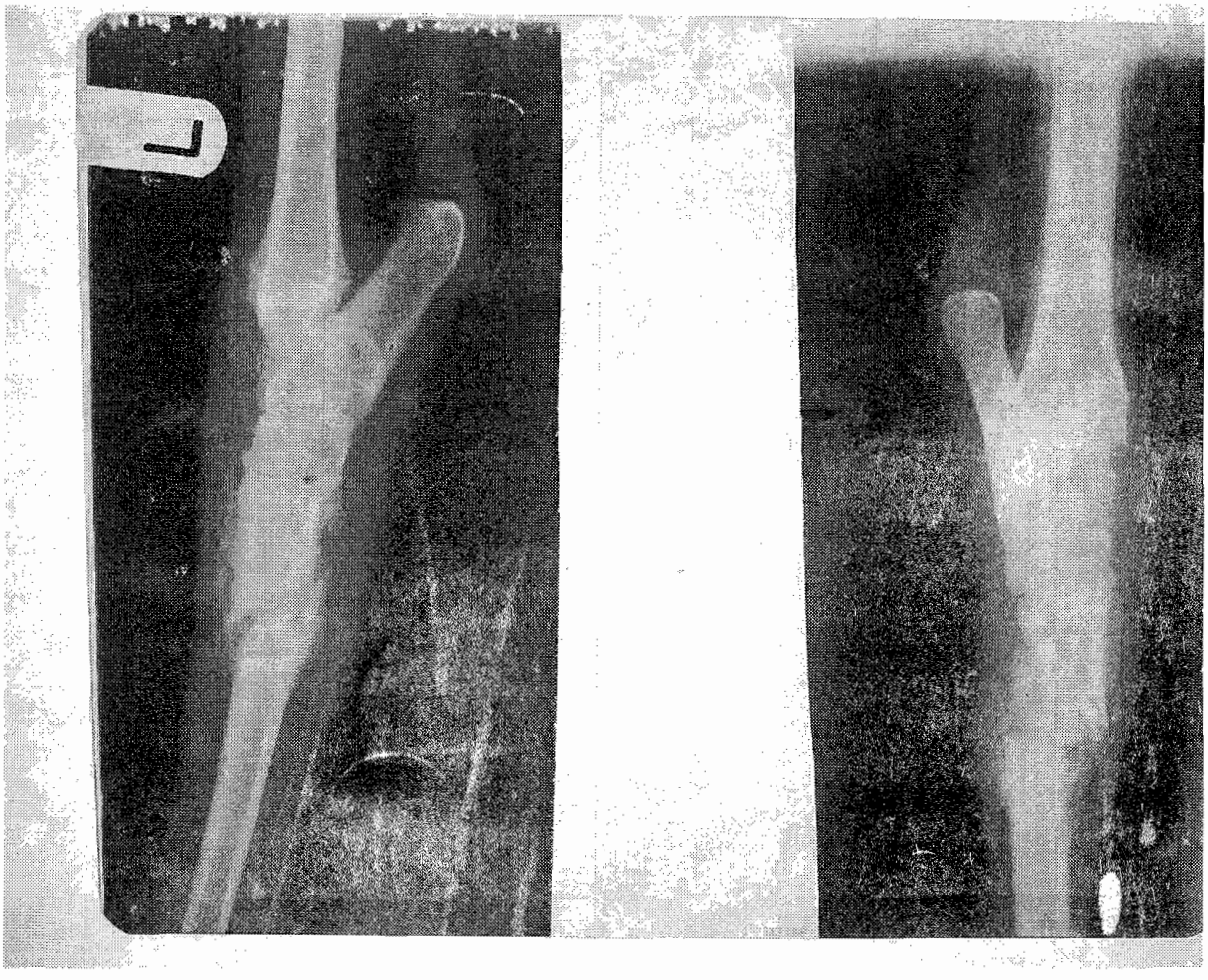


Fig. 4: Posterior-anterior and lateral view of the fractured proximal tarso-metatarsal bones in a two years old dog.



a` b

Fig. 5: Lateral (a) and medial (b) view of a fracture in the proximal third of the fused 3rd and 4th metatarsal bone in a one year old goat.

DISCUSSION

The monthly frequency of cases presented was distributed randomly as showed in the results of this study. Higher numbers of cases were recorded in the month of March, which is a dry season. This is followed by the months of July, October and May. July is the beginning of the rainy season, which coincides, with the breeding period of dogs in this environment. The canine species recorded the highest incidence of fracture. This may be due to the fact that it is most common pet animal found in many home and have greater propensity to roam about especially during breeding periods thus exposing them to direct violence either from individuals who consider their behavior a nuisance, or from automobile accidents. The relatively remote location of the UMVTH, from Maiduguri town may also significantly affect the caseloads, particularly fractures in small ruminants. There are very few referrals from the state veterinary clinic and such cases are usually of very poor prognosis. The antelopes are also commonly found as pets in some homes. Injuries and possible fractures frequently results from the physical capture methods employed by hunters and from inappropriate restraint, housing and management of the antelopes in captivity.

Results from this study suggest that the highest number of cases occurred in the tibia. Alexander (1982) similarly suggested that fractures of the tibia are relatively common in the dog and cat. Hill, (1977), Idowu, *et al.* (1984), Adeyanju *et al.,* (1988), and Harvey *et al.* (1991) however suggested that the femur is the most frequently fractured bone in veterinary practice. The humerus, femur, metatarsus, and metacarpus are also frequently fractured as shown in this study. Generally, the appendicular bone has been shown to have the highest incidence of fractures (Hill, 1977; Philips, 1980; Alexander, 1982; Wong, 1984; Idowu, *et al.* 1984; Harvey *et al;* 1991; Ogo *et al.* 2004; O'Connor, 2005). According to O'Connor (2005), the scapula is comparatively seldom fractured in the domestic animals on account of its position and slight mobility. O'Connor (2005) suggested that the usual cause is direct violence, from a blow, collision, kick, or fall. Automobile accident recorded highest frequency of the causes of fracture. This may be due to the fact that most domestic animals are allowed to roam about freely and therefore are prone to automobile RTA. This finding is in agreement with other findings, which suggest that automobile accident was responsible for more fracture than any other cause (Hill, 1977; Philips, 1980; Wong 1984; Denny, 1993). Only two cases recorded fracture due to fall from height. This poor presentation of fall from height as a cause of fracture may be attributed to the fact that communities surrounding the University of Maiduguri are suburban and rural with few high-raise structures.

Animals aged 2-4 months showed higher frequency in the fracture cases presented. The higher incidence of automobile accident and the resultant fracture in young and young adult dogs and cats may be due to inexperience in avoiding fast moving vehicles or wandering attitude of the young adult dogs especially during the breeding periods (Adeyanju *et al.,* 1988). About 60% of canine and 67% of feline patients were 2 years old or younger, a finding also reported by (Kolata *et al.*, 1974 and Hill, 1977; Philips, 1980 and Wong, 1984, Hosgood and Hoskins, 1998).

The very high number of fracture cases (58.6%) with undetermined etiology suggests that clients simply only notice the injuries when the animals return home from their roaming. The nature and extent of the injuries sustained may suggest a possible etiology (Denny, 1993). It may therefore be inferred that the nature and extent of the injuries sustained in most of the cases of fractures observed in this study and whose etiology could not be determined, suggests either automobile accidents or direct violence on

the animals by individuals.

Out of the 70 cases of fracture presented in the study, incomplete data of 3 cases (4.29%) with regard to sex distribution underscores the importance of proper record keeping for effective handling of cases and policy making. This could be achieved through obtaining all the necessary information about the patient. A separate record files on fracture cases should be opened for easy access and other purposes. The radiology unit in the University Veterinary Teaching Hospital should be well equipped with modern facilities and those in charge should always be present to enhance the efficiency of the clinic. Further more, evaluation of the patient's radiograph may provide insight into the type of trauma that caused the fracture. Plans of fracture management should be based on sound medical judgment because any deviation from the plan due to economics or lack of expertise, equipment or technical assistance may compromise the outcome.

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