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Prevalence and pattern of small animal orthopaedic conditions at the Veterinary Teaching Hospital, University of Ibadan

OD Eyarefe* & SN Oyetayo

Department of Veterinary Surgery and Reproduction, University of Ibadan

*Correspondence: Tel.: +2347064468932, E-mail: odeyarefe@gmail.com

Abstract

Small animal orthopaedic case records of a 20-year period were surveyed to obtain the prevalence and pattern of orthopaedic conditions presented to the Veterinary Teaching Hospital (VTH), University of Ibadan, Nigeria, with the objective of providing data for planning on small animal healthcare facilities, policy development and veterinary manpower training. Out of 618 small animal surgery cases managed within the period studied, 127 (19.6%) were orthopedic in nature across 22 canine breeds, consisting of dogs (45%), bitches (53%) and 2% unspecified sexes. Orthopedic conditions were prevalent in Alsatian 34.65%, Rottweiler 19.69%, Mongrel 18.11%, Crossbreeds 4.72%, Boerboel 3.94%, Pomeranian 1.54%, Samoyed 1.54%, Caucasian 1.54%, Neapolitan mastiff 1.54%, Lhasa Apso 0.79%, Keeshond 0.79%, Chihuahua 0.79%, French mastiff 0.79%, Tosa 0.79%, Pit-bull 0.79%, Spitz 0.79%, Bull Mastiff 0.79%, Dachshund 0.79% and Doberman pinscher 0.79%. Fracture cases were highest 61.42%, followed by hip dysplasia 14.17%, hip luxation 6.30%, lameness 2.36%, paralysis 1.57%, hock luxation 1.57%, sprain 1.57%, patella luxation 1.57%, abnormal gait 1.57%, arthritis 0.79%, osteosarcoma 0.79%, splayed limb 0.79%, congenital dysgenesis 0.79%, hypertrophic osteodystrophy 0.79%, stiffened stifle joint 0.79%, and unspecified 2.36%. fracture anatomic sites were: femur 57.69%, tibia and fibula 10.26%, humerus 6.41%, radio-ulna 5.13%, mandible 5.13%, metacarpal 3.85%, tibia 3.85%, metatarsal 2.56%, radius 2.56%, rib 1.28% and tarsal 1.28%. The highest occurrence of orthopedic cases was in 2015 (11.02%), while 1998 (1.57%) and 2010 (1.57%) had the least. No case was recorded in 1995 and 1997 (0%). Young dogs (< 1year) were more involved (60.0%) than adult (> 1 year) (32.0%). More cases were recorded in the first quarter (27.56%)-(January-March) than second quarter (April-June (25.20%), than fourth quarter (October –December (24.41%).The third quarter (July-September) had the least (22.83%). The implication of the data to orthopaedic patient management, and planning was discussed.

Keywords: Dogs, Orthopaedic conditions, Prevalence, Small animal, Veterinary teaching hospital.
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Introduction

Orthopaedic surgery is a specialised branch of surgery with a high technical skill and facility requirements, and focuses on the correction of musculoskeletal deformities caused by trauma, disease or developmental abnormalities of bones and joints of the mammalian systems (Salter, 1999; Johnson & Hulse., 2002, Hulse & Hyman**,** 2012**).** Orthopaedic cases constitute a major percentage of surgery caseload in most veterinary clinics and referral centres in different parts of the world (Appari *et al*., 2013). Orthopedic cases have a relatively high occurrence among veterinary hospitals and clinics in Africa (Van Niekerk *et al.,* 2002; Eyarefe *et al*., 2011; Eyarefe & Dei, 2014). However, most data generated from orthopaedic caseloads in Nigeria lack vital details and essential analytical components tailored towards enhancing focused manpower training and quality health care policy development (Shapiro *et al*., 2006; Friedman *et al*., 2010). Such data are either lumped up with general surgery data, entirely missing or insufficiently presented. It is noteworthy that information on animal population specific disease burden collated from major veterinary facilities are fundamental tools for global, national and local healthcare planning (Hripcsak & Albers, 2013), research (Rishi *et al*., 2014), and holistic animal health care system (Blecker *et al*., 2014).

This study, therefore, investigated the prevalence and pattern of orthopaedic conditions presented at the Veterinary Teaching Hospital of the University of Ibadan, a referral centre that attracts cases from cities in South-West Nigeria**,** with the objective of providing data for planning on small animal healthcare facilities, policy development and veterinary manpower training in Nigeria.

Materials and Methods

The study location

The Veterinary Teaching Hospital (VTH), University of Ibadan is a major animal health delivery facility located at the University of Ibadan, Ibadan, Oyo state, Nigeria, on latitude, 7.4417^{o}N, and longitude 3.9000^{o}E. The VTH was established in December 1981 following approval by the University Development Committee and the Senate to cater for the Clinical training of the students of the Faculty of Veterinary Medicine at the University of Ibadan. The progressive development of this facility, increased numbers of professionals across specialties and growing popularity due to improved patient management have enhanced annual increase in clientele and case referrals from neighbouring cities and states of the country.

Data Source

Records of small animal surgery cases managed in the past twenty years (1995 -2015) were obtained from the registry of the Veterinary Teaching Hospital, University of Ibadan. Patients' records in the small animal theatre register were used to trace each patient's case file from the hospital`s main registry. Further information on patient imaging was traced to the imaging registry of the Department of Veterinary Surgery and Reproduction, University of Ibadan.

Data Arrangement and analysis

The number of small animal cases managed within the study period was noted. Data of orthopaedic patients were entered into Microsoft excel spread sheet and further imported into Statistical Package for Social Sciences version 20 for further analysis. The species, breed, sex and age of small animals involved were arranged to reflect the distribution of orthopaedic conditions using descriptive statistics. The type of orthopaedic condition was described by the anatomic structure affected and presented using descriptive statistics. The period of presentation of the cases was grouped into first quarter (January to March), second quarter (April to June) and third quarter (July to September) and fourth quarter (October to December) and compared.

Results

Orthopaedic cases were 127(16.7%) out of 618 small animal surgery cases managed within the studied period.

Distribution of orthopaedic conditions:

Fracture cases (61.42%) were the highest , followed by hip dysplasia (14.17%). arthritis (0.79%), osteosarcoma (0.79%), splayed limbs (0.79%), congenital dysgenesis (0.79%), hypertrophic osteodystrophy (0.79%), patella luxation(0.79%) and stiffened stifle joint (0.79%) accounted for the least presented cases (Table 1).

Distribution of orthopaedic *conditions among dog breeds*

More Alsatians (German shepherd) (34.65%) and Rottweilers (19.69%) were presented than any other breed. The least presented were Lhasa Apso (0.79%), Keeshond (0.79%), Chihuahua (0.79%), French mastiff (0.79%), Tosa (0.79%), Boerboel (0.79%), Pit-bull (0.79%), Spitz (0.79%), Bull Mastiff (0.79%), Dachshund (0.79%) and Doberman pinscher (0.79%) (Figure 1).

Table 1: Percentage distribution of other *orthopaedic* conditions presented to the Veterinary Teaching Hospital, University of Ibadan

S/N	Condition	Occurrence	Percentage distribution (%)
1	Hip dysplasia	18	14.17
2	Hip luxation	8	6.30
3	Lameness	3	2.36
4	Paralysis	2	1.57
5	Hock luxation	2	1.57
6	Sprain	2	1.57
7	Abnormal gait	2	1.57
8	Hindlimb malalignment	2	1.57
9	Arthritis	1	0.79
10	Osteosarcoma	1	0.79
11	Splayed limb	1	0.79
12	Congenital dysgenesis	1	0.79
13	Hypertrophic osteodystrophy	1	0.79
14	Patella luxation	1	0.79
15	Stiffened stifle joint	1	0.79
16	Unspecified	3	2.36

Percentages are expressed in 2 places of decimal

Table 2: Percentage distribution of fractures presented to the Veterinary Teaching Hospital, University of Ibadan

S/N	Location	Occurrence	Percentage distribution (%)
1	Humeral fracture	5	6.41
2	Femoral fracture	45	57.69
3	Radioulna fracture	4	5.13
4	Tibial fracture	3	3.85
5	Fracture of the Radius only	2	2.56
6	Tibiofibular fracture	8	10.26
7	Tarsal fracture	1	1.28
8	Metatarsal fracture	2	2.56
9	Metacarpal fracture	3	3.85
10	Head and Mandibular fracture	4	5.13
11	Ribs fracture	1	1.28
	Total	**78**	**100**

Percentages are expressed in 2 places of decimal

Table 3: Yearly distribution of orthopaedic cases presented between 1995-2015

Year	Number of cases	Percentage distribution (%)
1995	0	0.00
1996	3	2.36
1997	0	0.00
1998	2	1.57
1999	5	3.95
2000	3	2.36
2001	7	5.51
2002	4	3.15
2003	7	5.51
2004	3	2.36
2005	7	5.51
2006	4	3.15
2007	7	5.51
2008	8	6.37
2009	9	7.09
2010	2	1.57
2011	12	9.45
2012	7	5.51
2013	10	7.87

Percentages are expressed in 2 places of decimal

Distribution of fracture location

The trend of distribution of anatomic site of fracture was: femoral fracture (57.69%), tibia and fibular fracture (10.26%), humeral fracture (6.41%), radio-ulna fracture (5.13%), mandibular fracture (5.13%), metacarpal fracture (3.85%), tibia fracture (3.85%), metatarsal fracture (2.56%), radial fracture only (2.56%), rib fracture (1.28%) and tarsal fracture (1.28%) (Table 2).

Age distribution of orthopaedic patients

More younger dogs (< 1year) (60.0%) were presented with orthopaedic conditions than adult dogs (> 1 year) 32.0% (Figure 2).

Sex distribution of orthopaedic patients

More bitches (53%) were presented than dogs (45%) (Figure: 3).

Yearly distribution of orthopaedic cases

The highest number of cases were recorded in 2015, 14 (11.02%), and the least in 1998, 2 (1.57%) and 2010, 2 (1.57%). No cases were recorded in 1995 (0%), and 1997 (0%) (Table: 3).

Quarterly distribution of orthopaedic *cases*

The trend in quarterly distribution of orthopaedic cases was first quarter (January to March - 27.56%), second quarter (April to June-25.20%), third quarter (July to September – 22.83%), fourth quarter (October to December-24.41%). (Figure 4)

Monthly distribution of orthopaedic cases

Most cases were recorded in February, 17(13.39%) and the least in March, 6(4.72%) (Figure 5).

Discussion

Survey of clinical case records serve to make data available for planning on animal health facilities management (Friedman *et al.,* 2010), personnel development (Friedman *et al.,* 2010), and

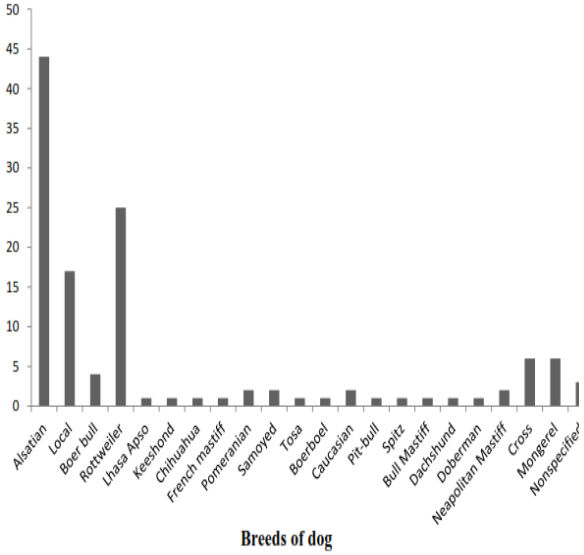

Figure 1: Percentage distribution of canine breeds presented with orthopaedic conditions at the Veterinary Teaching Hospital, University of Ibadan

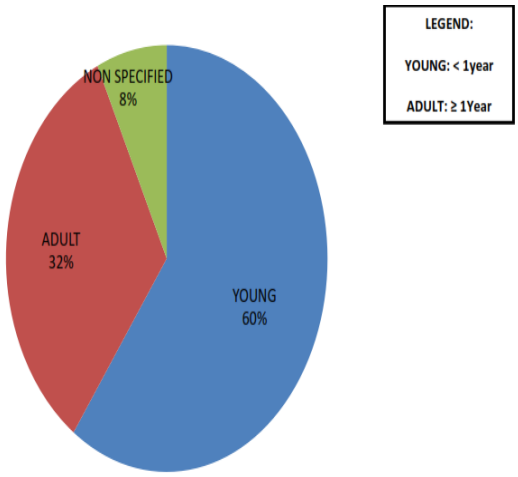

Figure 2: Age frequency distribution of Orthopaedic conditions presented at the Veterinary Teaching Hospital, University of Ibadan

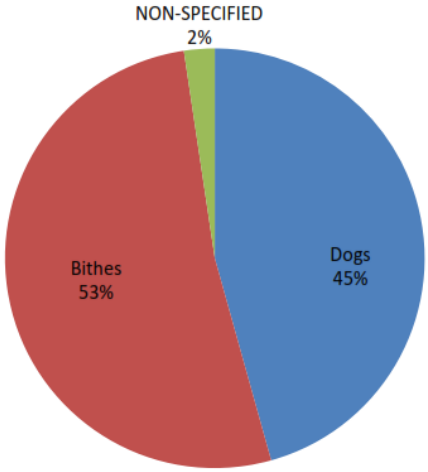

Figure 3: Sex frequency distribution of orthopaedic conditions presented at the Veterinary Teaching Hospital, University of Ibadan (1995-2015)

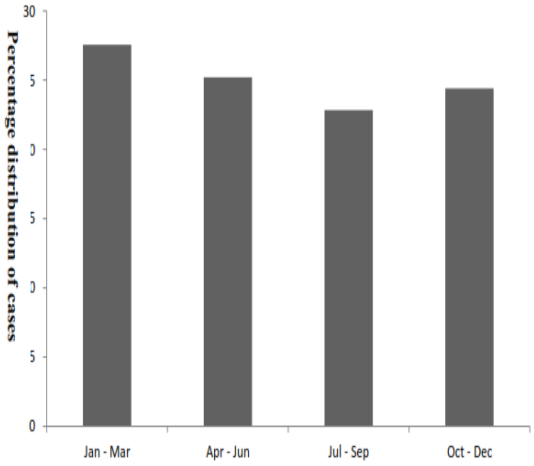

Figure 4: Quarterly distribution of orthopaedic conditions presented to the Veterinary Teaching Hospital, University of Ibadan (1995-2015)

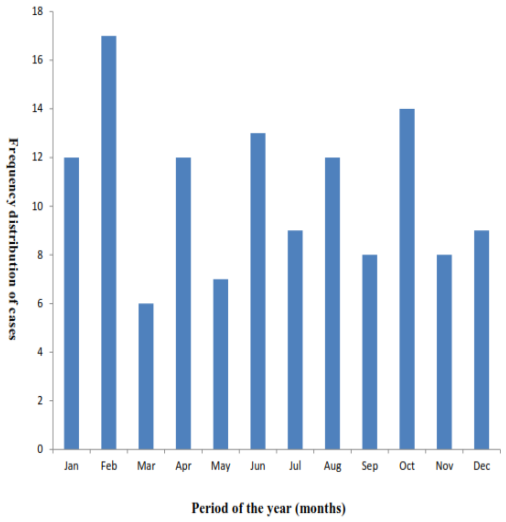

Figure 5: Pooled monthly frequency distribution of orthopaedic cases presented to the Veterinary Teaching Hospital, University of Ibadan (1995-2015)

Plate I: Showing a transverse fracture of the first tarsal bone in a 4-year- old Alsatian bitch (note arrow)

Plate II: Showing a complete transverse fracture of the distal one –third of radius and ulna in a 7-year –old Alsatian dog (note arrow)

Plate III: Showing an avulsion fracture of the tibia tuberosity in a 6–month-old Caucasian dog (note arrow)

Plate IV: Showing a femoral neck fracture in a 1-year- old Alsatian dog (note arrow)

Plate V: Showing a complete transverse fracture of the tibia and fibula bones in a 2 -year –old Alsatian dog (note arrow)

communication among clinicians (Noteboom & Qureshi, 2014). The results of this study showed a fluctuating, but gradual increase in yearly distribution of orthopaedic case load across the years studied (1995-2015) (Table 3). The orthopaedic caseload in a small animal healthcare facility is influenced by several factors including: pet population, facility location (rural or urban), peoples' lifestyles and attitude toward animals, hospital personnel skills and attitudes, as well as, an ardent pursuit of the mandate binding a facility's establishment (Van Niekerk *et al.,* 2002; Doyle *et al.,* 2004; Eyarefe *et al.,* 2014). The University of Ibadan Veterinary Teaching Hospital is a major tertiary animal healthcare facility in Southwest Nigeria and manages referral cases from private veterinary clinics within Ibadan and neighbouring cities, including Lagos, and other states in the Southwest.

The aetiologies of these conditions were mostly trauma. Although the specific type of trauma for many of the cases were not properly stated in the case files (hence not captured in the result), those captured were associated with automobile vehicles, jumping from heights, gunshot injuries, and congenital causes which corroborated earlier reports (Hill, 1977, Adeyanju *et al.,* 2004; Akinrimade, 2014) (Table 1). All patients presented were canine species. A previous report has also recorded highest occurrence off

Plate VI: Showing a short oblique fracture of the 3rd Metacarpal bone in a 2-year-old local dog (Dorso-palmer view). (note arrow

Plate VII: Showing a coxo-femoral luxation of the left hip with anterior in a 5-month- old Rottweiler bitch (note arrow)

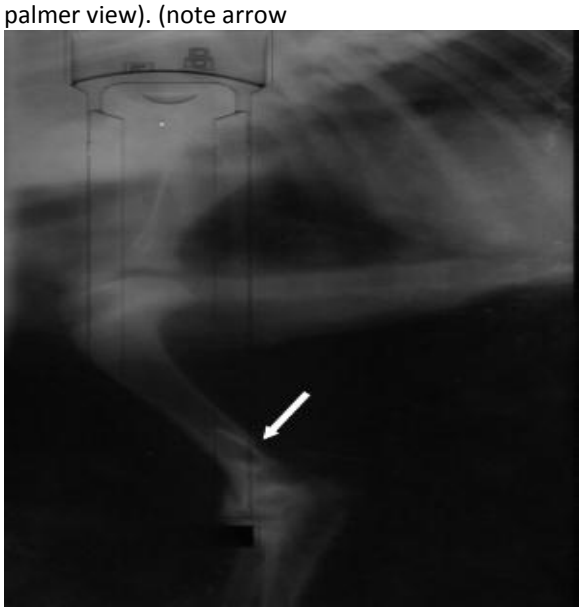

Plate VIII: Showing a complete oblique fracture of the distal one-third of the humeral diaphysis in a 2-month- old Boerboel dog (note arrow)

Plate IX: Showing a left Zygomatic arch fracture in a 1- year -old female local dog (note arrow)

fracture in canine species (Udegbunam *et al.,* 2008), which may be due to their being the most common pet acquired by man (Udegbunam *et al.,* 2008; Brindley, 2011). The absence of the feline orthopaedic cases may not be unconnected with the culture of not keeping cats as pet among people in Ibadan and its environs as some traditional and cultural folktales associate cats with witchcraft and wizardry (Eyarefe *et al.,* 2001).

The Alsatian (German shepherd), the Rottweiler, and the local dog breed (Mongrel) were the most presented for orthopaedic conditions among the 22 dog breeds recorded (Figure 1). Security concerns in many African countries influence the breeds of dogs acquired especially in the cities (Fielding & Plumridge, 2004). A summation of percentage occurrence of exotic breeds in comparison with the local breeds (mongrels) shows evidence of dog owners' preference for the exotic breeds. This may be as a result of preferred traits including: body sizes, body coats and colours, as well as social and security qualities which make them more endeared to their owners and attract more income to breeders (Hare & Tomasello, 2005, Kubinyi *et.al*, 2009). The German shepherd and Rottweiler breeds are prized for their mental acuity, strength, sizes, coat colour, and protective companionship qualities. These quality traits may have influenced their influx into many African countries, including Nigeria (Eyarefe & Dei, 2014). The German shepherd, however, is prone to hip disease (dysplasia) (Mäki *et al.,* 2001), and requires more exercise for fitness among the large breeds. This may have influenced its high incidence among the breeds presented.

The result showed a predominance of orthopaedic conditions in bitches than in dogs (Figure 3). Although bitches are mostly acquired for breeding,

they usually double up for security purpose at older age, especially in security conscious environments (Fielding & Plumridge, 2004).The aftermath of long stay of bitches in breeding Kennels during pregnancy makes them prone to joint conditions, while excessive activities during security process make both sexes prone to varying levels of orthopaedic injuries (Eyarefe & Dei, 2014).

The higher case load of orthopaedic conditions in younger dogs (< 1year) compared with adult (> 1year) may be associated with automobile injuries and nutritional osteopathies than other causative factors (Lauten, 2006; Streeter *et al.,* 2009). Young dogs have phobia for kennel confinement and often sleep under owners' vehicles making them prone to orthopaedic injuries (personal observation). The naivety of young animals to avoiding danger from on-coming vehicles when wandering around in an unfenced environment also makes them prone to orthopaedic injuries (Adeyanju *et al.,* 1988). Besides, many dog owners in the study environment are not familiar with breed associated nutritional requirements for healthy bone formation and maintenance, and this information is not usually provided by breeders. A consequence of this might be an upsurge in the incidence of nutritional osteopathies among young and growing dogs.

The distribution of common orthopaedic conditions in canine species from this study reveals a prevalence of fractures (61.42%): (axial bones - 6.41% and appendicular bones - 93.59%) (Table 2 and Plate 1-9). The study revealed a high prevalence of fracture of the appendicular bones with femoral fracture having the highest prevalence (57.69%). A high incidence of the appendicular bone fracture has been reported in previous studies (Ogo *et al.,* 2004*),* and a femoral bone fracture recurrence in orthopaedic patients (Harvey *et al.,* 1991).

Patients' inflow was highest in the first quarter (January to March - 27.56%), although not significant when compared with other quarters. This may be coincidental as orthopaedic case flow presented a uniform trend across the year's quarters. A general security concern also means that dogs, which are increasingly used for security purposes in this part of the world, are largely exposed to trauma-related orthopaedic conditions inflicted by burglars and armed robbers (Ozanne-Smith *et al*., 2001).

In conclusion, the prevalence of orthopaedic conditions is relatively high at the Veterinary Teaching Hospital, University of Ibadan which may be associated with the fact of it being a referral centre in the South- west region. Besides, the data expresses the need for more emphasis on fracture management among other orthopaedic conditions in our veterinary training programs.

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