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## A study on fractures in dogs presented to VCC, Jabalpur, Madhya Pradesh

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### Abstract

During the study period (October, 2020 to May, 2021), a total number of 11,638 cases were registered of which 137 animals were affected by fracture in different species of animals, which accounted for an overall occurrence of 1.18%. The occurrence of fracture was highest in case of dogs (61.31%) followed by goat (19.71%), cattle (8.76%), cat (5.84%), birds (2.92%) and other species (10.22%). The occurrence of fracture was highest in age group of less than 3 years (44.05%). Fractures were most common in male (60.71%) and in concern of breeds non-descript (50%) dogs were most commonly affected followed by Labrador retriever (15.48%), German shepherd (13.10%) other breeds (10.71%), Spitz/Pomeranian (8.33%) and Rottweiler (2.38%). Radius- ulna (25%) was the most commonly affected bone followed by tibia (20.24%), femur (17.85%) and humerus (13.10%). Out of the 18 fracture cases, 44.45% of dogs were presented 1-3 days after injury followed by 33.33% were presented after 3 days of injury and 22.22% were presented immediately after injury. Based on type of fracture, transverse (55.55%) were the highest followed by oblique (16.67%), spiral (16.67%) and comminuted (11.11%).

**Keywords:** Fracture, bone, age, sex, animal

### Introduction

In present trend with the relative increase in pet animals ownership, bone fractures constitute a major problem among dogs and cats. Bone is a dynamic biological tissue that comprises active cells integrated into a rigid framework. A fracture is the breakage in the continuity of a bone. Bone healing is a unique regenerative process that includes mesenchymal cell condensation, chondrogenesis, angiogenesis and bone formation (Pountos *et al.*, 2010). Fracture healing is affected by different systemic and local variables that influence restoration of the original physical and mechanical properties of the injured tissue. It requires the interaction of several physiological and biomechanical steps that reflect a wide range of activities at the molecular and cellular levels (Marsell *et al.*, 2011) <sup>[14]</sup>.

### Materials and Methods

A total number of 11638 animals, irrespective of age, sex and breed were screened during the study period of 8 months which were presented to VCC, College of veterinary science and animal husbandry, Jabalpur, Madhya Pradesh (October, 2020 to May, 2021).

### Results and Discussion

#### Occurrence of fracture in different species

Occurrence and distribution of fracture in different species of animals was calculated from the total cases registered at VCC. Out of 11638 animals, 137 animals were affected with a fracture of limb making the overall fracture occurrence as 1.18% (Table 01, Figure 01). The findings are similar to Singh *et al.* (2017) <sup>[20]</sup>, Chaurasia (2018) <sup>[4]</sup> and Jain *et al.* (2018) <sup>[8]</sup> reported overall occurrence of fracture as 1.27%, 1.52% and 1.14% respectively.

Out of the total 11638 animals, 9766 were dogs of which 84 were affected with fracture. The occurrence of fracture in case of dogs was 0.86%.

The finding was similar to Baderiya (2020) <sup>[2]</sup>, who reported that the occurrence of fracture in dogs was 0.74%. However, Jain *et al.* (2018) <sup>[8]</sup> and Keosengthong *et al.* (2019) <sup>[11]</sup> reported occurrence of fracture in dogs as 1.14% and 1.7%.

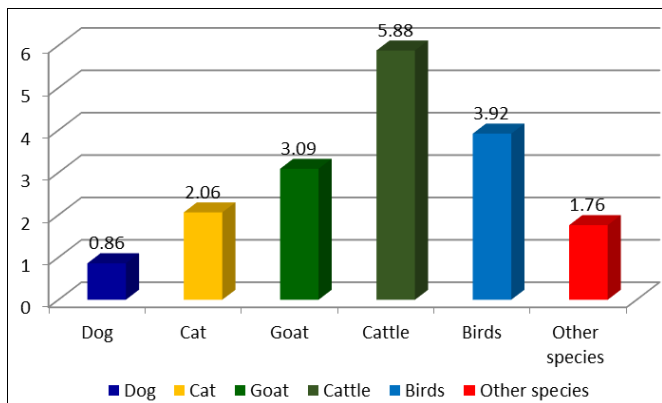
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**Table 1:** Occurrence of fracture in different species of animals presented at VCC, Jabalpur

Species	Total no. of animals registered	No. of animals having fracture	Per cent (%)
Dog	9766	84	0.86
Cat	388	08	2.06
Goat	874	27	3.09
Cattle	204	12	5.88
Birds	102	04	3.92
Other species (Horse, Sheep, Monkey and Mice)	304	02	1.76
Total	11638	137	1.18

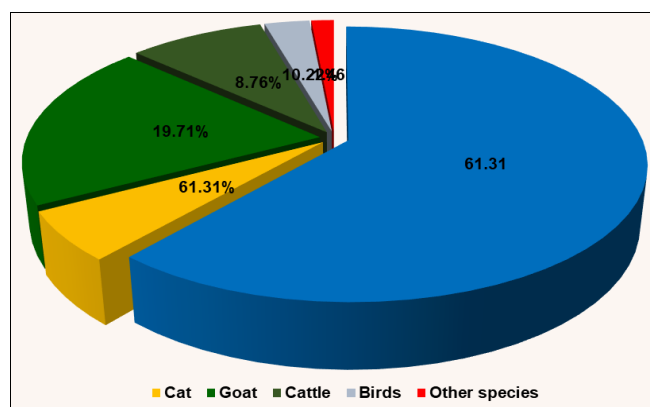


**Fig 1:** Occurrence of fracture in different species of animals presented at VCC, Jabalpur

This inconsistency may be attributed to differences in the base population, location, season (winter and summer) and duration of the study (October 2020 to May 2021).

**Table 2:** Distribution of fracture cases in different species of animals presented at VCC, Jabalpur

Species	No. of animals having a fracture	Per cent (%)
Dog	84	61.31
Cat	08	05.84
Goat	27	19.71
Cattle	12	08.76
Birds	04	02.92
Other species(Horse, Sheep, Monkey and Mice)	02	01.46
Total	137	100.00



**Fig 2:** Occurrence of fracture cases in different species of animals

Out of 137 fractures recorded, maximum number of fractures were found in dogs, 84 (61.31%) followed by goats, 27 (19.71%), cattle, 12 (8.76%), cats, 8 (5.84%), birds, 4 (2.92%) and other species including horse, sheep, monkey and mice, 2 (1.46%) (Table 02, Figure 02). The difference in fracture presentation percentage in different species is due to

variations in population and habitation of the different species in Jabalpur. The present findings are in consistency with the findings of Singh *et al.* (2018) and Kumar *et al.* (2020) [12] they reported the highest fracture percentage in dogs as 54.34% and 75.86% respectively.

**Based on anamnesis**

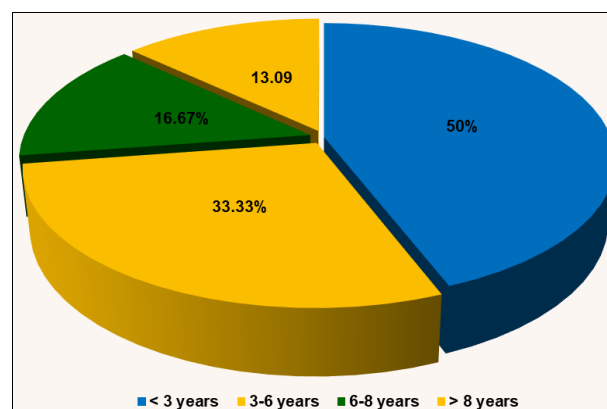
**Age**

In the present study, out of the total 84 cases of fracture, 37 cases were of age group less than 3 years (44.05%), 24 dogs were of 3 to 6 years (28.57%), 12 dogs were of 6 to 8 years (14.29%) and 11 dogs were of greater than 8 years (13.09%) of age (Table 03, figure 03).

The higher occurrence of fractures in young dogs may be correlated to the fact that young animals are not well trained or learnt with the hazard cope up skills which could be better instinct in older dogs and also young animals are more playful and active, which makes them susceptible for automobile accident or failing from height leading to fracture.

**Table 3:** Occurrence of fracture in different age groups of dogs

Age group	No. of animals	Per cent (%)
< 3 years	37	44.05
3-6 years	24	28.57
6-8 years	12	14.29
> 8 years	11	13.09
Total	84	100.00



**Fig 3:** Occurrence of fracture in different age groups of dogs

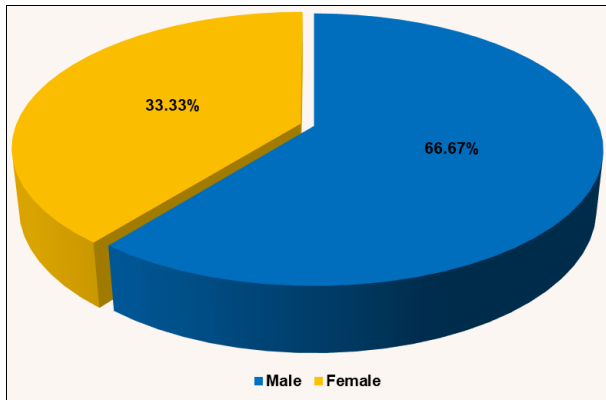
These findings are in correlation with the findings of Singh *et al.* (2015) [15], they reported a higher number of fractures in young dogs of age 1-3 years (78.95%). Fatima (2020) also reported a higher occurrence of fractures in the age group of 1-3 years (50%).

**Sex**

The fractures were more common in male dogs, 51 (60.71%) than the female dogs, 33 (33.33%) (Table 04, figure 04) of the total 84 dogs.

**Table 4:** Sex-wise occurrence of fracture

Sex	No. of animals	Per cent (%)
Male	51	60.71
Female	33	39.29
Total	84	100.00



**Fig 4:** Sex-wise distribution of fracture in dogs

These findings are in accordance with the findings of Patil *et al.* (2018) [15], they stated that the male dogs (73.01%) were found to have the highest occurrence of fracture as compared to female dogs (26.99%). Similarly, a higher occurrence of

fractures in male dogs was also reported by Chaurasia (2018) [4] and Baderiya (2020) [2].

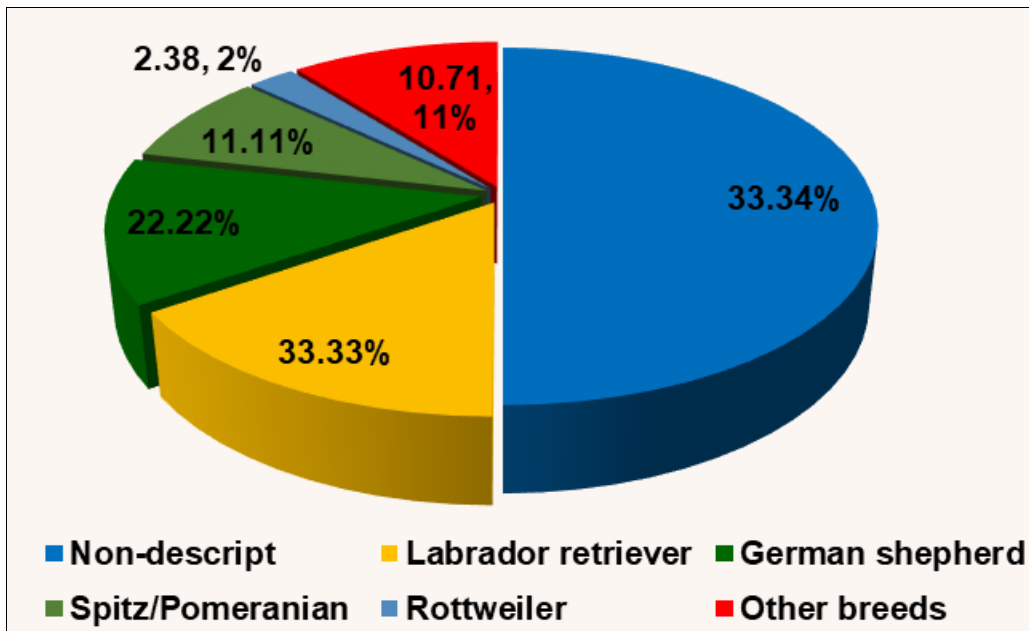
These findings can be deputed to the fact that the males being more aggressive and active than females making them more vulnerable to the fracture.

**Breed**

Out of 84 dogs affected with fracture, breed-wise involvement showed, 42 cases were of non-descript (50.00%), followed by 13 cases of Labrador retriever (15.48%), 11 cases were of a German shepherd (13.10%), 7 cases were of Spitz/Pomeranian (11.11%), two cases were of Rottweiler (2.38%) and 9 cases were of other breeds (10.71%) (Table 5, figure 05).

**Table 5:** Occurrence of fracture in different breeds of dogs

Breed	No. of animals	Per cent (%)
Non-descript	42	50.00
Labrador retriever	13	15.48
German shepherd	11	13.10
Spitz/Pomeranian	07	08.33
Rottweiler	02	02.38
Other breeds	09	10.71
Total	84	100.00



**Fig 5:** Occurrence of fracture in different breeds of dogs

Singh *et al.* (2015) [15], Uwagie-Ero *et al.* (2018) [23], Keosengthong *et al.* (2019) [11] and Das *et al.* (2020) [5] also reported the highest occurrence of fracture in non-descript dogs. Kumar *et al.* (2020) [12] reported the breed-wise occurrence in the order of non-descript (76), German shepherd (39), Labrador (34), Belgium shepherd (13), Rottweiler (11), Doberman (10), Pomeranian (8) and Pug (7). These findings may be correlated to the fact that more populations of non-descript dogs in and around Jabalpur are to be presented at the place of study.

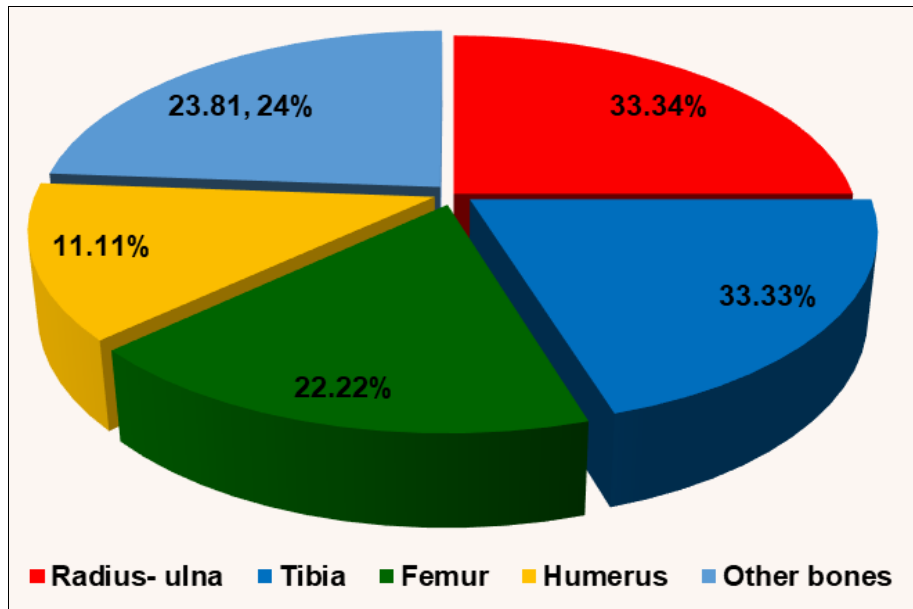
**Bone involved**

In the present study, 21 cases were of radius-ulna (25.00%), 17 cases were of the tibia (20.24%), 15 cases were of the

femur (17.85%), 11 cases were involving humerus (13.10%) and 20 cases were of other bones (23.81%) like carpals, metacarpals, tarsals, metatarsals, ribs and scapula (Table 06, figure 06).

**Table 6:** Occurrence of fracture according to bones involved

Bone	No. of animals	Per cent (%)
Radius- ulna	21	25.00
Tibia	17	20.24
Femur	15	17.85
Humerus	11	13.10
Other bones	20	23.81
Total	84	100.00



**Fig 6:** Occurrence of fracture according to bones involved

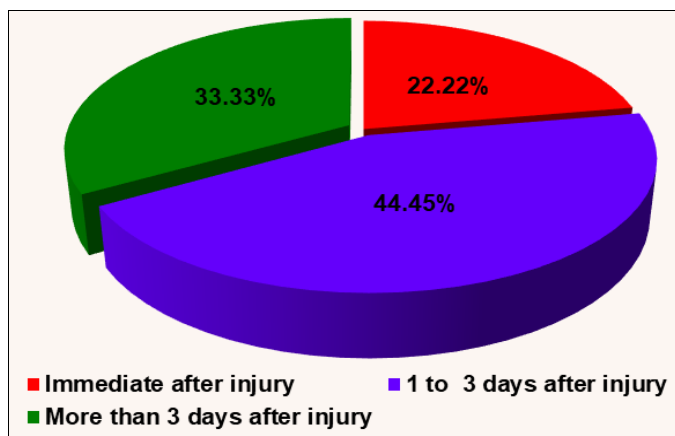
These findings are inconsistent with Bharath (2014) [3], who recorded higher occurrence in the radius and ulna (37.82%) followed by tibia (32.81%), femur (24.39%) and humerus (4.98%). De Souza (2012) [6] and Phillips (1979) [16] found that radius-ulna was more affected than the femur in the canine. However, these findings are in contrary to Ragunath *et al.* (2012) [18], Ali (2013) [1], Sran *et al.* (2015) [22] and Patil *et al.* (2018) [15], they reported a higher occurrence of fracture in case of femur. Out of 84 fracture cases presented, 18 cases of age group 1-8 years with diaphyseal fracture of either sex and irrespective of breed, suitable for plating were selected for the treatment.

**Duration of fracture**

Duration of injury before presenting the cases included in the present study for the treatment was, 08 dogs were presented 1 to 3 days of the injury (41.67%), 6 dogs were presented more than 3 days after injury (33.33%), 4 dogs were brought immediately after injury (22.22%) (Table 07, figure 07).

**Table 7:** Duration passed after fracture

Duration (days)	No. of animals	Per cent (%)
Immediately after injury	04	22.22
1 to 3 days after injury	08	44.45
More than 3 days after the injury	06	33.33
Total	18	100.00



**Fig 7:** Duration passed after fracture

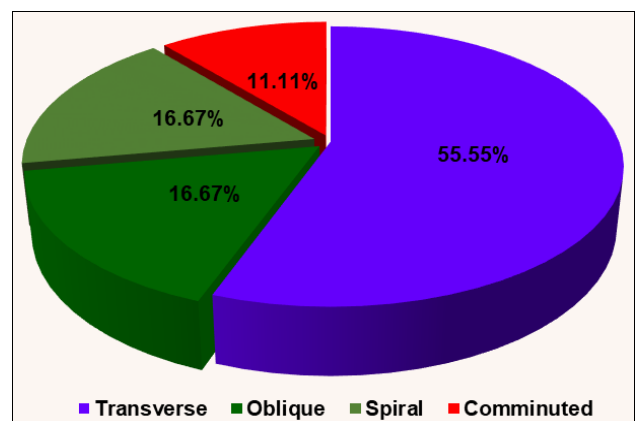
These present are in accordance with Kushwaha *et al.* (2011) [13] reported that duration of fractures was 0-2 days in 41.56%, 2-4 days in 23.37%, 4-6 days in 2.6%, 6-8 days in 5.19%, 8-15 days in 6.50% and >15 days (18.18%). The findings are in contrary to Chaurasia (2018) [4] who reported that most of the dogs were presented immediately after injury (41.66%). Kallianpur *et al.* (2018) [9] reported the mean time of presentation above 3 days. The finding corresponds to the awareness of the owner. Availability of hospital in the proximity, socio-economic status and owner’s attention towards the pet are the most influential factors for variation in the presentation of the animal for the treatment.

**Type of fracture**

Types of fracture involved were, highest is of transverse (55.55%), followed by oblique (16.67%) and spiral (16.67%), then comminuted (11.11) (Table 08, Figure 08).

**Table 8:** Type of fracture

Type of fracture	No. of animals	Per cent (%)
Transverse	10	55.55
Oblique	03	16.67
Spiral	03	16.67
Comminuted	02	11.11
Total	18	100.00



**Fig 8:** Type of fracture

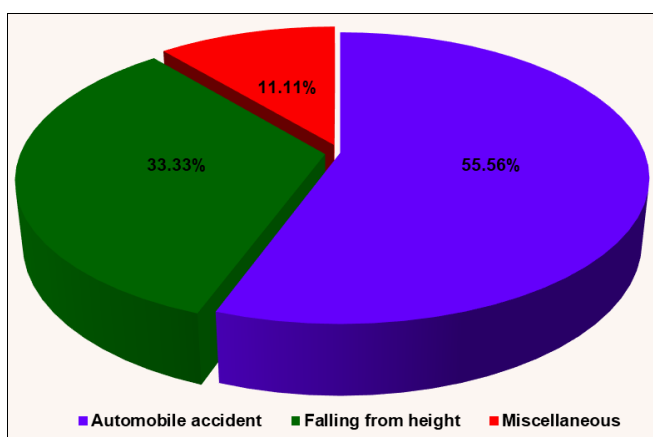
The highest transverse fractures might be attributed to the anatomical structure of the bone as maximum number of fractures was reported in the radius ulna being thinner and narrowed at mid-shaft and prone for fracture. These findings are in complementary to the findings of Kushwaha *et al.* (2011) [13] who reported 60.00% transverse fractures, 35.00% oblique and 5.00% comminuted fractures. Simon *et al.* (2010) also reported 44.8% of transverse fractures and 26.28% of comminuted fractures. These findings are in contrary with the findings of Kumar *et al.* (2016) [12] who reported more of oblique fractures.

### Aetiology of fracture

In the present study, the primary aetiology was found to be an automobile accident which was seen in 10 dogs (55.56%), followed by 6 dogs were affected due to falling from height (33.33%), whereas in one case each of the other causes like bitten by a dog and hit by stick (Table 09, Figure 09).

**Table 9:** Etiology of fracture in dogs

Aetiology	No. of animals	Per cent (%)
Automobile accident	10	55.56
Falling from height	06	33.33
Dog bite	01	05.56
Hit by stick	01	05.55
Total	18	100.00



**Fig 9:** Etiology of fracture in dogs

The findings of Tercanliglu and Sarierlu (2009), Ali (2013) [11] and Singh *et al.* (2015) [15] are in accordance with the present study reports the major cause of fracture is automobile accident. Kumar *et al.* (2020) [12] also reported the major cause of fracture as automobile accidents (65%) followed by falling from height (27.16%). While in the contrary Raouf *et al.* (2019) [18] reported the most common cause as falling from a height (80.62%) followed by vehicle accidents (19.38%). The present findings may be related to the fact that most of the dogs were of non-descript (Stray dogs) which are let loose and rush onto the roads leading to automobile accidents. Most of the dogs are let loose in residence, making them prone to fall from heights.

### Conclusion

In conclusion, this study investigated the occurrence and distribution of fractures in different species of animals presented at VCC, Jabalpur. Out of a total of 11,638 registered animals, 137 were affected by limb fractures, resulting in an overall fracture occurrence rate of 1.18%. The highest number of fractures occurred in dogs, followed by goats, cattle, cats, birds, and other species. Fractures were

more common in young dogs, with the majority occurring in dogs under 3 years of age. Male dogs had a higher occurrence of fractures compared to females. Non-descript dogs were most commonly affected by fractures, followed by Labrador Retrievers and German Shepherds. Radius-ulna fractures were the most prevalent, followed by tibia, femur, and humerus fractures. The primary aetiology of fractures was attributed to automobile accidents and falling from heights. These findings were consistent with previous studies, although some variations could be attributed to factors such as location, population, season, and study duration. The study highlights the vulnerability of young dogs to fractures due to their lack of hazard-coping skills and increased activity levels. The findings also emphasize the importance of owner awareness, accessibility to veterinary care, and socioeconomic factors in the presentation and treatment of animal fractures.

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