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Incidence of developmental orthopaedic diseases in dogs

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Abstract

A prospective study was conducted on dogs of either sex aged below one year presented to the Department of Veterinary Surgery and Radiology and Veterinary Clinical Complex, N.T.R College of veterinary Science, Gannavaram from October 2022 to January 2024. A total number of 2360 growing dogs aged less than one year were presented during the study period Out of 2360 cases 547 cases (23.17%) were presented with history of lameness. Out of these 547 cases, 67 (12.25%) (2.84% of total cases) had developmental orthopedic diseases. The present study describes Breed, age and sex wise incidence of developmental orthopaedic diseases were recorded.

Keywords: Developmental, orthopaedic, incidence, young dogs

1. Introduction

Among the various conditions that can affect young dogs, developmental orthopaedic diseases stand as critical and demanding attention in small animal veterinary practice. Developmental orthopaedic diseases are a type of bone and joint diseases that usually affect dogs during their growing period. Although these diseases develop and usually manifest during the period from birth to skeletal maturity, their long-term clinical effects may be persistent and profound (Breur *et al.*, 2020) ^[1]. These diseases can cause lameness and pain in young growing dogs. Developmental orthopaedic diseases in young dogs include canine hip dysplasia, elbow dysplasia, Osteochondritis Dissecans, Panosteitis, patellar luxation, rickets, hypertrophic osteodystrophy, angular limb deformities and Legg Calve-Perthes disease (Demko and Mclaughlin, 2005) ^[2]. Due to availability of limited reports on developmental orthopaedic diseases in dogs in India, the present study describes the incidence of different developmental orthopaedic diseases in dogs.

2. Materials and Methods

The present study was conducted on dogs of either sex aged below one year presented to the Department of Veterinary Surgery and Radiology and Veterinary Clinical Complex, N.T.R College of veterinary Science, Gannavaram from October 2022 to January 2024. Clinical cases presented with symptoms such as lameness, swelling of limbs, restricted range of motion, pain, gait abnormalities, postural abnormalities, angular limb deformities such as valgus, varus, Procurvatum and Recurvatum and difficulty in getting up and getting down in young dogs aged below one year which were suggestive of developmental orthopedic diseases were included in the study. Breed, age and sex wise incidence were recorded.

3. Results and Discussion

A total number of 2360 growing dogs aged less than one year were presented during the study period i.e., October 2022 to January 2024. Out of 2360 cases 547 cases (23.17%) were presented with history of lameness. Out of these 547 cases, 67 (12.25%) (2.84% of total cases) had developmental orthopedic diseases.

Out of the 67 cases with developmental orthopaedic diseases, the most common developmental orthopedic disease diagnosed was Canine Hip Dysplasia (35/67, 52.24%) followed by Angular Limb Deformities (12/67, 17.92%), Patellar Luxation (6/67, 8.95%), Elbow Dysplasia (5/67, 7.46%), Hypertrophic osteodystrophy (5/67, 7.46%) and Panosteitis (4/67, 5.97%) (Table 1). From the above results, it was concluded that Canine hip dysplasia was the most common developmental orthopaedic disease in the dogs of age below one year. These findings are in accordance with Shameena *et al.* (2021) [3] who stated that Canine hip dysplasia was the most commonly diagnosed developmental orthopaedic disease in dogs.

Table 1: Distribution of developmental orthopaedic diseases in dogs

S. No.	Type of DOD	Number of Dogs	Percent
1	Canine hip dysplasia	35	52.24%
2	Angular limb deformities	12	17.92%
3	Patellar luxation	6	8.95%
4	Elbow dysplasia	5	7.46%
5	Hypertrophic osteodystrophy	5	7.46%
6	Panosteitis	4	5.97%
	Total	67	100.00%

3.1 Breed wise incidence

Among the 67 cases having developmental orthopaedic diseases, highest incidence was observed in German Shepherd Dog (26.87%), followed by Labrador Retriever (20.89%), Great Dane (11.96%), Golden Retriever (7.46%), Rottweiler (5.97%), Mudhol Hound (5.97%), Mongrel (5.97%), Siberian Husky (4.48%), Saint Bernard (2.98%), Beagle (1.49%), Dalmatian (1.49%), Shih Tzu (1.49%), Pug (1.49%) and Chow-Chow (1.49%). Out of the 67 cases, Canine hip dysplasia had highest incidence and was diagnosed in 9 breeds. The German Shepherd Dog was the most affected breed (15/35, 42.86%) followed by the Labrador Retriever (9/35, 25.71%), Golden Retriever (3/35, 8.57%), Rottweiler (2/35, 5.71%), Saint Bernard (2/35, 5.71%), Beagle (1/35, 2.86%), Siberian Husky (1/35, 2.86%), Shih tzu (1/35, 2.86%) and Pug (1/35, 2.86%). Similar to the findings of present study, Nouh *et al.* (2014) [4] and Vidoni *et al.* (2021) [5], reported that large breed dogs such as German Shepherd Dog, Labrador Retrievers and Rottweilers were most commonly affected for Canine hip dysplasia. Angular limb deformities was diagnosed in 5 breeds. The Great Dane (4/12, 33.34%) was most common affected breed followed by Mongrel (n=3/12, 25.00%), Mudhol Hound (2/12, 16.67%), Labrador Retriever (1/12, 8.33%) and Dalmatian (1/12, 8.33%). However, Shameena *et al.* (2021) [3] identified Angular limb deformities in German Shepherd Dog (25%), Rottweiler (25%), French Bulldog (25%) and non-descript breed (25%). Patellar luxation was diagnosed in four breeds. The Labrador Retriever (2/6, 33.32%) was the most commonly affected breed, followed by Golden Retriever (n=1; 16.67%), Mudhol Hound (1/6, 16.67%), Siberian Husky (1/6, 16.67%) and Mongrel (1/6, 16.67%). Shameena *et al.* (2021) [3] reported highest incidence of Patellar luxation in Labrador Retriever was 11.10% followed by Golden Retriever where it was 5.56% during their study on incidence of developmental orthopaedic diseases in dogs. Elbow dysplasia was diagnosed

in the Rottweiler (2/5, 40.00%) followed by Great Dane (1/5, 20.00%), Golden Retriever (1/5, 20.00%) and Chow- Chow (1/5, 20.00%). Similarly, Wind and Pacard (2012) [6] and O'Neill *et al.* (2020) [7] reported that young dogs of heavy and large sized breeds showed a greater predilection for elbow dysplasia especially in the growing stage of the dogs. Hypertrophic osteodystrophy showed highest incidence in Labrador Retriever (2/5, 40.00%) and Great Dane (2/5, 40.00%) and had lowest incidence in German Shepherd Dog (1/5, 20.00%). Kushwaha *et al.* (2012) [8] found highest incidence of Hypertrophic osteodystrophy was in non-descript dogs (36.37%), followed by German Shepherd Dog (27.27%), Spitz (18.18%), Dobermanns (9.09%) and Labrador Retrievers (9.09%). Panosteitis was diagnosed in German Shepherd Dog (2/4, 50.00%) followed by Great Dane (1/4, 25.00%) and Mudhol Hound (1/4, 25.00%). Similar Baines *et al.* (2006) [9] stated that incidence of Panosteitis was more in German Shepherd Dogs.

3.2 Age wise incidence

In the present study, developmental orthopedic diseases were diagnosed in young and growing dogs aged from 3 months to 12 months. Among the 67 cases, the occurrence of developmental orthopaedic diseases was more common in dogs aged between 4 to 6 months (31/67, 46.27%) followed by 7-9 months (20/67, 29.85%), 10-12 months (13/67, 19.4%) and less than 3 months (3/67, 4.48%) (Table 2). Out of 32 cases of Canine hip dysplasia highest incidence was observed in dogs aged between 7-9 months (15/35, 42.86%) followed by 4-6 months (12/35, 34.28%) and 10-12 months (8/35, 22.86%). Simon *et al.* (2010) [10] recorded highest incidence of Canine hip dysplasia in young animals aged between 3 months and one year with an incidence rate of 52.94%. In the present study among 12 cases of Angular limb deformities highest incidence was observed in dogs aged between 4-6 months (7/12, 58.33%) followed by less than 3 months (2/12, 16.67%), 7-9 months (2/12, 16.67%) and 10-12 months (1/12, 8.33%). Kushwaha *et al.* (2012) [8] found that dogs in the age group of 0-3 months (64.28%) were more frequently affected with Angular limb deformities than those aged between 3-6 months (35.72%). Patellar luxation was common in dogs aged between 10-12 months (3/6, 50.00%), 7-9 months (2/6, 33.33%) and 4-6 months (1/6, 16.67%). Lara *et al.* (2013) [11] stated that developmental medial luxation had a higher incidence in those dogs under one year of age. Among 5 cases of Elbow dysplasia highest incidence was observed in dogs aged between 4-6 months (4/5, 80.00%) followed by 10-12 months (1/5, 20.00%). Janutta and Distl (2008) [12] stated that elbow dysplasia was most often seen in young dogs aged less than 18 months. Out of 5 cases, Hypertrophic osteodystrophy highest incidence was observed in dogs aged between 4-6 months (4/5, 80.00%) followed by dogs aged less than 3 months (1/5, 20.00%). Safra *et al.* (2013) [13] reported that highest incidence of Hypertrophic osteodystrophy was occurred among the dogs aged below six months of age. Among 4 cases of Panosteitis highest incidence was observed in dogs aged between 4-6 months (3/4, 75.00%) followed by 7-9 months (1/4, 25.00%). Demko *et al.* (2005) [2] reported that Panosteitis was the most commonly seen in dogs aged between 5 to 12 months.

Table 2: Age wise incidence of developmental orthopaedic diseases in dogs.

S. No.	Developmental orthopaedic diseases	0-3 Months	4-6 Months	7-9 Months	10-12 Months	Total
1	Canine hip dysplasia	-	12 (34.28%)	15 (42.86%)	8 (22.86%)	35 (52.24%)
2	Angular limb deformities	2 (16.67%)	7 (58.33%)	2 (16.67%)	1 (8.33%)	12 (17.92%)
3	Patellar luxation	-	1 (16.67%)	2 (33.33%)	3 (50.00%)	6 (8.95%)
4	Elbow dysplasia	-	4 (80.00%)	-	1 (20.00%)	5 (7.46%)
5	Hypertrophic osteodystrophy	1 (20.00%)	4 (80.00%)	-	-	5 (7.46%)
6	Panosteitis	-	3 (75.00%)	1 (25.00%)	-	4 (5.97%)
Total		3 (4.48%)	31 (46.27%)	20 (29.85%)	13 (19.40%)	67 (100.00%)

3.3 Sex wise incidence

Among the 67 cases that were diagnosed with developmental orthopaedic diseases in dogs, 45 were male dogs (67.16%) and 21 were female dogs (32.84%) which shows that incidence was two times more in male dogs to that of female dogs (Table 3). In the present study, out of 35 dogs diagnosed with Canine hip dysplasia 22 were male (62.86%) dogs and 13 were female dogs (37.14%). Among the dogs diagnosed with Angular limb deformities 9 were male dogs (75.00%) and 3 were female dogs (25.00%). In contrary to the findings of present study, Kushwaha *et al.* (2012)^[8] reported Angular limb deformities in eight (57.14%) male dogs and six (42.86%) female dogs. Out of 6 dogs diagnosed with Patellar luxation 5 dogs were male (83.33%) and 1 was female dog (16.67%). In contrary to the present study, Bound *et al.*

(2009)^[14] and Lara *et al.* (2013)^[11] stated the incidence of patellar luxation was more common in female dogs. In dogs diagnosed with Elbow dysplasia 3 were male dogs (60.00%) and 2 were female dogs (40.00%). Fitzpatrick *et al.* (2009)^[15] observed male dogs were commonly affected with elbow dysplasia compared to females. Among the dogs diagnosed with Hypertrophic osteodystrophy 3 were male dogs (60.00%) and 2 were female dogs (40.00%). Munjar *et al.* (1998)^[16] reported that male dogs were 2.3 times more likely to develop Hypertrophic osteodystrophy compared to female dogs Out of 4 dogs diagnosed with Panosteitis 3 were male dogs (75.00%) and 1 was female dog (25.00%). Baines *et al.* (2006)^[9] who reported male dogs were more frequently affected with panosteitis than female dogs.

Table 3: Sex wise incidence of developmental orthopaedic diseases in dogs.

S. No.	DOD	Male	Percent	Female	Percent	Total
1	Canine hip dysplasia	22	62.86%	13	37.14%	35
2	Angular limb deformities	9	75.00%	3	25.00%	12
3	Patellar luxation	5	83.33%	1	16.67%	6
4	Elbow dysplasia	3	60.00%	2	40.00%	5
5	Hypertrophic osteodystrophy	3	60.00%	2	40.00%	5
6	Panosteitis	3	75.00%	1	25.00%	4
Total		45	67.16%	22	32.84%	67

4. Conclusion

To conclude, canine hip dysplasia was the most common developmental orthopaedic disease in the dogs of age below one year. German Shepherd Dogs were most commonly affected breed for developmental orthopaedic diseases. Dogs with the age of 4 to 6 months were commonly affected with developmental orthopaedic diseases in dogs. Male dogs were commonly affected with developmental orthopaedic diseases compared to that of females.

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