# RETROSPECTIVE STUDY OF 180 DYSPLASTIC DOGS ADMITTED AT THE VETERINARY TEACHING HOSPITAL, UNESP-BOTUCATU

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## ABSTRACT

Hip dysplasia (HD) is one of the most important canine orthopedic disease because of its high occurrence and severe consequences in the quality of life of many dogs. The aim of this study was to evaluate epidemiologically and statistically 180 dysplastic dogs attended at the Veterinary Teaching Hospital, Sao Paulo State University, in a five year period. It was correlated the severity of clinical signs and the HD from radiographs of 120 animals. Sex, body weight and age of animal at time of diagnosis were not a risk factor for severity of HD or clinical signs. More than 50% of the Rottweillers, German Shepherds, Labradors Retrievers and Pit Bulls presented with severe HD. Mean body weight of dogs with severe HD was 34.31kg. From 180 evaluated dogs, 22.22% had osteoarthritis at time of diagnosis. Around 45% of pure breed dogs presented with severe HD versus 27.27% of mix breed dog. A total of 42.11% of clinically asymptomatic dogs had severe radiographic signs of HD. There was no significant correlation between the severity of clinical signs and radiographic lesions.

**Keywords:** hip dysplasia, dogs, veterinary orthopedics

# ESTUDO RETROSPECTIVO DE 180 CÃES COM DISPLASIA COXOFEMORAL ATENDIDOS NO HOSPITAL VETERINÁRIO DA UNESP BOTUCATU

## RESUMO

A displasia coxofemoral (DCF) é uma das principais afecções ortopédicas em cães, uma vez que sua ocorrência é alta e afeta diretamente a qualidade de vida de muitos pacientes. A presente pesquisa teve como objetivos avaliar epidemiologicamente 180 cães portadores de DCF, correlacionando os dados estudados e determinando possíveis fatores de risco num período de cinco anos, além de avaliar a correlação entre o grau de severidade dos sinais clínicos e da avaliação radiográfica de 120 animais. Sexo, peso e idade do animal não representaram fator de risco para severidade da DCF ou dos sinais clínicos. Os cães das raças Rottweiler, Pastor Alemão, Labrador Retriever e Pit Bull apresentaram mais de 50% dos representantes com DCF severa. Os cães sem raça definida apresentaram uma distribuição

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semelhante dentro dos quatro graus de DCF. O peso médio dos cães com DCF severa foi 34,31kg. Dos 180 animais avaliados, 22,22% apresentavam sinais de osteoartrose secundária a doença. Um total de 42,11% dos animais assintomáticos apresentaram sinais radiográficos de DCF severa. Não houve correlação estatística entre a severidade dos sinais clínicos e radiográficos.

**Palavras-chaves:** displasia coxofemoral, cães, ortopedia veterinária

## ESTUDIO RETROSPECTIVO DE 180 PERROS COM DISPLASIA DE CADERA ATENDIDOS EN EL HOSPITAL VETERINARIO DE LA UNESP-BOTUCATU

### RESUMEN

La displasia de cadera (DC) es una de las más importantes enfermedades ortopédicas de los caninos, debido a su alta ocurrencia y severas consecuencias en la calidad de vida de muchos perros. El objetivo de este estudio fue evaluar epidemiológica y estadísticamente 180 perros con displasia atendidos en el Hospital Veterinario Escuela de la Univ Estadual Paulista, en un período de cinco años. Además, fueron correlacionadas la severidad de los signos clínicos y de los hallazgos radiográficos de 120 animales. Sexo, peso corporal y edad del animal en el momento del diagnóstico no fueron factores de riesgo para la DC o para la presencia de signos clínicos. Más del 50% de los Rottweiller, Pastores Alemanes, Cobradores de Labrador y los denominados "Pit Bull" presentaron DC severa. El peso promedio de los perros con DC severa fue de 34,31kg. De 180 perros evaluados, 22,22% presentaban osteoartritis al momento del diagnóstico. Alrededor de 45% de los perros de raza pura presentaron DC severa versus 27,27% de perros mestizos. Un total de 42% de perros clínicamente asintomáticos tuvieron signos radiográficos severos de DC. No hay correlación significativa entre la severidad del signo clínico y las lesiones radiográficas.

**Palabras clave:** displasia de cadera, caninos, ortopedia veterinaria

## INTRODUCTION

Canine hip dysplasia (HD) is a common inherited trait orthopedic disease (1). It is a genetic disease of high prevalence, debilitating, causing pain, discomfort and decreased lifespan in dogs (2) which is probably more prevalent in large breeds, and the occurrence is also influenced by environmental factors (3). The disease is characterized by an abnormal development of the hip joint causing joint laxity with subluxation or luxation of the femoral head, leading or not to bilateral osteoarthritis. It is still an important cause of chronic pain and it can affect more than 50% of some breed's population (4-8).

Affected dogs present with lameness, bilaterally shortened strides and bunny hopping with exercise intolerance and difficulty rising and climbing stairs. Onset of clinical signs is reported by owners between 3 and 10 months of age and may worsen as the secondary osteoarthritis progresses (5, 9).

Standard ventrodorsal hip-extended radiographs confirm the diagnosis and a grading system is applied. In North America, the Orthopedic Foundation for Animals (OFA) recommends a seven-class classification (excellent, good, fair, borderline, mild, moderate, severe) (10), whereas in continental Europe, the *FédérationCynologiqueInternationale* (FCI) recommends a five-grade scale from A to E (4, 5, 11, 12).

As therapeutic options, Oliveira (13) cites physiotherapy, hydrotherapy, use of anti-inflammatory non-steroidal, use of chondroprotective and surgery. Surgical techniques are

recommended: triple pelvic osteotomy, arthroplasty excision of femoral head and neck, pectinealmyectomy, intertrochanteric osteotomy, sinfiodese juvenile pubic, joint denervation (14) and total hip replacement (15).

The purpose of this retrospective study was to evaluate epidemiologic factors associated with HD in 180 dogs and the correlation between the severity of clinical signs and radiographic changes of 120 dogs with HD.

## MATERIALS AND METHODS

Medical records of dogs presented to the Veterinary Teaching Hospital of the Sao Paulo State University with standard ventrodorsal hip-extended radiographs confirming hip dysplasia in a five year period were reviewed. Patients were distributed into two study groups. Group 1 (G1) with 180 dogs, and group 2 (G2) with 120.

On G1, epidemiologic data such as age, breed, sex and weight were statistically correlated with the grade of HD at presentation. The disease was graded as transitional, mild, moderate and severe according to Genevois et al. (12).

On G2, 120 dogs with detailed history where selected out of G1. Statistical correlation between severity of clinical signs and severity of HD was evaluated. Clinical signs were graded as asymptomatic, mild, moderate and severe.

All data was submitted to statistical analyses using the appropriate method among Descriptive, Goodman, Kruskal-Wallis, Mann-Whitney, Anova e t-Student methods.

## RESULTS

On G1 a true statistical correlation between sex and the development of HD was not observed. Out of 180 dogs, 98 were male and 82 were female. The mean age of dogs with transitional, mild, moderate and severe HD was respectively 36, 64, 60 e 48 months of age.

There was no statistical relationship between body weight and severity of HD. Mean weight of dogs with mild, moderate and severe HD were respectively 34.31kg, 34.21kg e 34.31kg.

Half of the affected females presented with severe HD whereas the other half had the same distribution on grades transitional, mild and moderate. In the male population, 43.88% presented with severe HD and only 8.16% with mild HD. Marked prevalence of severe HD was observed in pure breed dogs (PBD). More than 50% of each breed population such as Rottweiler, Pit Bull Terrier, Labrador Retriever and German Shepherd presented with severe HD (Table 1). About 42% of Labrador Retrievers were evaluated to have severe HD, however 50% of them were asymptomatic. Similar presentation was observed in German Shepherds where 47% presented with severe HD, and 52% had mild clinical signs.

On G2, severe HD was presented by 45% of PBD and 27% of mixed breed dog (MBD), whereas severe clinical signs were presented by 23% of PBD and 31.82% of MBD. The MBD had the same frequency when presenting mild, moderate and severe clinical signs, and only 4.54% were asymptomatic. Rottweillers were the ones with less asymptomatic animals (10.71%). Like in G1, German Shepherds were the most affected by severe HD (47.37%), followed by Rottweiler (46.43%) and Pit Bulls (44.45%). A total of 42.11% of clinically asymptomatic dogs revealed severe radiographic changes. There was no direct correlation between the severity of clinical signs and radiographic changes (Table 2).

Table 1. Distribution of the most affected breeds of dogs with hip dysplasia in a population of 180 dogs (descriptive statistical analysis).

| | Hip Dysplasia | | | | |
|---|---|---|---|---|---|
| Breed | Transitional | Mild | Moderate | Severe | Total |
| MBD | n=5 (15.63%) | n=11 (34.38%) | n=7 (21.88%) | n=9 (28.13%) | n=32 |
| Rottweiler | n=4 (8.51%) | n=11 (23.40%) | n=7 (14.89%) | n=25 (53.19%) | n=47 |
| GermanSheperd | n=0 (0.00%) | n=7 (28.00%) | n=4 (16.00%) | n=14 (56.00%) | n=25 |
| Labrador | n=5 (29.41%) | n=2 (11.76%) | n=1 (5.88%) | n=9 (52.94%) | n=17 |
| Pit Bull | n=2 (20.00%) | n=1 (10.00%) | n=2 (20.00%) | n=5 (50.00%) | n=10 |
| Fila Brasileiro | n=0 (0.00%) | n=3 (30.00%) | n=4 (40.00%) | n=3 (30.00%) | n=10 |
| Others | n=5 (12.82%) | n=7 (17.95%) | n=8 (20.51%) | n=19 (48.72%) | n=39 |

Table 2. Distribution of displastic dogs (G2) according to clinical presentation and radiographic signs (statistical analyses: Goodman Test).

| | HD | | | | |
|---|---|---|---|---|---|
| Clinical signs | Transitional | Mild | Moderate | Severe | Total |
| Asymptomatic | n=4 (21.05%) | n=6 (31.58%) | n=1 (5.26%) | n=8 (42.11%) | n=19 |
| Mild | n=4 (9.30%) | n=8 (18.60%) | n=14 (32.56%) | n=17 (39.54%) | n=43 |
| Moderate | n=5 (16.13%) | n=7 (22.58%) | n=8 (25.81%) | n=11 (35.48%) | n=31 |
| Severe | n=2 (7.41%) | n=6 (22.22%) | n=5 (18.52%) | n=14 (51.85%) | n=27 |

## DISCUSSION

A true statistical correlation between sex and the development of HD was not observed here, however, some studies have found both male and female prevalence. Wood et al. (4) and Vieira et al. (2) identified more joint abnormalities in females'hips when compared to males' hips, whereas the results obtained by Maki, Liinamo and Ojala (16) and Rettennmaier at al. (17) agree with the work described herein.These variations could be explained by different pressure of selection over each gender in canine populations by breeding programs (4).

The results obtained from this study represent an earlier age at which animals present for evaluation when compared to other studies. Normally, the interval at which clinical signs are detected and radiographic diagnosis is confirmed is from 48 to 96 months (18). However, being HD a developmental orthopedic disease, lameness or gait abnormalities can develop at 3 to 10 months of age, and from then on, clinical signs may progress and be detected by owners according to the severity of the disease and attention to the animal (18, 19).

Similar interval for body weight was observed by Sallander, Hedhammar and Trogen (20) where mean weight was 34kg for males and 27 kg for females in a group of 160

Labrador Retrievers. No study evaluating the correlation between body condition score and severity of HD is acknowledged by the author; however the evaluation of overfeeding and the development of HD revealed different results. According to Janutta and Hamann and Distl (19), excessive feeding, isolated, may not increase chances of developing the disease but it makes it worse or predisposes it in genetically susceptible animals. Experimental studies revealed that animals that are fed *ad libitum* are at higher risk of developing the disease due to overfeeding (20). This can be explained by the fact that accelerated weight gain may lead to non equal development of soft tissues, resulting in asynchrony of pelvic muscle and skeletal system (9). In general, the nutritional risk factors are related to the excessive calcium intake and electrolyte misbalance and the excessive protein *per se* intake has no negative influence in the skeletal development (21, 22).

Some studies indicate that 35 dog breeds are considered at high risk of developing the disease; however, the frequency of presentation of each breed varies in the different countries and regions (22, 23).

In Brazil, Rottweillers, Labrador Retrievers and German Shepherds are very popular breeds, and therefore, are over represented in this study. The mixed breed dogs, nevertheless, are also over represented. The German Shepherd, which is widely distributed throughout the world, is commonly affected by HD with a prevalence of 50 to 55% of dogs (19) and in this study, were the most affected by severe HD (56%). Vieira et al. (2) evaluated the radiographs of 386 dogs German Shepherd and Labrador Retriever, noting that the first race was associated with lower level of HD compared to the second.

As expected, there was no direct correlation between the severity of clinical signs and radiographic changes. According to Torres, Rocha and Silva (24), a great number of asymptomatic dogs with severe HD is expected. In his study, up to 70% of dogs affected by HD were asymptomatic (Table 2).

The results of this study differ from some data reported in the literature, however, it is to the author's knowledge that such an extensive epidemiologic study has not ever been done in Brazil. In our population, the distribution of the different grades of HD amongst transitional, mild, moderate and severe was 10.83%, 22.5, 23.3 e 41.6% respectively, whereas in a canine French population, the distribution was 35.13%, 30.54%, 25.68% and 8.65% respectively (12). The high incidence of severe HD in the presented canine populations can be explained by the inefficient system of selection of breeding dogs in the country. Due to the severity of the affection and its herdability, there is a need of establishing a more rigid selection process over the breeding canine population in order to decrease its incidence and improve their phenotype (22, 25). A study by Worth, Bridges and Jones (26), followed animals susceptible to HD that were phenotypically selected by the New Zealand Veterinary Association (NZVA) for years, concluded that there was a significant reduction in the angle of the joint laxity and Noberg only for the German Shepherd breed, while for Labrador Retrievers, Golden Retrievers and Rottweillers no reduction in the incidence of HD throughout the study.

Despite several studies, and the fact that the prevalence of the disease overcomes 50% of some breeds' population, the progress in decreasing its incidence is still slow in many countries, which could be explained by errors in diagnostic and by breeders that still use dysplastic animals for reproduction (6, 7, 11).

## CONCLUSIONS

Considering the progressive increase of prevalence of the disease, the impact on the dog's quality of life and the amount of money spent by owners every year on medical and surgical treatment, epidemiologic studies are warranted and the work of veterinary doctors along with owners and breeders in order to decrease the incidence of the disease must be based upon solid literature.

In this study, sex, body weight and age were not a risk factor for the severity of HD. The Rottweiler, German Shepherds, Labrador Retrievers and Pit Bull Terrier were the most common breeds affected by severe HD. The severity of radiographic changes does not correspond to the severity of the clinical findings.

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