



# BREEDING AGREEMENT TO KEEP DOWN HIP DYSPLASIA OF DOGS

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## ABSTRACT

At the time of purchasing a dog, should observe that they have hip dysplasia or not. The combined application of the quantitative and qualitative methods could help in the selective breeding of dogs. A healthy diet and avoiding unusual playing could free them from this hip dysplasia. Inbreeding ensures the fixation of such traits the chance of the following problem. In severe cases, novel clinical approaches and surgical procedures could be applicable.

## 1. INTRODUCTION

Canine hip and elbow dysplasia are widespread skeletal diseases in many dog breeds. These degenerative diseases are characterized by conformational changes in the affected joints and can result in clinical lameness and considerable impairment of the dog (Janutta *et al.*)<sup>[5]</sup>. Dysplasia also occurs in humans, with a frequency of approximately about 4 from 1000 births, with a greater probability of girls and newborns; higher birth weight was a risk factor in humans (Holen *et al.*)<sup>[1]</sup>. Specific single nucleotide polymorphisms and positional candidate genes in dogs with canine hip dysplasia have been found to correlate with osteoarthritis and developmental dysplasia of the hip in humans (Zhou *et al.*)<sup>[14]</sup>. Larger and heavier dog breeds like the German shepherd, labrador, rottweiler, and other were considered to be most endangered.

## 2. CLINICAL GENETICS OF HIP DYSPLASIA IN DOGS

Hip (Figure-1) and elbow dysplasia which may cause the dog to experience pain later and may cause arthritis (Link)<sup>[3]</sup>. The Orthopedic Foundation for Animals found that 19.1% of German shepherd is affected by this hip dysplasia (Link)<sup>[4]</sup>. The effect of a father was significant with a high coefficient; frequencies of hip dysplasia decrease with the increase of inbreeding of animals (Kasarda *et al.*)<sup>[6]</sup>. (Samoy *et al.*)<sup>[10]</sup> defined incongruity at dogs as a result of bad alignment of the joint of the elbow. Abnormal shape of the ulnar trochlear notch or short radius or ulna can result in loose fragments in different locations. The genetic relation between hip and elbow dysplasia of canid was estimated by (Holen *et al.*)<sup>[5]</sup>. They were also the most frequent developmental orthopedic diseases in dogs during a ten-year study, carried out by (Lafond *et al.*)<sup>[7]</sup>.

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(Lafond *et al.*)<sup>[13]</sup> stated significantly the higher occurrence of hip dysplasia at male labradors compared to females, while (Rettenmaier *et al.*)<sup>[9]</sup> found no significant difference between sexes. The occurrence of canine hip dysplasia in the populations suggests some genetic basis for these diseases. (Maki *et al.*)<sup>[8]</sup> stated the inheritance of dysplasia (elbow and hip) as quantitative and close to continuous, with a major gene affecting the trait jointly with numerous minor genes. Genetic screening programs are complicated by the polygenic nature of canine hip dysplasia (Figure-1) and related osteoarthritis, as well as environmental influences on phenotype. Several chromosomal markers for canine hip dysplasia (Figure1) have been reported for a population of cross-bred labrador retriever-greyhounds (Todhunter *et al.*)<sup>[12]</sup>. A report was observed 26.75% of dogs with the presence of hip dysplasia to some degree (1898 out of 7094 examined). Results were observed in German shepherds in the USA in the years 1974 to 2005, where only 19% of the population showed the presence of hip dysplasia. Whereas, (Janutta *et al.*)<sup>[5]</sup>, observed in Germany the presence of hip dysplasia in a population of German shepherd dogs to 21.3%.

### 3. SUMMARY

To prevent dysplasia (Figure-1), keeping it on a healthy diet, and limiting the amount of jumping or rough play (Link)<sup>[2]</sup>. In addition, prevention of increased presence of hip dysplasia (Fig. 1) is a rigorous selection of parents which is related with different standard breeders association in different countries. Inbreeding increases the possibility to fix traits, therefore after accurate selection decreases the chance of presence of hip dysplasia (Maki *et al.*)<sup>[8]</sup> and knowledge that heritability of dysplasia shows to be polygenic affected by more genes. There has been a significant effort on identifying specific genes, mutations, and quantitative trait loci, to use in conjunction with standard imaging methods for the identification of canine hip dysplasia carriers (Zhou *et al.*)<sup>[14]</sup>, (Zhu *et al.*)<sup>[15]</sup>. As evidence-based assessments of canine hip dysplasia become available, their selection and implementation will improve and facilitate the development of novel clinical approaches and surgical procedures (Schachner *et al.*)<sup>[11]</sup>. These trends should be confirmed by a larger genetic study on the molecular level (Kasarda *et al.*)<sup>[6]</sup>.

### 4. CONFLICT OF INTEREST

All authors have declared that there is no conflict of interests regarding the publication of this article.

### REFERENCES

- [1] K.J. Holen, A. Tegnander, T. Terjesen, O.J. Johansen, S.H. Eiknes, "Ultrasonographic evaluation of breech presentation as a risk factor for hip dysplasia," In: Acta Paediatr, vol. 85, pp. 225-229, 1996.
- [2] <http://www.animalplanet.com/pets/healthy-pets/dog-hip-dysplasia/>
- [3] <https://web.archive.org/web/20080918195744/http://www.dogbiz.com/dogs-grp7/germ-shep/german-shepherd-health-issues.html>
- [4] <https://web.archive.org/web/20090610214651/http://www.offa.org/hipstatbreed.html>
- [5] V. Janutta, H. Hamann, O. Distl, "Complex segregation analysis of canine hip dysplasia in German Shepherd dogs," In: J. Hered, vol. 97, pp. 13-20, 2006.
- [6] R. Kasarda, G. Meszaros, O. Kadleciko, J. Buleca, "Impact of inbreeding and heritability of canine hip dysplasia in German Shepherds population," Folia Veterinaria (pre-print), 2008.
- [7] E. LaFond, G.J. Breur, C.C. Austin, "Breed susceptibility for developmental orthopedic diseases in dogs," In: J. Am. Anim. Hosp. Assoc., vol. 38, pp. 467-477, 2002.
- [8] K. Maki, A.E. Liinamo, M. Ojala, "Estimates of genetic parameters for hip and elbow dysplasia in Finnish Rottweilers," In: J. Anim. Sci., vol. 78, pp. 1141-1148, 2000.
- [9] J.L. Rettenmaier, G.G. Keller, J.C. Lattimer, E.A. Corley, M.R. Ellersieck, "Prevalence of canine hip dysplasia in a veterinary teaching hospital population," In: Vet. Radiol. Ultrasound, vol. 43, pp. 313-318, 2002.
- [10] Y. Samoy, B. Van Ryssen, I. Gielen, N. Walschot, H. Van Bree, "Review of the literature: elbow incongruity in the dog," In: Vet. Comp. Orthop. Traumatol., vol. 19, pp. 1-8, 2006.

[11] E.R. Schachner, and M.J. Lopez, "Diagnosis, prevention, and management of canine hip dysplasia: a review," *Veterinary Medicine: Research and Reports*, vol. 6, pp. 181-192, 2015.

[12] R.J. Todhunter, R.G. Mateescu, G. Lust, *et al.*, "Quantitative trait loci for hip dysplasia in a cross-breed canine pedigree," *Mamm Genome*, vol. 16, pp. 720-730, 2005.

[13] J.L. Wood, K.H. Lakhani, K. Rogers, "Heritability and epidemiology of canine hip-dysplasia score and its components in Labrador retrievers in the United Kingdom," In: *Prev. Vet. Med.*, vol. 55, pp. 95-108, 2002.

[14] Z. Zhou, X. Sheng, Z. Zhang, *et al.*, "Differential genetic regulation of canine hip dysplasia and osteoarthritis," *PLoS One* 5:e13219, 2010.

[15] L. Zhu, Z. Zhang, S.S. Friedenberg, *et al.*, "The long (and winding) road to gene discovery for canine hip dysplasia," *Vet J.*, vol. 181, pp. 97-110, 2009.



Figure-1. Hip dysplasia of dog ([https://commons.wikimedia.org/wiki/File:Artificial\\_hip\\_in\\_dog.JPG](https://commons.wikimedia.org/wiki/File:Artificial_hip_in_dog.JPG))