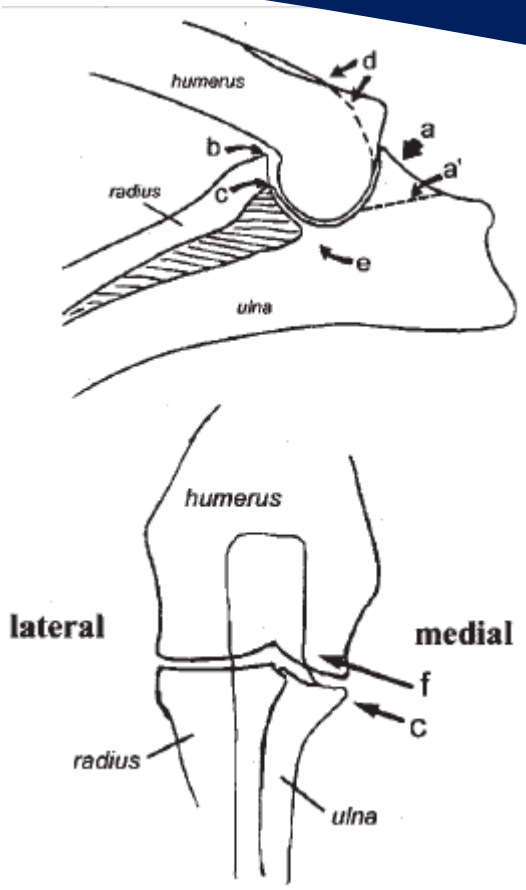
Elbow Dysplasia

Heritable elbow dysplasia is an orthopaedic disorder that results in the abnormal development of the elbow joint. It is a term used to represent a group of conditions including fragmented medial coronoid process (FMCP), osteochondrosis (OC) and osteochondritis dissecans (OCD), ununited anconeal process (UAP) and elbow incongruity. These conditions may occur on their own or in combination with each other. These developmental anomalies can be associated with pain, forelimb lameness, and reluctance to extend or flex the elbow joint. It is typically seen in young large breed dogs and males are affected at about twice the rate of females.



The Canine Elbow

a) Anconeal process, site of osteophyte development
a') Line of separation for UAP
b) Site of osteophyte development
c) Medial coronoid process
d) Site of osteophyte development
e) Trochlear notch
f) Site of osteochondrosis lesion

Most cases first present at 6–12 months of age because of persistent forelimb lameness, but some dogs present later in life (>6 years old), with clinical manifestations of medial coronoid disease and little or no prior history of lameness. A further group presents with lameness due to continuing or progressing joint deterioration.

Common diagnosis of ED is through clinical signs of lameness and radiographic evaluation of the elbow joint. The radiographic signs of ED and the clinical presentation do not necessarily always correlate directly. A dog may have significant radiographic changes and not be clinically lame and a young dog might present with an acute lameness, but no radiographic changes are seen at this time. Evaluating this dog at a later date when the clinical lameness has gone, might show radiographic signs of ED due to osteoarthritis (OA).

Several large studies have examined the genetic basis of elbow dysplasia, which appears to be inherited differently in different breeds. To complicate matters further, there is evidence that the different diseases of elbow dysplasia could be inherited independently. The differences in inheritance suggest that elbow dysplasia is a common end point for a variety of genetic disorders which disturb elbow development through various mechanisms.

Joint incongruity is now recognised as the major cause for the various manifestations of elbow dysplasia, although OC also seems to play a role. Joint incongruity is likely to occur because of radius/ulnar length mismatch, which results in excessive force to either the medial coronoid process or the anconeal process. The exact mechanism is likely to be more complex and is still not understood. Other forms of incongruity have been suggested, but are currently not well supported in the literature.

ED is thought to occur as a result of genetics and many environmental factors contribute to the occurrence and severity of the disease, such as high energy diets, leading to rapid growth rates or excessive exercise .

Because of the complexity of inheritance and the effects of environmental variables in disease expression, it is unlikely that genetic testing for elbow dysplasia will be possible in the foreseeable future. Despite the ability to treat affected dogs, there is no satisfactory medical protocol or surgical procedure to significantly alter the progression or cure the disorder. This makes it increasingly important to reduce the incidence of the disease through selective breeding. Selectively breeding phenotypically normal individuals has been shown to reduce the incidence of the disorder.

CHEDS

Currently, breeders use radiographs to screen elbows. In Australia this is known as the Australian National Kennel Council (ANKC) – Canine Hip and Elbow Dysplasia Scheme (CHEDS).

The CHED scheme reports elbows as phenotypically normal or dysplastic. The abnormal are graded as grades 1 through 3, with grade 1 being the least abnormal. The grades are separated by the relative amount of osteophyte formation on the anconeal process.

Estimated Breeding Values

The EBV is a reflection of the genetic superiority of an animal compared to its counterparts and is calculated from the phenotype of an individual and its relatives and their pedigree relationship. Selecting breeding stock on the basis of a dog's genetic merit, ideally based on a highly predictive phenotype, will confer the breeder with greater selection power, accelerate genetic improvement towards better elbow conformation and thus more likely decrease the prevalence of ED. For further information on EBV see the Hip Dysplasia Fact Sheet.

The NGRC is currently collecting hip and elbow scores of golden retrievers with the aim to provide Estimated Breeding Values (EBVs) as a breeding tool for golden retrievers in Australia.

If you like to be a part of this project could you please click here

Treatment

The treatment of elbow dysplasia should ideally correct underlying causes before significant joint damage has occurred. Unfortunately, the complex nature of ED makes the identification of the early stages of disease difficult. Late diagnosis has led to inconsistent clinical outcomes as the joint continues to deteriorate. As a result, numerous procedures to manage end-stage disease have been developed and currently there is no satisfactory medical protocol or surgical procedure to significantly alter the progression or cure the disorder. Biomechanical testing of the elbow joint to improve our understanding of canine gait is important research currently being carried out which could establish appropriate treatment alternatives for this common and debilitating disease.

References

- Kirberger, R. M. and S. L. Fourie (1998). "Elbow dysplasia in the dog: pathophysiology, diagnosis and control." J S Afr Vet Assoc **69**(2): 43-54.
- Meyer-Lindenberg, A., M. Fehr and I. Nolte (2006). "Co-existence of ununited anconeal process and fragmented medial coronoid process of the ulna in the dog." J Small Anim Pract **47**(2): 61-65.
- Fitzpatrick, N., T. J. Smith, R. B. Evans and R. Yeadon (2009). "Radiographic and arthroscopic findings in the elbow joints of 263 dogs with medial coronoid disease." Vet Surg **38**(2): 213-223.
- Vermote, K. A., A. L. Bergenhuyzen, I. Gielen, H. van Bree, L. Duchateau and B. Van Ryssen (2010). "Elbow lameness in dogs of six years and older: arthroscopic and imaging findings of medial coronoid disease in 51 dogs." Vet Comp Orthop Traumatol **23**(1): 43-50.
- Clements, D. N. (2006). Gene Expression in normal and diseased elbows. Proceedings of the Autumn Meeting of the British Veterinary Orthopaedic Association. Chester UK**:** 6-7.
- Grandalen, J. and F. Lingaas (1991). "Arthrosis in the elbow joint of young rapidly growing dogs: A genetic investigation." Journal of Small Animal Practice **32**: 460-464.
- Hazelwinkle, H. A. W. (2006). Clinical investigation and aetiology of elbow dysplasias. Proceedings of the 21st Annual Meeting of the International Elbow Working Group. Prague, Czech Republic**:** 5-11.
- Lewis, T. W., J. J. Ilska, S. C. Blott and J. A. Woolliams (2011). "Genetic evaluation of elbow scores and the relationship with hip scores in UK Labrador retrievers." Vet J **189**(2): 227-233.
- Maki, K., L. L. Janss, A. F. Groen, A. E. Liinamo and M. Ojala (2004). "An indication of major genes affecting hip and elbow dysplasia in four Finnish dog populations." Heredity (Edinb) **92**(5): 402-408.
- Nap, R. C. (1995). Pathophysiology and clinical aspects of canine elbow dysplasia. Proceedings of the 7th International Elbow Working Group Meeting. Constance, Germany**.:** 6-8.

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