

# Canine Hip Dysplasia

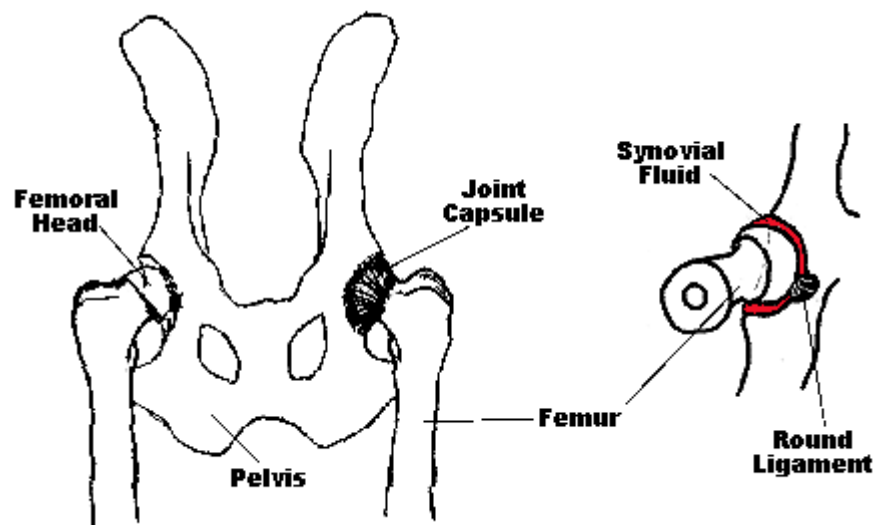
Canine Hip Dysplasia (CHD) afflicts millions of dogs each year and can result in debilitating orthopedic disease of the hip. Many dogs will suffer from osteoarthritis, pain, and lameness, costing owners and breeders millions of dollars in veterinary care, shortened work longevity, and reduced performance. The occurrence of CHD is well documented in the large and giant breed dogs, but there is also evidence that CHD is prevalent in many small and toy breeds as well as in cats.

Hip dysplasia was first described in 1937. It is a disease of complex inheritance. Accordingly, veterinarians and dog breeders have attempted to eliminate CHD through selective breeding strategies. However, the reduction of CHD frequency in pure-breed dogs has been disappointing.

## What is CHD?

### A Brief Anatomical Review

The hip is a ball and socket joint. The "ball" is known as the **femoral head**. The "socket" part of the joint is known as the **acetabulum**. The femoral head is attached to the inside of the acetabulum by the **round ligament** or **ligamentum teres** and to the periphery of the acetabulum by the **joint capsule** (see illustration). The joint capsule is a continuous envelope that surrounds the joint from the neck of the femur to pelvic bones around the acetabulum, this closed compartment is filled with a viscous, lubricating fluid called **synovial fluid**. Both the joint capsule and the synovial fluid play an important role in the stability of the hip joint and ultimately in the development of CHD.



The muscles that cause rotation of the hip (not shown) are also extremely important for hip stability. Each individual muscle develops a force component that pulls the femoral head into the acetabulum. For optimal function and stability of the hip, these forces require complex dynamic coordination and balance.

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## CHD Definitions

**Dysplasia** comes from the Greek words *dys*, meaning "disordered" or "abnormal", and *plassein* meaning "to form". The expression **hip dysplasia** can be interpreted as the abnormal or faulty development of the hip. Abnormal development of the hip causes excessive wear of the joint cartilage during weight bearing, eventually leading to the development of arthritis, often called *degenerative joint disease (DJD)* or osteoarthritis. The terms DJD, arthritis and osteoarthritis are used interchangeably.

CHD was first described in 1937 by Dr. Gerry B. Schnelle. In a paper entitled *Bilateral Congenital Subluxation of the Coxofemoral Joints of a Dog* Schnelle writes: "**The condition described herein, rare though it may be, should be recognized as being congenital and potentially hereditary, and the dog or bitch in which it occurs should be destroyed or sterilized in the eugenic interests of the breed.**"

In 1966, Henricson, Norberg and Olsson refined the definition of CHD describing it as: "**A varying degree of laxity of the hip joint permitting subluxation during early life, giving rise to varying degrees of shallow acetabulum and flattening of the femoral head, finally inevitably leading to osteoarthritis.**" Today, the general veterinary consensus is that hip dysplasia is **hip joint laxity resulting in osteoarthritis.**

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## The Development of CHD

It is generally agreed that hip joint laxity is somehow related to the development of DJD. However, prior to the research conducted at the University of Pennsylvania, there existed little or no *scientific* evidence to bolster this empirical association. The magnitude of hip laxity had not been correlated with the presence or the extent of DJD. The above definitions of CHD are vague as to the amount of laxity required to bring about arthritic change. The [science behind the PennHIP method](#) has shown unequivocally that hip joint laxity is the most important risk factor for the development of DJD.

As described above, CHD is a **developmental** disease meaning that it is not present at birth, but develops with age. The series of radiographs below illustrate how a loose hip gradually develops DJD.



At 6 months, this dog's hips exhibit extreme laxity, but no DJD.



At 15 months, laxity is accompanied by the development of "mild" to "moderate" DJD: the femoral heads appear slightly "flattened", the femoral necks are beginning to thicken and the acetabular rims are in the early stages of remodeling.



At 6 years, DJD has progressed into a "severe" form, marked by extreme bony remodeling of the acetabular cups and the femoral head and necks.

## CHD Diagnosis

CHD in its severest form can be diagnosed by clinical signs, but it usually requires radiographic evidence of hip joint laxity and/or the appearance of DJD to arrive at a definitive diagnosis.

An affected dog may have one or any combination of the following clinical signs:

- Presentation: 5 months to 12 months for the **severe form** of hip dysplasia; later for the **chronic form**
- Abnormal Gait
- Bunny-hopping When Running
- Thigh Muscle Atrophy (loss of muscle mass)
- Pain
- Low Exercise Tolerance
- Reluctance to Climb Stairs
- Audible "click" When Walking
- Increased Intertrochanteric Width ("points of hips" are wider than normal)

Clinical signs by themselves do not necessarily mean that a dog has hip dysplasia, other conditions of the hip can mimic CHD. A radiograph is essential for a more accurate assessment of the dog's hip joint integrity.