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Canine Hip Dysplasia

Hip dysplasia is a common condition of large breed dogs and many dog owners have heard of it but the fact is that anyone owning a large breed dog or considering a large breed dog as a pet should become familiar with this condition. The larger the dog, the more likely the development of this problem becomes, particularly as the dog ages. The following is a review of this disease. If you have additional questions, please send them through the Ask A Vet feature on the home page.

So What is Hip Dysplasia?

The term dysplasia means abnormal growth, thus hip dysplasia means abnormal growth or development of the hips. Hip dysplasia occurs during the growing phase of a puppy, usually a large breed puppy, and essentially refers to a poor fit of the ball and socket nature of the hip. The normal hip consists of the femoral head (which is round like a ball and connects the femur to the pelvis), the acetabulum (the socket of the pelvis), and the fibrous joint capsule and lubricating fluid that make up the joint. The bones (femoral head and acetabulum) are coated with smooth cartilage so that motion is nearly frictionless and the bones glide smoothly across each other's surface.



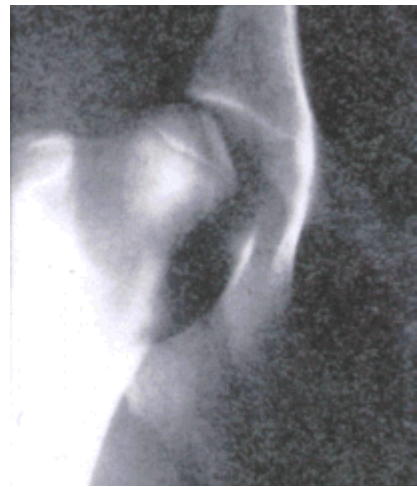
The femoral head (the ball in the ball and socket joint) is outlined in

yellow. The acetabulum (the socket in the ball and socket joint) is outlined in red. The femoral head ball is designed to fit inside the acetabulum socket.

When a dog has hip dysplasia, the ball and socket do not fit smoothly. The socket is flattened and the ball is not held tightly in place, thus allowing for some slipping. This makes for an unstable joint and the body's attempts to stabilize the joint only end up yielding arthritis.



normal hip - femoral head fits snugly inside acetabulum



early stage hip dysplasia - note space between femoral head and acetabulum



bad hip dysplasia

If this Disease Starts in Puppyhood, Why are Most Affected Dogs Elderly?

Actually, there are two sets of patients typically affected by hip dysplasia. The first group is the adolescent dog, typically 6 to 18 months of age. The radiograph on the right shows the hips of such a patient. This dog has hip dysplasia but has not yet developed arthritis. Note the shallow hip sockets. This dog was brought to the vet's office for signs of discomfort. Radiographs were taken and hip dysplasia was discovered. Many dogs with similar radiographs will not be in pain and thus will not end up coming to the vet for an evaluation. These dogs show up as elderly dogs, after they have been walking on their poorly formed hips for many years. After many years, bony build up along the margins of the socket, mineralization of the joint capsule, cartilage wear, and inflammatory change in the joint (i.e., degenerative arthritis) has become painful and now the dog comes to the vet for an evaluation.

Why Do Some Dogs Have Pain at a Young Age While Others Don't Have Pain Until They're Old?

Obviously different individuals may have different degrees of dysplasia. A dog's weight makes a difference (a lighter dog can tolerate a more abnormal hip joint). The muscle mass supporting the joint is greater in a younger dog and helps reduce the stress directly on the bones. Still, some dogs have truly shocking radiographs and virtually no symptoms while others show relative subtle changes and are very uncomfortable. We don't know why there isn't a better correlation between radiographs and actual pain.

How Can an Owner Tell if their Dog is Having Discomfort?

Do not expect a dog with dysplasia (or any other chronically painful condition for that matter) to cry or whine in pain. Instead discomfort is shown with reduced activity, difficulty rising or lying down or going up stairs. A characteristic swivel of the hips is seen from behind and classically stairs are taken in a bunny hop fashion.

What Causes Hip Dysplasia?

The primary cause of hip dysplasia is genetic but inheritance of this trait is not as simple as a dominance/recessive relationship like we study in high school biology. Normal dogs can breed and yield dysplastic offspring as the condition may skip generations. Until a test based on the actual DNA can be developed, the best we can do to prevent this disease is to breed only dogs with normal hips (a challenge since often dogs are not apparently dysplastic until they have already started a breeding career.)

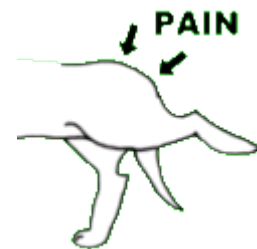
Nutritional factors are also important in the development of hip dysplasia. For example, it has been popular to try to nutritionally "push" a large breed puppy to grow faster or larger by providing extra protein, more calcium, or even just extra food. Practices such as these have been disastrous, leading to bones and muscle growing at different rates and

creating assorted joint diseases of which hip dysplasia is one. One study showed that when puppies of hip dysplasia prone breeds were allowed to free feed, two thirds went on to develop hip dysplasia while only one third developed hip dysplasia when the same diet was fed in meals. Another study showed German Shepherds were nearly twice as likely to develop hip dysplasia if their adult weights were above average. Studies such as these have led to the development of puppy foods designed for large breed puppies, where the optimal nutritional plane is lower than for small breed puppies.

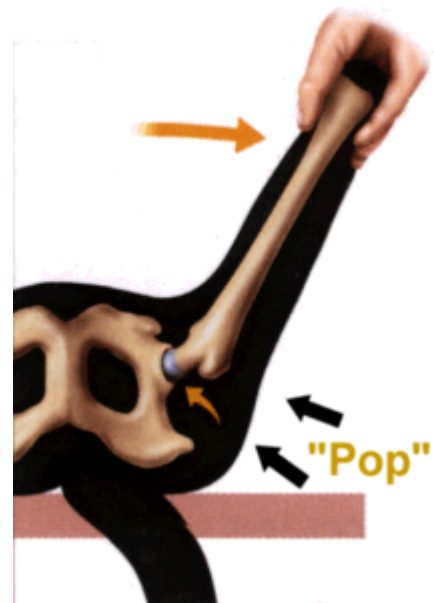
How Can I Find out if My Dog has Hip Dysplasia?

There are two reasons to pursue testing: to explain a dog's discomfort/rear weakness or to screen a dog for breeding purposes. If a dog is not going to be bred and is not in any apparent discomfort, there may be no benefit to looking at the conformation of the bones in a radiograph except possibly to look back at a future time to get a sense for progression of bony changes.

The first step in diagnosis is an examination. Your veterinarian will likely extend the dog's hind leg backward to check for pain. (Hip dysplasia causes pain on hip extension.) The dog may be asked to walk around to demonstrate the possible hip swivel. Another test involves having the dog lie on its back with a hind leg perpendicular to the body. As the leg is moved away from perpendicular to the body, a dysplastic hip will generate a pop as the femoral head slips to the center of the acetabulum. This pop, which can be felt if one's hand is resting on the hip during the exercise, is called an Ortolani sign. You may hear this term used as hip dysplasia is discussed.



To find out for sure about dysplasia, radiographs are necessary and this generally involves some sort of sedation to minimize the patient's discomfort as their hips are properly positioned for the picture. Sedation also helps the veterinary team control the dog's position better so they can minimize the number of radiographs needed in order to get one good diagnostic view. The classical view is called a VD pelvic view where the dog is held on its back with its legs straight out. This shows the seating of the two femoral heads as well as any bony changes indicating arthritis. This is the view required by the Orthopedic Foundation for Animals for registration.



What is OFA Registration?



When purchasing a puppy, particularly one of a larger breed, often the parents will be listed as OFA “Good” or OFA “Excellent.” What this means is that the breeder has had the hips of the dog’s parents certified by the Orthopedic Foundation for Animals. The OFA is an organization with a goal of reducing the incidence of hip dysplasia (though now it is also possible to obtain certification for elbows, thyroid function, and other issues). The idea here is that a dog for breeding can have radiographs taken at age 24 months. The radiographs are sent to the OFA for review by several independent radiologists where they are graded. Hips that are rated as good or excellent receive a registration number. Offspring of OFA-certified parents would be less likely to develop dysplasia themselves, however, it is important to realize that a dog with excellent hips at age 2 may not have such excellent hips at age 5, 7, or 10. OFA certification is no guarantee that a dog will not develop hip dysplasia symptoms in the future and does not guarantee that the offspring will not develop hip dysplasia.

What is PennHip Registration?

Many people with potential breeding dogs do not want to have to wait two years for OFA registration. The University of Pennsylvania Hip Improvement Plan, developed by Dr.



Gail Smith, allows for another way to predict if a dog will develop hip dysplasia. For PennHip certification, the veterinarian taking the radiographs must receive special training and special equipment is necessary. The pet is anesthetized and two radiographs are taken: one with the femoral heads compressed (pushed into the acetabula as far as they will go) and one with the femoral heads distracted (pulled out of the acetabula as far as they will go). A measurement called a distraction index is calculated from these radiographs, the idea being that a tighter fitting hip (one allowing less distraction) is less likely to develop dysplasia. Each dog breed has a different range of distraction indices that are considered acceptable. Puppies can be certified as young as 16 weeks of age with this system.



view in distraction



view in compression

Is Surgery the Best Treatment for Hip Dysplasia?

There are many surgical options for hip dysplasia and it is important to understand which patients benefit from which surgery. Some surgical procedures are controversial and some are not. All will entail a recovery period as well as expense. Often both hips need not be treated surgically; treating one hip is often enough to yield good results. Hip surgery is expensive, usually \$2000 to \$3000 in the Los Angeles area. If you are considering surgery for your dog, these are the procedures to know about:

Triple Pelvic Osteotomy

This surgery is appropriate for young (age 8-18 months) dogs with dysplasia but without

degenerative arthritis changes. This means that there is a window of opportunity for this surgery and if the dog develops arthritis or becomes too old, it will be too late for this surgery to be performed. In this surgery the ill-fitting acetabulum is essentially sawed free of the rest of the pelvis, re-positioned for a tighter fit on the femoral head, and then plated back into place.

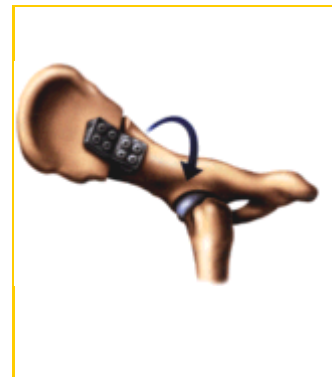


Three cuts are made to free the acetabulum from the pelvis

Many times surgery on one hip leads to positive changes in the other hip so that surgery on the second hip is not necessary. Alternatively it is possible to do the TPO on both hips if it seems clear that ultimately both will need surgical correction. This is a surgery that requires a board certified surgeon or a surgeon with extensive orthopedic experience. After care involves a good 3 to 4 months of exercise restriction. No leashed walks are allowed for 2 months except to go outside for elimination.

Femoral Head/Neck Osteotomy

This surgery is commonly referred to as the *FHO* and is best used for smaller dogs (50 lbs or less) or very active dogs. Here, the femoral head is cut off and removed, allowing the joint to heal as a false joint (just a capsule connecting the two bones but no actual bone to bone contact). If the dog is not carrying too much weight, a false joint is strong enough. If the dog is very active, a false joint will form quickly. The pet typically does not want to use the leg for the first 2 weeks but should at least be partially using the leg after 4 to 6 weeks. The leg should be used nearly normally after a couple of months. Many veterinarians are well experienced with this surgery and often a specialist is not needed. This surgery is typically substantially less expensive than the other procedures.





*femoral head before
FHO*



femoral head cut off after FHO

Total Hip Replacement

This procedure is for dogs with established degenerative hip changes. For these dogs, the best choice may be to simply replace the hip (or hips) with a prosthetic hip. This procedure may sound radical but it has been commonly performed for nearly 20 years in dogs with great success. This is a highly invasive procedure, obviously, and infection must be avoided at all costs (no skin disease can be present in the skin over the hips, extra precautions for sterility are used). In other words, when complications occur they have potential to be disastrous. Complications have about a 10% incidence. Expect about 3 months of exercise restriction after this procedure. Usually only one hip receives surgery at a time. Often only one replacement is needed and the pet does well enough not to need surgery on the other side.





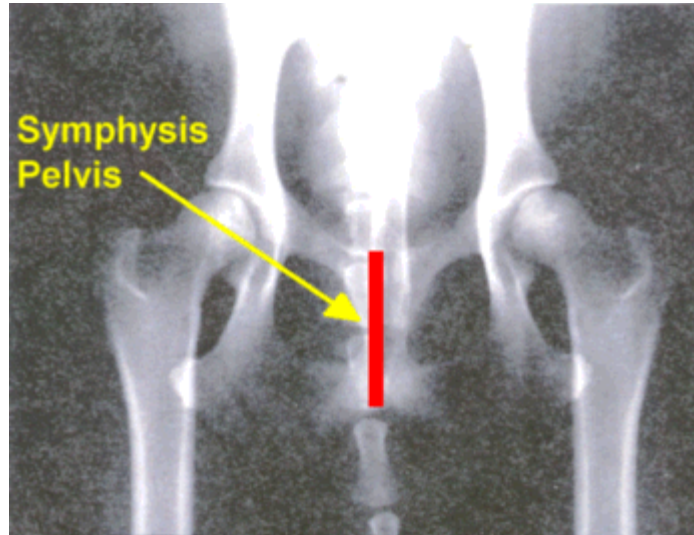
x-ray of a bilateral (both hips) total hip replacement

DARthroplasty

DAR stands for dorsal acetabular rim. In this procedure, bone grafts taken from other areas of the pelvis are used to build a longer rim on the acetabulum so that the femoral head will have a deeper socket in which to fit. This procedure is best done in dogs that are too old for triple pelvic osteotomy or have just started developing degenerative arthritis. This is a fairly new procedure in the hip dysplasia arena and thus somewhat controversial. Long term success (i.e., how patients do when they are old) is not really known as the procedure has not been performed long enough to collect results from a large number of patients. A specialist is needed for this surgery.

Juvenile Pubic Symphysiodesis

This surgery is performed on young puppies before age 5 months, so it is generally done as a preventive procedure before it is known if the puppy will indeed have dysplastic hips. The pubic symphysis is the cartilage seam connecting the right side of the pelvis to the left side. As an individual matures, this cartilage converts to bone and the two halves of the pelvis fuse permanently. This surgery prematurely seals the symphysis, which in turn results in rotation of the developing hip sockets into a more normal alignment. While studies show promise, because this procedure is done on puppies who do not yet actually have hip dysplasia, it is hard to evaluate success.



What Non-Surgical Treatment is Available?

Non-surgical treatment of hip dysplasia is essentially the same as non-surgical treatment for any other type of arthritis. There are nutritional supplements to help repair cartilage, pain medications, and anti-inflammatory medications. Physical therapy and massage are also important and helpful in non-surgical joint therapy. For details see [medications for degenerative arthritis](#).

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