

Canine Hip Dysplasia

Hip dysplasia is a developmental disease of the coxofemoral (hip) joint. The parts of the hip joint are the femoral head, which is ball-shaped and connects the femur (thigh bone) to the pelvis; the acetabulum, which is the socket of the pelvis; and the fibrous joint capsule and lubricating fluid that make up the joint. The bones are coated with cartilage so that they glide smoothly across each other's surface as the dog walks. Dysplasia means "abnormal growth," and hip dysplasia is basically a bad fit between the ball and the socket. The exact cause of hip dysplasia is unknown, but is thought to be a combination of genetic, nutritional and environmental factors. Hip dysplasia can occur in any breed, but is most common in large breed dogs.

Disease process and diagnosis:

First stage: Hip laxity

The primary problem in hip dysplasia is a looseness of the hip joints known as "laxity", which allows the femoral head to slide around within the acetabulum (and sometimes pop in and out of the acetabulum) as the patient moves. This is due to uneven growth between the muscles and the bones, and may affect one or both hips. Some puppies may limp at this stage, but many have no symptoms.

Hip x-rays: x-rays at this stage are unlikely to show arthritis, but can reveal hip laxity:



Figure 1: Dog with normal hips



Figure 2: Dog with hip laxity (early hip dysplasia)

Second stage: remodeling and degenerative joint disease

If surgical intervention is not pursued at the first stage (hip laxity), the hip dysplasia will move into the second stage. The laxity of the hip causes pain and erosion of joint cartilage, which the body responds to by changing the shape of the hip joint to provide some stability. The femoral head (ball) and the acetabulum (socket) will flatten and soft tissue around the joint will become stiff scar tissue. With time, this will progress to degenerative joint disease (arthritis); these patients present as elderly dogs that are stiff and painful after years of walking on their poorly-formed hips. New bone builds up along the ball and socket, the joint capsule becomes mineralized, the cartilage is worn down and the joint becomes inflamed



Figure 3: Remodeled hip joint Figure 4: Hip joint with dysplasia and arthritis

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Diagnosis:

Ortolani test: for the Ortolani test, the patient lays on his or her back. The thigh is moved towards and away from the body, while feeling and listening for a telltale “click” as the femoral head pops out of and back into the acetabulum:

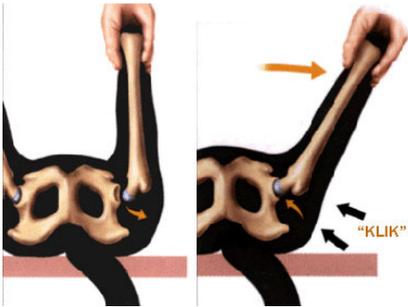


Figure 5: Positive Ortolani test

Radiographs (x-rays):

Hip x-rays will be done with the patient on his or her back (a “ventrodorsal view”) and side (“lateral” view). In older patients with suspected arthritis, sedation may not be required for this. In younger dogs who likely have only hip laxity or early remodeling, sedation or general anesthesia is required for diagnosis of hip dysplasia as the hips must be very precisely positioned.

For early detection of hip dysplasia there are two main radiographic techniques, OFA and PennHIP

OFA x-rays:

Breeding dogs can have x-rays taken at 24 months and submitted to the Orthopedic Foundation for Animals (OFA), where they are reviewed by several independent radiologists and graded. Dogs with hips rated as “Good” or “Excellent” receive a registration number. While it is wise to purchase a puppy that has parents with hips scored as “Good” or “Excellent,” this does not guarantee that your puppy will not develop hip dysplasia. This because hips that look very good at 24 months may not look as good several years down the line as well as other factors noted below in “Prevention”. This technique usually requires sedation only.

PennHIP x-rays:

This technique involves two radiographs, one with femoral heads compressed, one with femoral pulled out as far as they can go (“distraction”). A measurement called “distraction index” is calculated from the difference between these two radiographs; the less distraction, the less likely the patient is to develop hip dysplasia. The PennHIP requires full anesthesia, but allows detection of hip dysplasia as young as 16 weeks of age. PennHIP x-rays must be performed by a veterinarian certified in the PennHIP method. This test can be done by the radiologists at the Veterinary Imaging Center of San Diego (www.vicsd.com).

Clinical signs:

Clinical signs of young dogs with hip laxity due to dysplasia:

- Poor muscle development over the hind end
- Difficulty standing up after lying down
- Bunny hopping when running
- “Rolling” gait (appear as if they are drunk when walking)

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- Audible click with hip movement when walking

As remodeling sets in, these clinical signs will usually resolve or at least improve; this usually occurs at about 18 months of age. As the arthritis develops, eventually clinical signs will re-appear.

Clinical signs of older dogs with hip arthritis due to dysplasia: most of these patients will not cry out in pain! Their discomfort will be much more subtle

- Stiffness after sleeping (usually in the morning) or after exercise
- Reduced activity or quickness to tire while exercising
- Loss of muscle mass over the hind end
- Reduced hip motion
- Pain and creaking (crepitus) on movement of the hip
- Limping

Treatment:

Surgical: There are many surgical methods to correct or treat hip dysplasia; the most common methods are listed below:

Before arthritis has developed (laxity only):

- **Triple pelvic osteotomy (TPO):** this should be performed in dogs ideally under 6 months old, before there is any remodeling or arthritis. Dogs with any hip arthritis are not good candidates for this procedure. A TPO involves cutting the pelvis in three places to free the acetabulum so that it can be repositioned for a tighter fit with the femur, then plating it back into place. This surgery can slow or even halt the progression of arthritis. Aftercare requires 3 to 4 months of exercise restriction. Many pets will only need this surgery on one hip, even if both hips are dysplastic.



Figure 6: Sites where the pelvis is cut for a TPO



Figure 7: Completed TPO

After arthritis has developed:

- **Arthroplasty (total hip replacement):** this is a very expensive procedure but can have excellent results. Infection of surgical site can be disastrous, so extra precautions are taken. Complication rates will vary between each surgeon, but are generally about 10%. Usually the patient must have restricted exercise for 3 months after this surgery.
- **Femoral head and neck osteotomy (FHO):** this procedure involves cutting off the femoral head, so that this bone does not grind into the acetabulum and cause pain. It is best for small or very active dogs; the joint will heal as a false joint (just a joint capsule connecting the two bones, without any actual contact between these bones), if a dog is small the false joint will be strong enough for weight bearing, and if the dog is very active a false joint will form quickly. Usually pets will not walk on the leg for 2 weeks after surgery, but should at least be partially using the leg by 4-6 weeks post-surgery.



Figure 8: total hip replacement



Figure 9: FHO

Medical:

No clinical signs (detected on screening tests):

- **Weight management:** if you do not wish to pursue surgery for your pet, and he or she is not currently limping or otherwise in pain, the best thing to do is to be very strict about his or her weight. Obesity will markedly accelerate the development of arthritis and pain.
- **Supplements:** joint supplements (glucosamine and chondroitin) such as Dasuquin[®] and fish oil supplements such as Eicosaderm[®] may also be recommended by your veterinarian.
- **Exercise control:** is also important: you should aim to provide your pet with a stable exercise routine day-to-day.

Clinical signs (pain, limping, etc.): in addition to weight management, supplements and exercise control, your veterinarian may recommend:

- **NSAIDs:** non-steroidal anti-inflammatories are often recommended as a first-wave treatment to alleviate your pet's pain, if there is no contraindication to these medications. If there is a pre-existing liver or kidney problem, NSAIDs can exacerbate this, so the doctors at La Costa Animal Hospital require a limited blood panel prior to starting NSAIDs, 2 weeks after starting and every 6 months if this medication will be used long-term. Metacam[®] (meloxicam) is the NSAID preferred at La Costa Animal Hospital, as we rarely see adverse effects with this product. It is a tasty (honey flavored!) liquid given once daily, and is also available as an injectable if your pet is in a lot of pain. NSAIDs can work wonders for an arthritic dog.
- **Other pain medications:** may be recommended, such as tramadol, amantadine or gabapentin.
- **Adequan[®]:** this contains polysulfated glycosaminoglycan (PSGAG), which prevent the action of enzymes that degrade joint cartilage. This is administered as an injection; the exact frequency this is given will depend on your veterinarian's preferred protocol and your pet's response to this treatment, but most pets receive this twice a week for 4-6 weeks, then once monthly thereafter.
- **Acupuncture and massage:** these treatments can dramatically improve the quality of life of pets with arthritis. While acupuncture and massage are not offered as a service at La Costa Animal Hospital, we would happily refer you to practitioner if you feel these treatments may be right for your pet.
- **Hill's j/d:** this is a diet manufactured by Hill's pet foods for pets with arthritis. It is high in fatty acids, glucosamine, chondroitin and other supplements that support the muscles and bones.
- **Stem cell treatment:** is now being offered at La Costa Animal Hospital! Your pet's fat is surgically collected then sent to VetStem (<http://www.vetstem.com/>) for preparation as a stem cell dose. This dose is available 24hours later to be injected into your pet's hip joint. For more information, please visit our "Services" page.
- **Other supplements:** your veterinarian may recommend supplements such as s-adenosyl methionine (SAMe), niacinamide, vitamin E or selenium, grape seed extract, zinc, or others that have proven to help animals with arthritis

Prevention:

While hip dysplasia is partially inherited, this inheritance is not straightforward; normal dogs can have puppies with terrible hips, and dogs with terrible hips may have puppies without hip dysplasia. A DNA test for the gene that causes hip dysplasia is not available, so the only precaution you can take is to ensure your puppy's parents are free from hip dysplasia (OFA "excellent" or "good").

Nutrition is also important in the development of hip dysplasia. It is critical that large breed puppies are fed a large breed puppy food as meals (not free-fed) to ensure that bones and muscles grow at the same weight.

Early detection:

The doctors at La Costa Animal Hospital recommend a screening Ortolani test and hip x-rays for breeds that are predisposed to hip dysplasia. These screening tests are recommended at about 5 months of age, so that there is still time for a TPO surgery if you would like to pursue this. These tests require sedation; if your pet will be spayed or neutered at around five months of age, sedation will be administered prior to anesthesia, during which time these screening tests can be performed.