

## **Hip Dysplasia**

### **Understanding Hip Dysplasia**

The hip joint forms the attachment of the hind leg to the body and is a ball and socket joint that allows the leg to move through a wide range of motion. The ball portion is the 'head of the femur' (= thigh bone) and the socket is termed the 'acetabulum'. Hip dysplasia (HD) is a developmental (or growth) disorder that begins with hip laxity and progresses to arthritis over a period of months to years. The term HD simply means that the hip joint does not form normally, and the ball and socket do not fit together properly. Even though most puppies are born with normal hips, genetic and other factors (such as body type, growth rate, exercise, nutrition) are the reason for 'loose' hips, which is the cause of instability within the hip joint called subluxation. Subluxation occurs when the head of the femur partially rides up on the outside edge of the acetabulum. This process causes joint inflammation, swelling and pain and wears down the cartilage within the joint, causing exposure of the underlying bone. Cartilage is the coating of any joint that ensures that motion is frictionless, smooth and pain-free. Without cartilage covering the joint, the joint surface becomes rough and uneven resulting in motion becoming painful. Over time, arthritis develops, limiting the range of motion in the hip joint, and further causing pain and discomfort. Because of these two 'phases' of HD the disease is termed 'biphasic'. Young animals frequently present because of the pain associated with hip laxity and joint inflammation; older animals present because of the secondary arthritic changes. Whether your pet shows signs at a young age or at a later time depends on the severity of the disease.

### **Clinical Signs of Hip Dysplasia**

The most common indication that a dog may have hip dysplasia is a bilateral (both sides) hind leg lameness, stiffness or decreased activity level in any large breed dog. Many dogs show difficulty rising, not wanting to jump into the car, tiring easily, decreased willingness to play, 'bunny hopping' or waddling gait and short strides in the rear legs. The onset of clinical signs may appear suddenly but, in general, is a slow progression. Exercise typically makes the lameness worse. Although the disease is almost always present in both hip joints, one side is usually more severely affected based upon clinical signs and palpation. Since both rear legs hurt, dogs do not limp constantly, which may make the problem less obvious.

### **Diagnosis**

The diagnosis is based upon signalement, history, physical examination and further diagnostics. Palpation of the hip joint usually shows decreased range of motion and pain. Conventional radiographs (X-rays) are generally used as the first diagnostic tool and work well to establish the diagnosis in cases with obvious subluxation or secondary changes (arthritis). The radiograph typically taken is positioned in an 'OFA (Orthopedic Foundation of America)-like position'. OFA-radiographs are still used as the standard for certification of dogs' hips for breeding purposes. However, attempts at reducing the frequency of HD using this procedure alone have been disappointing. For this reason, for more subtle/early forms of hip dysplasia, a PennHIP radiograph may be necessary. This procedure allows quantification of the maximum amount of hip laxity by using a custom distraction device that pushes the ball out of the socket. This procedure is ideal for

early diagnosis and can be used as early as 4 months of age. The PennHIP radiographs will be sent to the PennHIP analysis center and a number between 0 and 1 will be assigned to your dog giving the likelihood of future arthritis (the lower the better). Subluxation can also be detected by palpation (while moving the hip joint one can feel the hip pop back into place after subluxation, which is called the Ortolani Sign – an indication of hip dysplasia).

Hip dysplasia is mainly diagnosed in dogs, but occurs in cats as well. Other causes of hip arthritis that may be treated similar to congenital HD are traumatic luxation of the hip, Legg-Perthes disease in small dogs (a developmental disease of the ball part of the femur due to problems with the blood supply) and fractures.

### **Treatment options for Hip Dysplasia**

There are two general treatment options for Hip Dysplasia: medical or surgical. This decision will have to be made on an individual basis to ensure that the best treatment is chosen for your pet.

Medical management consists of weight management, exercise modification/physical therapy, joint supplementation and pain relief (see our arthritis brochure for details). Because hip dysplasia represents an anatomic abnormality, the underlying cause (looseness in the joint or bony changes) will not change significantly with this form of treatment. However, we may be able to decrease the progression of the arthritis, decrease the amount of pain and improve your pets' quality of life. Medical management may be attempted for any patient prior to choosing surgical treatment.

A wide variety of surgical treatment options have been described. Some treatment options may only be performed at a certain age and therefore it is important to make a decision to pursue this treatment in a timely fashion. Below you can find a summary of the treatment options we favor at AESC.

### **Juvenile Pubic Symphysiodesis (JPS)**

This treatment is our favorite treatment since it addresses both hip joints at the same time and is associated with almost no complications. However, it can only be performed up to five months of age. The JPS procedure was developed to improve the fit of the hip joint by altering the pelvis while the puppy is still growing. Simply stated, JPS uses thermal destruction to fuse the growth plate of the pubic bone (one of the pelvic bones), effectively anchoring the rest of the pelvis. The pelvis subsequently grows outward, with the acetabulae rotating to provide more coverage of the femoral head. This procedure is minimally invasive, and can be very effective in improving the hip joints. However its greatest benefit is seen in puppies 12 to 16 weeks of age.

### **Triple Pelvic Osteotomy (TPO)**

Puppies who are too old to benefit from the JPS procedure may still be candidates for a TPO. Puppies with a positive Ortolani Sign, who are 6 to 10 months of age, and who have no signs of degenerative changes in their hips on x-rays may be good candidates for the TPO procedure. Arthroscopy is the best assessment technique

of cartilage health and to confirm that the puppy is truly a good TPO candidate. Prior to performing the TPO, we will evaluate your dogs' cartilage status and abort the procedure if we feel that he/she may not benefit from it significantly. The TPO surgery involves cutting the pelvis in three places to rotate the acetabulum into a new position to provide more coverage of the femoral head and prevent subluxation. The big disadvantage of this procedure is the invasiveness and the requirement of strict exercise restriction while the bone is healing. Complications with the implant (loosening of the screws) are common, however, generally not of clinical significance. Furthermore, this procedure only addresses one hip at a time.

### **Total Hip Replacement (THR)**

Dogs who have missed the time window for JPS or TPO, who have not done well with medical management and are at least 10 months of age are candidates for total hip replacement surgery. Hip replacement involves removing the acetabulum and head of the femur and inserting medical grade implants. This adjustment provides your dog with a pain-free, fully functional hip joint.

Currently, there are two main options available when choosing a THR: cemented and cementless (or cement free) THR. The cementless THR system was especially designed for younger patients in an effort to avoid a common long-term complication of cemented THR: aseptic loosening. Aseptic loosening means that the implant loosens without the presence of infection which is the most common cause of revision surgeries in humans. The cementless system is integrated into the patient's femur and acetabulum via bony ingrowth. Cementless THR also avoids other complications associated with the use of cement such as fat embolism and cement granulomas, which is why it is our preferred technique especially for the young patient.

The biggest concern with THR is the financial side and a higher complication rate when compared to FHO or JPS. Complications include implant loosening, luxation of the artificial joint, femur fracture or infection which may require removal of the implants and result in and FHO.

### **Femoral Head and Neck Osteotomy (FHO)**

FHO stands for removing head and neck of the femur without inserting any implants. This procedure is a salvage procedure developed to alleviate pain in dogs with hip arthritis. It is a surgery that creates a "false joint", since there is no bone on bone contact. Rather, the muscles of the hip joint take over supporting the hip entirely. Removal of the abnormal bone results in pain-free range of motion and with diligent physical therapy most animals have improved function and great pain relief. However, since the joint articulation is removed, this procedure is not as well suited for large breed, agility or working dogs since the results are less favorable when compared to a THR.