

FACT SHEET

Hip Dysplasia

What is Hip Dysplasia?

A look back to the modern dog's wolf-like ancestor, which roamed the plains and forests millions of years ago, shows how critical it was to be able to move freely and rapidly in search of prey. Nature was quite uncompromising. If enough food couldn't be caught or stolen due to an inability to run, jump, twist and turn, then starvation would be the only alternative.

When supper was provided by another this need for excellence declined, so being a bit slower and being a bit stiff on a leg didn't matter so much. The dog's association with man for more than 10,000 years may appear to have been to mutual advantage but some debts wait to be paid; one of these debts concerns a condition called hip dysplasia.

Hip Dysplasia is a term which encompasses a number of specific developmental and other abnormalities involving the hip joint. Developmental changes come first and are related mainly to growth and are known as primary changes. Others come later; these are related to wear and tear from usage and are termed secondary changes.

It is one of the most common skeletal diseases seen by veterinarians. The condition is very common in large breed dogs, but can be seen in any breed. The end result is that one or a pair of joints becomes mechanically unsound and therefore does not function properly. An unsound joint is usually a painful one and lameness will result. In extreme cases the dog may find movement very difficult and much suffering will be involved.

It was in the light of these findings that the British Veterinary Association (BVA) and the Kennel Club (KC) developed a scheme some 30 years ago to assess the degree of hip malformation of dogs through radiography. Over this time almost 100,000 radiographs (X-rays) have been examined to provide a standardised opinion on HD status, principally for the use of breeders.

It is primarily a disease of purebreds although it can happen in mixed breeds, particularly if it is a cross of two dogs that are prone to developing the disease. German Shepherds, Labrador Retrievers, Rottweilers, Great Danes, Golden Retrievers, and Saint Bernards appear to have a higher incidence.

Structure and function

The hip joints of land animals and even some birds are remarkably similar. The design has withstood the test of time and usage by countless species and is close to anatomic perfection.

Where mobility, meaning athleticism, is needed, the normal hip is an ideal way of enabling the transfer of power from the hind leg muscles to the body, so that the creature is driven forward with strength and speed. The close relationship of the 'ball' to the 'socket' permits rapid changes of direction and the strength of the supporting structures of ligaments, tendons and muscles makes the hip a unit. Large joint surfaces of cartilage lubricated by joint fluid ensure smooth pain-free action. Little wonder, then, that any disturbance to this ideal circumstance has such dire consequences.

Developmental demands

It is argued that dogs are not born with hips affected by dysplasia (unlike humans suffering from the disease). Hip modeling, otherwise termed development, can worsen with the passing of time, most particularly during the rapid growth phase between 14 and 26 weeks of age.

Changes in anatomic relationships within the joint start in early puppy-hood with first usage and continue through into young adulthood. Wear and tear from exercise of the distorted joint is followed by varying amounts of inflammation and degeneration resulting in remodeling change.

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The BVA/KC Hip Dysplasia Scheme

All radiographs submitted to the BVA/KC Hip Dysplasia Scheme are assessed by means of scoring. The hip score is the sum of the points awarded for each of nine radiographic features of both hip joints.

The lower the score, the less the degree of hip dysplasia present. The minimum or best score for each hip is zero and the maximum or worst is 53, giving a range for the total of 0 to 106. The average score of the breed, or the 'breed mean score', is calculated from all the scores recorded for a given breed and is shown alongside its range thereby giving a representation of the overall hip status of the breed.

All breeders wishing to try to control HD should breed only from animals with hip scores well below the breed mean score. Sires (fathers) to be bred from should only be ones whose progeny (offspring) have achieved consistently low scores. The same selection procedure should be used for bitches for breeding, since the use of animals with higher than ideal scores may make the risk of producing offspring with high scores much greater. This circumstance is not only disappointing and potentially costly in terms of compromised breeding plans, but may lead to subsequent civil court action.

For the hip scoring scheme to be meaningful and successful in the attempt to control this serious disease it is important that all radiographs taken under the scheme are submitted for scoring, whatever the apparent state of the hips, in order that the information gathered is as relevant as possible. It is only by this means that proper conclusions may be drawn by the scheme's statisticians, geneticists and veterinary advisers.

It is not hard to understand why things happen so quickly and how critical a whole series of factors in the dog's life are, when realising some animals treble their size and weight during a three-month period of adolescence. Getting all the many nutritional needs in the right quantity, to the right place and at the right time requires a mastery of logistics.

However, it has to be realised that this apparent basic requirement overlays the parts played by inheritance and other factors, for example the type of exercise taken and the degree of body weight.

Signs and symptoms

Hip Dysplasia is a terrible genetic disease because of the various degrees of arthritis, also called degenerative joint disease, arthrosis, and osteoarthritis. It can eventually lead to pain and debilitation. The very first step in the development of arthritis is hyaline cartilage (the type of cartilage lining the joint) damage due to the inherited bad biomechanics of an abnormally developed HD joint. Traumatic articular fracture through the joint surface is another way cartilage is damaged.

With cartilage damage, lots of degradative enzymes are released into the joint. These enzymes degrade and decrease the synthesis of important constituent molecules that form hyaline cartilage called proteoglycans. This causes the cartilage to lose its thickness and elasticity, which are important in absorbing mechanical loads placed across the joint during movement.

Eventually, more debris and enzymes spill into the joint fluid and destroy molecules called glycosaminoglycan and hyaluronate which are important precursors that form the cartilage proteoglycans. The joint's lubrication and ability to block inflammatory cells are lost and the debris-tainted joint fluid loses its ability to properly nourish the cartilage through impairment of nutrient-waste exchange across the joint cartilage cells.

The damage then spreads to the synovial membrane lining the joint capsule and more degradative enzymes and inflammatory cells stream into the joint. The first signs of pain then appear. In an attempt to stabilize the joint to decrease the pain, the animal's body produces new bone at the edges of the joint surface, joint capsule, ligament and muscle attachments (bone spurs).

The joint capsule also eventually thickens and the joint's range of motion decreases. No one can predict when or even if a dysplastic dog will start showing clinical signs of lameness due to pain. There are multiple environmental factors such as caloric intake, level of exercise, and weather that can affect the severity of clinical signs and phenotypic expression (radiographic changes). There is no rhyme or reason to the severity of radiographic changes correlated with the clinical findings. There are a number of dysplastic dogs with severe arthritis that run, jump, and play as if nothing is wrong and some dogs with barely any arthritic radiographic changes that are severely lame.

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The diagnosis of hip dysplasia is based on history, physical examination, and radiographic evaluation. A typical history may include any or all of the following:

- Difficulty or stiffness upon rising
- Rising using front legs only and dragging rear
- "Bunny hopping" gait
- Short stride in rear legs
- Reluctance to exercise or climb stairs
- Rear limb lameness
- Soreness in hips
- Waddling rear limb gait

The clinical signs commonly begin between five to eight months of age or after skeletal maturity. Some dogs don't have noticeable problems until eight to ten years of age or older. The onset of clinical signs may appear sudden or gradual. This variability is due to the individual severity of the disease as well as pain tolerance of the pet.

Cause

If Hip Dysplasia was caused by a single factor then it would have been fully understood and largely overcome by now. It is known that two factors determine whether HD is to occur and, if so, how bad it will be - inheritance and what is termed 'environment'. The former relates to the genetic code passed to the offspring by both parents and the latter to all the outside influences, which alter and mould the growth and functions of the bones, cartilage, ligaments, tendons and muscles of the body

In simplistic terms the genetic code is rather like the architect's building blue prints and, the environment, the builders and their materials. In HD the architect gets things wrong to a greater or lesser extent but the builders have the greater influence on how things look and function in the final analysis.

Although Hip Dysplasia is generally a genetic condition, it can also be associated and/or worsened with the following:

- Obesity. Any dog carrying excessive weight will exacerbate degeneration of the joint in a dog with a loose hip
- Rapid growth of a puppy especially in the ages from 3 to 10 months
- High calorie diets
- Poor quality protein diets
- Lack of exercise

Treatment

Overweight dogs

One of the most important factors affecting the health of a dog with Hip Dysplasia is to ensure that an ideal weight is maintained. If your dog is overweight, we suggest that you feed your dog Naturediet Senior/Lite, which has a lower calorific content and is lower in protein and higher in fibre. With weight control, the goal is to prevent the dog from becoming overweight to reduce mechanical stresses applied to the hip joints. In general terms, the ribs should be easily felt and there should be an indentation in front of the pelvic wings, i.e. a waist line.

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Rapid growth in puppies

This should be avoided at all costs. The diet for a puppy must be balanced and provide the correct calorific values along with the right amounts of minerals and vitamins to promote gradual growth of the bones. Feeding puppies a high calorie diet increases the rate of growth to a level that may be unhealthy.

We recommend that in order to ensure your puppy receives the correct quantities and the correct type of food that they are fed Naturediet Puppy/Junior. Please refer to our fact sheet Puppy Feeding & Care for more information. Adult food may be fed from the age of 6 months. The nutrient level in Naturediet is more than sufficient for further muscle development to help strengthen joints.

High calorie/poor quality protein food

An important factor of any food is to ensure that the dog receives the correct calorific values when feeding. Additionally, they need to receive the correct amounts of protein and more importantly the right types and high quality proteins. Many of the pet foods manufactured today use protein from animal by-products such as feather meal, beaks, feet and guts. Naturediet only uses high quality meat and thus high quality proteins. For adult dogs any of the Naturediet range may be used.

Exercise

Dogs with hip dysplasia should be exercised regularly to maintain the mobility of the joints. However, exercise should be moderate not excessive as excessive exercise may worsen the condition.

Puppies need to be especially careful as growth patterns often result in disproportionate limbs: if a growth phase occurs whereby the legs have lengthened, exercise needs to be heavily restricted for a period to allow for the muscle surrounding the bone and joint to stretch and strengthen the joints.

Controlled exercise is indicated to prevent or relieve the inflammatory process that leads to the pain associated with arthritis. The amount and difficulty of the activity is determined on a trial and error basis. Exercise should start with short leash walks and be gradually increased until the dog reaches the desired level of activity. If clinical signs start to reappear, the amount of exercise is scaled back to a level that will not cause clinical signs.

Overall, exercise should fit to an individual dog's maximum intensity level with the goal to maintain muscle tone and cardiovascular function without causing pain, stiffness, and inflammation to the joint. The right amount of exercise helps to maintain muscle tone and strength and stabilises the unstable dysplastic joint.

Exercise also improves joint range of motion, which in turn, keeps the dog more comfortable. Swimming, because it is a non-weight bearing exercise, can be a very useful means of maintaining muscle tone and range of motion without placing concussive forces on the joint.

Warmth

Keep the dog in a warm environment and out of draughts. Warmth tends to help control the pain of arthritis from hip dysplasia. As in people, arthritic pain in dogs tends to be worse in the damp and cold of winter. Providing a well-padded and warm bed will help alleviate some of the pain associated with osteoarthritis. An egg-crate foam bed for dogs is commercially available.

Applying superficial heat in the form of heating pads may also relieve pain. Care must be taken not to burn the skin especially with an electric heating pad. Heat works best for chronically inflamed joints from arthritis while cold works better to treat acute (sudden) types of joint injury.

Vitamins

Many dog food manufacturers use anti oxidants such as BHA and BHT, which may cause long term health problems with dogs. Naturediet food contains natural Vitamin E and Vitamin C, which is a natural antioxidant and is an important nutrient in the synthesis of collagen and cartilage. Naturediet contains all the vitamins necessary for the well being of your dog.

Glucosamine is a well known supplement that has become widely used in the treatment of osteoarthritis in both dogs and humans. Please refer to our Glucosamine Fact Sheet for further information.

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How do I get my dog's hips x-rayed?

An owner should make an appointment with their veterinary surgeon for hip radiography to be carried out under the scheme. This may require admission to the veterinary practice for a short period or a day. Sedation or general anaesthesia will be required since the manual restraint of animals during radiography is only permitted under exceptional circumstances. Additionally, the radiograph must be of the highest photographic quality and the projection of all the required structures must be as dictated by the rules of the scheme (copies of which are available from the BVA).

The advice of the practice staff should be followed regarding any period of 'nil by mouth', the time of the appointment and the need in every case to present at the time of the procedure the Kennel Club registration and, if appropriate, transfer certificates. It is a requirement of the scheme that the registration number is indelibly printed on to the radiograph. It will be necessary for the owner of the dog or his agent to sign the scoring sheet there by signifying the identity of the animal in question and associated details, giving permission for the results to be published and to be subjected to genetic and statistical research.

The minimum age of the dog at the time of the radiography is 12 months; there is no upper age limit. Dogs may not be scored under the scheme more than once. The cost of the procedure will be a composite of the veterinary surgeon's fee for taking the radiograph and the fee forwarded with the film to the BVA. The latter covers the fees paid to the scrutineers appointed under the scheme, a reimbursement of costs incurred by the Kennel Club and an administration charge made by the BVA.

Drug treatments

Numerous drugs are available to control the signs of osteoarthritis secondary to HD. The use of non-steroidal anti-inflammatory pain relievers such as Buffered aspirin, EtoGesic or Rimadyl can be used during bouts of lameness. These drugs inhibit prostaglandin release, which decreases the inflammatory process and therefore, less pain is produced.

These medications can also be given an hour or so before known periods of exercise to decrease inflammation. Side effects may be seen in some dogs, which include vomiting, diarrhoea, and in appetite.

Various alternative drug therapies known as disease-modifying osteoarthritis agents can be used. According to the manufacturers, these drugs work by providing the raw materials to enhance the synthesis of glycosaminoglycan and hyaluronate that cannot be adequately produced in the diseased arthritic joint. These are the molecules that form proteoglycan, which is an important constituent of the hyaline cartilage that lines the joint.

These drugs may also enhance the synthesis of other macromolecules by cartilage cells that inhibit degradative enzymes produced within the arthritic joint.

Controlled studies have been reported about the positive effects in people for osteoarthritis; no controlled studies, to date, have been reported on the clinical response when treating arthritis in dogs but clinically most dogs seem to respond. Oral disease-modifying osteoarthritis agents known as nutraceuticals are now on the market and are available over-the-counter for people. Various veterinary products can also be obtained, examples include; Cosequin, SynoviCre, Glycoflex, Arthramine and MaxFlex Pet.

These drugs take approximately one month to reach therapeutic levels in the blood stream. Minimal to no side effects have been reported with their use. Injectable disease-modifying osteoarthritis agents are another alternative therapeutic choice. Examples of these products include Hyaluronic acid and Polysulfated Glycosaminoglycans (Adequan). These drugs can be injected into the joint, vein or muscle and have been shown to be a useful adjunctive treatment for osteoarthritis in dogs. Since these drugs are injected, more rapid therapeutic levels are obtained. They may be initially used with the oral nutraceuticals for a series of injections for one month since the oral agents take approximately one month to reach therapeutic levels.

The literature indicates that the earlier these drugs are administered, the more likely it will decrease inflammation and protect against cartilage degradation in osteoarthritis. The use of these drugs should be tailored for the individual dogs and any improvement noted. If side effects occur like Gastric upset, the medication should be given with food or discontinued altogether. If there is persistence of obvious lameness/pain after approximately 6 months using one medication, change the therapy to a different medication from the above choices.

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Surgical interventions

In younger dogs usually less than 10 months old, with only subluxation caused by dysplasia, a triple pelvic osteotomy (TPO) can be performed to re-establish joint stability, encourage normal joint development and minimise abnormal biomechanical forces on the joint before osteoarthritis occurs. This procedure is not indicated if osteoarthritis is already present. Recovery time is about 6 weeks and a good success rate has been reported with return of normal hip function. For older dogs (over 10 months) over 35 pounds that already have established osteoarthritis and can no longer be medically managed, a total hip replacement is the treatment of choice for re-establishing normal, pain-free limb function and joint mechanics.

A high degree of success has been reported with this surgery and like the TPO, post-op recovery is about 4-6 weeks. The main disadvantage to this surgery is the high cost. An alternative surgery, which is more of a salvage procedure, when there is significant osteoarthritis but a total hip replacement is cost prohibitive, is a femoral head and neck excision. This eliminates hip pain by removing the femoral head and neck and initiating the development of a fibrous false joint that permits ambulation. The false joint is less stable with a reduced range of motion than the normal joint, which in turn, causes an abnormal gait. Nevertheless, pain relief with adequate function can be achieved.

The procedure can be performed in all dogs of all sizes, but there are usually better long-term success rates in smaller dogs less than 20 kg (about 44 pounds). Pre-operative muscle mass and early postoperative physical therapy, are two important factors in determining a successful outcome. This surgery is usually not as successful if there is severe disuse muscle wasting (atrophy) present and/or the animal is obese.

Heavier dogs usually require more extensive post-operative rehabilitation to help promote an ambulatory pain-free false joint. Rehabilitation is aimed at preserving and promoting the leg's muscle mass, strength and range of motion through early (3-5 days) postoperative weight bearing ambulation and passive range-of-motion exercises. Early ambulation can be achieved by assisting the dog in getting up and walking. A towel can be placed under the abdomen to make assistance easier to perform in heavy dogs.

Leash walks and/or swimming beginning the day of discharge from the hospital should be performed until near normal use of the leg returns. Passive range of motion physical therapy is also necessary to increase muscle strength and flexibility. Dogs that are obese, inactive or have substantial muscle atrophy and have poor owner compliance with physical therapy recommendations are poor candidates for this surgery.

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