

Diseases of the Hip

The Hip

The hip is a “ball and socket” type joint which allows for a wide range of motion in multiple planes. The head of the femur forms the “ball” that inserts into the acetabulum (the “socket”), which is a spherical recess in the pelvis. As with all joints there is a joint capsule, which is a sheet of fibrous tissue completely surrounding the entire joint and attaches both to the neck of the femur and the rim of the acetabulum. Within this “bag” is joint fluid, which lubricates and provides nutrition to the articular cartilage.

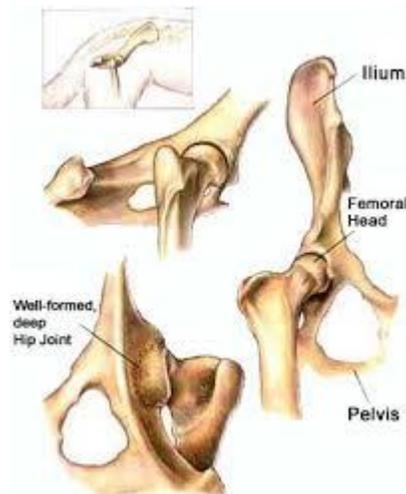
The joint is held in place and prevented from dislocating by a number of structures and surface tension created by the joint fluid itself. The joint capsule acts as a ligament to limit motion and there is a proper ligament connecting the femoral head to the centre of the acetabulum (both of these structures must tear in order for the hip to dislocate). Numerous large muscles have attachments very close to the joint or cross over it, providing significant stability as well. These muscle attachments allow for function after a surgical procedure called an FHO, which will be discussed in detail later.

Hip Dysplasia

Hip dysplasia is a developmental disease characterized by laxity of the hip or failure of the “ball” to seat well into the “socket”. In young patients this results in subluxation (ie partial dislocation) of the femoral head, which results in mild to severe degenerative joint disease and arthritis as the patient ages. Hip dysplasia is a genetic disease that is influenced

by other factors such as environment, diet, etc. It is estimated that millions of dogs in North America are affected with hip dysplasia with associated costs to society in the hundreds of millions of dollars.

Hip dysplasia can occur in a dog of any breed, but tends to occur in larger dogs. Unfortunately, this is usually a bilateral disease. Some breeds of dogs are predisposed to hip dysplasia: Labrador and Golden Retrievers, Newfoundlands, German Sheppards, and Bulldogs are some examples. Cats can also be affected.



Hip Dysplasia is a painful disease and can affect dogs at any age from four or five months and older. The pain results from catastrophic reduction of the head of the femur into the socket when the paw strikes the ground during locomotion. Damage to the cartilage and underlying bone results in degeneration and remodelling of the joint and ultimately osteoarthritis as dogs age.



How Do I Know If My Dog Has Hip Dysplasia?

Only a veterinarian can diagnose hip dysplasia by performing a proper orthopedic examination and obtaining x-rays. A number of signs can occur that suggest hip dysplasia and any hind limb lameness that occurs in your dog should be evaluated. The vast majority of medium and large dogs presented for hind limb lameness do in fact have cruciate ligament disease, however a significant number of those also have dysplastic hips. One retrospective study performed at a major university teaching hospital showed that of all large dogs presented for evaluation of hip problems 60% had hip problems, while 98% had cruciate ligament disease.



A 10 month-old dog with severe hip dysplasia. The hips are sub-luxated. This case requires surgical management.

Numerous alterations to gait and mobility may be associated with hip dysplasia. Dogs with severe hip dysplasia may adopt a “bunny-hopping” gait where both hind limbs move together. As degenerative changes progress, affected dogs develop a short-strided, stiff gait in the hind limbs, have difficulty with stairs and avoid or hesitate before jumping up onto furniture or into vehicles. These dogs are frequently described as “lazy” due to an apparent lack of desire to go for walks or engage in play activity for more than short periods of time.

Several physical exam findings are also associated with hip dysplasia. Affected dogs may have poor muscle tone or muscle atrophy, particularly of the upper limb and haunches. Poor or restricted range of motion is a very common finding and dogs will often react painfully when their hips are extended during examination. Under sedation, a number of findings are commonly noted but are beyond the scope of this handout

When you present your dog to your veterinarian for a lameness problem, a complete orthopedic examination is usually appropriate to obtain a proper diagnosis. The lameness exam should include a gait evaluation, a complete physical examination including a detailed examination of all 4 legs with the dog awake, and a proper orthopedic examination. The orthopedic examination itself is a very detailed examination of all 4 limbs and all of the joints of those limbs. This examination must be performed under sedation and includes a number of manipulations and physical tests to determine the full extent of any existing orthopedic problems. It is important to appreciate that the dog has 4 legs; **all limbs should be examined thoroughly!** Good quality, properly positioned radiographs of any affected limbs and joints are

then obtained to assist diagnosis and plan appropriate treatment.

A definitive diagnosis is obtained with radiographs of the hips. Standard hip-extended view (OFA) radiographs are the typical diagnostic view obtained. This will adequately diagnose dogs with severe dysplasia or those that have degenerative changes present. These radiographs are also the basis for the older grading scheme historically used to determine severity. This grading system works on a 1 to 4 scale, with grade 4 being the most severe. It is important to recognize the limitations of this view – approximately 50% of younger dogs with hip dysplasia but no degenerative changes will appear normal and be misdiagnosed.



A 12 year-old dog with hip dysplasia and severe arthritis. A total hip replacement has been performed on the left.

PennHIP radiographs are a far more sensitive indicator of hip laxity and are used to calculate a “distraction index.” The distraction index is used to diagnose hip laxity and a predisposition to develop osteoarthritis later in life. These radiographs are able to accurately diagnose dogs 5 months of age and older and

can be used to eliminate dogs from breeding who have this trait.

Management of Hip Dysplasia, Progression and Arthritis

Dogs with hip dysplasia exhibit a wide range of clinical signs from none at all to severe debilitating disease. The severity of radiographic changes does not correlate well to clinical signs – meaning that dogs can have really severe changes on xrays and little or no visible problems. The opposite is also true – dogs can have minor changes yet have severe mobility problems.

As hip dysplasia is a developmental disease, this problem develops from birth and is a permanent condition. Hip dysplasia can become worse with time, especially as the hip degenerates and the acetabulum fills in with osteophytes (bone development that is the end result of arthritis). The in-filling of the socket with bone causes it to become wider and shallower, worsening the laxity and clinical signs.

Degenerative joint disease that results from laxity, inflammation and inevitably arthritis is chronic and progressive. Clinical signs worsen with the passage of time and therefore dogs become more likely to display signs as they age. If detected early, numerous preventive measures can be taken that may dramatically alter the course of the disease. As with all orthopaedic diseases, early detection and treatment can profoundly impact the outcome.

As the severity and clinical signs of hip dysplasia are highly variable, a wide range of treatment options may be appropriate depending on the case. These treatments can range from basic medical management through more



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aggressive medical management to surgery, including total hip replacement. Treatment is tailored to the individual needs of the patient. It is important to understand that as this is a progressive disease, as time passes it is likely that additional therapy will be required to manage clinical signs.

Medical Management

Medical management is necessary upon diagnosis to control clinical signs and prevent or slow progression of the disease. **It is important to understand that treatment is life-long as this is a permanent condition.** The goal of all therapy, including surgery, is to minimize the development of arthritis so that the dog can live a normal, healthy and pain-free existence.

It is also important to understand that arthritis is not a disease. Hip dysplasia, cruciate ligament disease, elbow dysplasia, etc, are diseases. These diseases cause inflammation; arthritis is simply inflammation with the addition of time. As such, the goal of **all** of our therapies is to prevent or suppress inflammation, thereby preventing the development of arthritis. Attempting to treat arthritis is generally unproductive – at that point it is too late.

Medical management may consist of one or more of the following: NSAIDS, laser therapy, joint diet/dietary management, chondroprotectants, platelet-rich plasma, and stem cell therapy. Which therapies are chosen depends on the particulars of the case, the degree of arthritis present, the size of the dog and the client's preferences. **Understand that these long-term treatments are not optional – failure to comply with the specific diet and chondroprotectant regimen prescribed will**

result in more rapid progression and damage that is permanent. Some patients may also require other treatments such as occasional laser therapy or medication to keep them functioning normally. A brief description of these therapies is listed below.



Weight, Diet and Hip Dysplasia

In any patient with any orthopedic disease, the most important factor impacting the development of disease, prognosis and treatment is the weight of the patient. This is true with respect to the relative weight of the dog (St. Bernard v. Chihuahua) but especially with respect to obesity. **Regardless of the orthopedic condition, failure to recognize and address issues of diet and obesity will result in treatment failure, no matter how much is invested in treatment and surgery.** Some surgeons have a policy of declining to perform surgery until obesity issues are resolved due to the higher complication rate, increased difficulty in performing procedures and sometimes demonstrated failure of compliance on behalf of the client. Your veterinarian should provide specific dietary recommendations including not only a specific diet(s), strict feeding guidelines that include specific measuring instructions and complete diet counselling. Any complicating



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medical conditions such as hypothyroidism need to be diagnosed and treated.

Joint Diets – A prescription veterinary diet formulated specifically for addressing joint disease and arthritis in our patients. These diets are designed not only to deal with inflammation associated with joint disease but are excellent at addressing weight issues that will have the most impact on patient outcomes. Joint diets have had a major impact on how we manage joint disease over the past decade, and for many dogs on monotherapy have allowed us to replace drugs with food.

Therapuetants

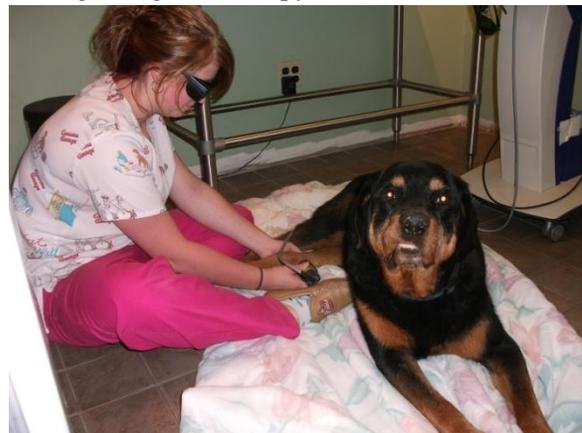
Chondroprotectants - All dogs with any type of joint disease should be on chondroprotectants (glucosamine, with or without chondroitin) and this is usually prescribed and supplied in our hospital. Please note, glucosamine incorporated into dry dog food is not present in sufficient quantities to have a therapeutic effect – most of it is destroyed during processing as it breaks down under the high temperatures and pressures used to make dry kibble. It has to be added to the food after processing, usually as a top-dressing added at feeding time by the client. It is strongly advised to use a veterinary product to ensure that the correct formulation and dose are being administering in a therapeutically useful format.

NSAID's - All dogs presented with clinical signs initially start on NSAID's as this is our primary means of immediately addressing pain and inflammation. While our other therapies are just as good at addressing these issues they all take a significant amount of time to start having an effect – drug therapy is immediate. Often we will withdraw the NSAID's if possible when other therapies have had time to take effect. A

number of options are available, including some newer products that have a reduced incidence of adverse effects.

Regenerative Therapies

Laser Therapy – Therapy lasers have become increasingly popular in small animal practice since they became widely available in the past 5 years. Laser therapy allows us to treat both acute injuries and chronic disease with often spectacular results. It is also extremely helpful for managing post-operative pain, inflammation and swelling and is included in our post-operative management for all orthopedic cases. This treatment has had a major impact on dramatically lowering our post-op complication rate for a variety of reasons. A separate hand-out regarding this therapy is available.



Stem Cell Therapy – We have performed stem cell therapy on a great number of our patients concurrent with surgery. This treatment is appropriate for cases where significant joint disease is already present at the time of diagnosis. It is especially important in managing cases that have other concurrent diseases such as hip or elbow dysplasia. Stem cell therapy for these cases has produced excellent results and in many cases an obvious reduction in radiographic



findings associated with osteoarthritis has been noted when follow-up x-rays were taken several months later. A separate hand-out regarding this therapy is available.



Stem cells being processed from fatty tissue.

Physiotherapy and Exercise

Regular moderate exercise is vitally important for dogs with hip dysplasia. Light exercise, particularly in the form of leash walks, light off-leash activity, and swimming have a significant and positive impact on dogs with hip dysplasia and secondary osteoarthritis. Exercise helps maintain joint health, especially range of motion, healthy muscle mass and overall mobility.

Helpful exercise periods for these dogs mean shorter duration and more frequent. Exercise periods ideally would involve 15-20 minute sessions about 3-4 times daily. Longer duration exercise periods should be avoided, as should vigorous or extreme activity. A very long walk daily is likely to accelerate problems rather than help them. “Weekend Warrior Disease” – doing no activity all week then playing hard all weekend – will have the most devastating impact.

In addition to light exercise, other physiotherapy may be prescribed for dogs with advanced clinical signs. Significant loss of range of motion is particularly evident in most dogs with hip dysplasia. Maintaining good range of motion is extremely important in these dogs and infact improved range of motion is a major outcome measure in many orthopaedic diseases. A number of exercises and activities can be prescribed to assist with this.



Fracture malunion in a young dog. This dog had a fracture to the head of the femur that healed improperly, causing a severe gait abnormality and chronic pain. Surgical management was required for this case.

Surgical Management of Hip Diseases

There are three commonly available surgical options for management of diseases of the hip joint. The first, double pelvic osteotomy, is a means of treating hip dysplasia in juvenile dogs (5 to 7 months of age). The other two, femoral head ostectomy and total hip replacement, are classified as salvage surgeries. Surgical intervention is restricted to patients with severe disease.



Bilateral double pelvic osteotomy

Double Pelvic Osteotomy (DPO)

DPO involves cutting the pelvis in two locations, allowing it to be rotated externally and effectively increasing the coverage of the femoral head by the acetabulum and eliminating hip laxity. Success of this surgery requires that the dog have significant growth potential remaining and therefore cannot be performed in dogs past the age of seven months (eight months in giant breed dogs). This would of course require that the dog have their hips screened by approximately 5 months of age.

When correctly performed, DPO will permanently eliminate hip joint laxity and therefore essentially “cure” the dog’s hip dysplasia. The probability of developing osteoarthritis later in life becomes extremely low. This is a technically demanding surgery and there is potential for complications, which can include implant failure, temporary or permanent neurological damage and serious or fatal intra-operative haemorrhage. Fortunately these are relatively rare complications when the procedure is performed meticulously.

Femoral Head Ostectomy (FHO)

Femoral head ostectomy works by removing the femoral head and neck and interposing soft tissue between the femur and acetabulum. This will of course obliterate the hip joint completely, thereby eliminating pain associated with hip disease. Due to the large number of tendon attachments and heavy musculature surrounding the hip, the femur will pivot around this point and allow for relatively normal function.

The majority of cats and dogs under 25 Kg will gait normally or near-normally after this procedure. In larger dogs in the 25-30Kg range, a mild gait abnormality will likely be present, but they are otherwise functionally normal and are able to run and play like any normal dog. In very large dogs (>35Kg), we try to avoid FHO as a significant gait abnormality and some functional impairment is likely. In a small percentage of cases a persistent lameness will be present.



This procedure has relatively low risk otherwise and has been a routine orthopaedic procedure for more than 50 years. Recently however, the validity of FHO has been called into question as the majority of the studies pertaining to FHO are admittedly older and may not be truly reflective of actual outcomes seen clinically. Nonetheless, FHO is considered a reasonable and effective option for unsalvageable trauma or disease of the hip in many patients.

Total Hip Replacement (THR)

As the name implies, total hip replacement involves replacing the acetabulum (socket) and femoral head and neck (ball) with artificial implants. The diseased femoral head and neck are cut off, the acetabulum and femoral shaft are reamed out and replaced with artificial implants. These implants may be press-fit in-growth

(biological fixation or BFX) or cemented (CFX) or a hybrid of both. The choice of CFX vs. BFX implants is dependant solely on patient factors that dictate the implants used; neither is necessarily superior to the other. The surgeon must be familiar with both systems and be able to switch between them as necessary.

Indications for THR include unsalvageable trauma, such as badly healed fractures and hip dislocations that are unable to be repaired, severe hip dysplasia with or without chronic degenerative changes, and FHO revision. THR can be performed on any dog or cat from 2Kg to 80Kg. Exclusions for surgery include obesity, unmanaged cruciate ligament disease or other orthopedic disease, incomplete or successful medical management of hip dysplasia, and skin infection. Obviously most of these exclusions are temporary and allow surgery to occur on resolution. Age is not an exclusion; any healthy dog may be a candidate for THR.



THR is the only joint surgery in veterinary orthopedics where the expected outcome is completely normal function post-operatively. The goal of surgery is to return an injured or chronically lame dog to normal or near-normal function, including athletic, sporting and working dogs. A 2010 study using objective gait analysis demonstrated normal weight-bearing as early as 12 weeks post-operatively. Other more



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recent evidence also supports this finding. Compared with most other surgical options, particularly FHO, THR is clearly a superior option in most cases based on currently available evidence.

While the pay-off to the patient is extremely appealing, THR is not without risk. Very serious potential for complications limit performance of this procedure to only the most highly experienced and advanced orthopedic surgeons. Highly rigorous, expensive and complex training is involved not just for the surgeon, but for the entire surgical and radiology team. A minimum of 6 to 8 highly trained people are required to ensure meticulous and precise performance of this procedure. In order to achieve certification, candidates must engage in months of intensive training and study.

Complications can be serious and lead not only to loss of the arthroplasty but may include fracture of the femur or pelvis, neurological injury and infection. The concept that a failed THR results in “an expensive FHO” is over-simplified. Reported complications also include dislocation, implant loosening, embolism, and implant displacement or subsidence. Complication rates with cemented implants have been reported at 12-13% and include luxation (4%), infection (1-2%) and aseptic loosening (2-3%). While a significant proportion of these complications would result in explantation of the implants, it has also been demonstrated that the outcome after implant removal is (in general) identical to that which would be seen with an FHO.

Post-Operative Care

Client compliance with post-operative care is extremely important – **failure to meticulously follow instructions can, and usually does result in severe complications and treatment failure.** It is our preference whenever possible to provide complete and comprehensive case management for the entire post-op period. In our practise, we perform laser therapy during the first two weeks post-op to aid with recovery and pain management. Other pain management such as NSAIDs, opioids (codeine), bandaging, etc, are provided as is a short course of antibiotics. Physiotherapy is a crucial component of post-op management and instructions are given at discharge. Other than prescribed physiotherapy, absolute exercise restriction is necessary and off-leash activity is strictly forbidden. Unrestricted access to flights of stairs in the house is to be avoided, however going up and down exterior stairs to get in or out of the house is permissible (on-leash only!).





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Sutures are removed after 14 days and post-op x-rays are taken at 6 weeks. If post-op x-rays are within expectations, owners are instructed to continue with prescribed treatment and physiotherapy until 12 weeks post-op, at which point normal activity may be resumed. For THR patients radiographs are obtained again at six months post-op, then annually thereafter. Annual rechecks (radiographs) are strongly recommended as, although uncommon, implant loosening, subsidence and infection can occur long after implantation.

THR patients are able to walk on the affected limb within hours after surgery with assistance. Hospitalization is one to three days post-operatively dependant on the surgeon and patient factors. Patients are able to weight-bear normally by 1 month and are on exercise restriction for 8-12 weeks post-operatively. For THR patients radiographs are obtained one and six months post-op, then annually thereafter. Annual rechecks (radiographs) are strongly recommended as, although uncommon, implant loosening, subsidence and infection can occur long after implantation.

Cost

The cost of these procedures is as follows:

Orthopedic exam: \$450 + HST

(includes consult, sedation and whatever xrays are necessary)

Surgeries:

(includes laser therapy sessions, all routine post-op medications, suture removal, rechecks, etc)

Double Pelvic Osteotomy (DPO) \$2500 + HST

Femoral Head Ostectomy (FHO) \$2250 + HST

Total Hip Replacement (THR) \$4500 + HST

Note that post-op xrays are **not** included in the cost of surgery.

****A non-refundable deposit of \$250.00 is due at the time of booking any orthopedic work-up and/or surgery****

****Financing options are available. Please contact reception for further details.**