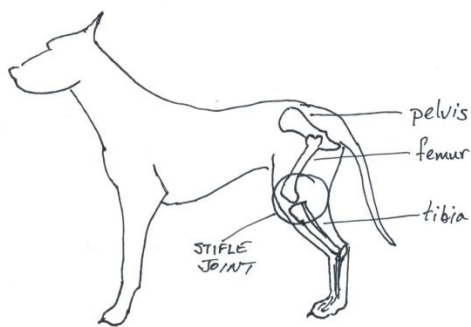


Patellar Luxation

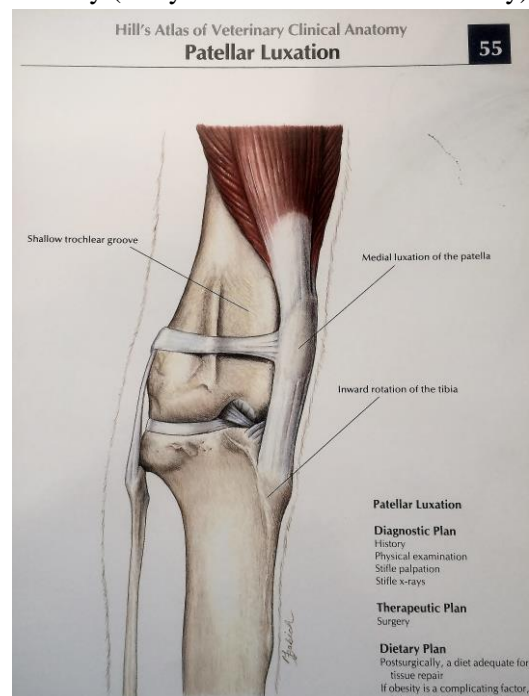
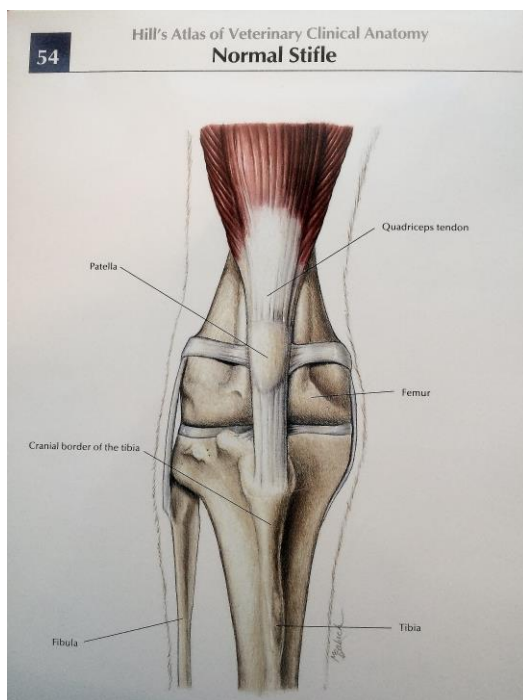
The Patella

The patella (equivalent to the “knee cap”) is one of several structures in the stifle (equivalent to our knee) that provide joint stability and allow normal function. The stifle is the joint formed by the femur, tibia and patella and is a basic pulley system that allows the lower leg to swing in a backward and forward direction like a pendulum.



A large group of muscles at the front of the upper leg known as the quadriceps originate from the femur and insert on the tibia. The tendon of insertion is called the patellar tendon and contains the patella within it. The patella rides in a groove at the end of the femur called the trochlea. When the quadriceps muscles contract, the tendon pulls on the tibia and the lower leg swings forward. The pulley formed by the patella riding in the trochlea substantially multiplies the force applied by the muscle contraction and also keeps the mechanism aligned so that the force is translated through a straight line.

Patellar luxation occurs when the patella becomes dislodged from the trochlea - “dislocates” or luxates – and rides along the side of the trochlea instead. The patella can luxate either medially (towards the middle of the body) or laterally (away from the middle of the body).



Medial patellar luxation is by far the most common and can occur for any of a number of different reasons. It is most commonly seen in miniature and toy breed dogs but can be seen in any breed and is usually bilateral (both hind legs affected). The most commonly affected breeds include Jack Russell Terriers, Toy Poodles, Yorkshire Terriers and Pomeranians. Cats are also occasionally affected.

How Do I Know If My Dog Has Patellar Luxation?

Patellar luxation is diagnosed by performing a physical examination and obtaining x-rays. It can be diagnosed as an “incidental finding” during a routine check-up or as part of an orthopaedic exam to determine the cause of a lameness issue. Signs associated with patellar luxation can range from absent (ie – dog shows no lameness or indication of problems), to non-weight-bearing lameness. Dogs affected with severe bilateral disease usually have a very bizarre gait and posture where their back is arched, both stifles are externally rotated and the feet are carried far forward under their body. They may also attempt to walk only on their front legs – ie. perform a “hand-stand”.

Most dogs with clinical signs have a gait that is described as “hopping” or “skipping”, where their gait is mostly normal but the dog will occasionally lift the affected leg for several strides and hop on three legs. This occurs as the patella dislocates and then pops back into proper position. Clinical signs are a manifestation of the mechanical problem caused by luxation and a response to pain.



Patellar luxation is graded on diagnosis which is both an indication of severity and what is physically happening to the patella during gaiting. Grade 1 occurs when the patella can be luxated with finger pressure but returns immediately to its normal position when released. Grade 2 occurs as above but does not return to normal position when released. Grade 3 occurs when the patella is always luxated but can be pushed back into the groove with finger pressure. However it will immediately re-luxate when released. Grade 4 occurs when the patella is luxated and cannot be replaced into normal position. Grades 3 and 4 should always be surgically corrected. Grades 1 and 2 may or may not require surgical correction depending on the circumstances.

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



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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.

Patellar Luxation, Progression and Arthritis

Clinical signs and secondary problems associated with patellar luxation can be highly variable. As a result, treatment recommendations are dependant on the particulars of the individual problem(s). Patellar luxation is usually chronic but can occur acutely due to trauma or be associated with rupture of the cranial cruciate ligament. Dogs with lower grades of luxation not accompanied by clinical signs are often not treated surgically. All dogs with clinical signs as well as those with higher grades of luxation should receive surgical correction. Grades can change with time (for the worse usually), and dogs that were previously not showing clinical signs can suddenly become clinical. This often happens during middle age (around 7 or 8 years of age); the reason for this is not clearly understood.



Dogs with traumatic luxation are often successfully treated with medical management and strict exercise restriction, though some may require surgery. Dogs with patellar luxation secondary to cruciate ligament rupture require surgical repair. Large breed dogs more frequently have lateral patellar luxation and their problems can be significantly more complicated to address.

As with any other orthopaedic disease affecting the joint, patellar luxation can cause inflammation, which can lead to arthritis and degenerative joint disease. Fortunately this tends to be somewhat less severe than that seen with other joint diseases. Nonetheless, medical management is very important to the management of patellar luxation. At least minimal long-term therapy is appropriate to all patellar luxation cases, even after surgical correction. Appropriate long-term medical therapy will directly determine the outcome and the long-term comfort of the patient.

Medical Management

As mentioned previously, many cases of patellar luxation require surgical repair. However, medical management is necessary for almost all cases, including those not requiring surgery, pending surgery, in the perioperative period (during recovery) **and for the rest of the dog's life after surgery.** It is important to understand that surgery is a very important event, but management of degenerative joint disease is life-long. No matter how good a job the surgeon does, it is important to understand that some arthritis will develop over time.

It is also important to understand that arthritis is not a disease. Hip dysplasia, cruciate ligament disease, patellar luxation, etc,



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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, chondro-protectants, 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. Most cases require minimal therapy and not advanced treatments such as stem cell therapy, long term NSAID's, etc. Ideally, our long-term treatment plan for all of our patients is to manage them with chondroprotectants and joint diet. Understand that these long-term treatments are not optional – failure to comply with the specific diet and chondroprotectant regimen prescribed is likely to result in long term problems. A brief description of these therapies is listed below.



Weight, Diet and Degenerative Joint Disease

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 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.

Therapeutics

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.

NSAID's - All dogs presented for severe luxation/ degenerative joint disease initially start on NSAID's as this is our primary means of immediately addressing pain and inflammation. Dogs with less severe clinical signs may or may not be prescribed NSAIDs depending on the situation. 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.

Surgical Management of Patellar Luxation

There is always an anatomical problem or deformity involved that allows or causes the patella to luxate, however other factors can contribute. Causes can include hip dysplasia, cruciate ligament rupture, angular limb deformity where the leg is “bent” and/or “twisted” pulling the quadriceps mechanism out of alignment, and a shallow trochlear groove. Most cases involve a combination of problems and all of them must be addressed when surgically correction is pursued. In cases where a severe angular limb deformity is present it may be necessary to perform a surgery(s) to cut and realign the femur and/or tibia to “straighten” the dogs leg.

The “Standard Repair”

Surgical correction of patellar luxation involves a combination of a number of separate techniques to return and retain the patella in the trochlea. These techniques are usually used concurrently. A “standard repair” is used to correct dogs without severe angular limb deformity and many different slight variations are in common use.

The trochlear groove is first assessed for depth, shape, evidence of cartilage damage and arthritic changes. Most dogs will require some remodeling or deepening of the groove to retain the patella in proper position. There are a number of acceptable variations on how to do this; the method we usually perform is a wedge recession trochleoplasty. This technique allows us to significantly deepen the groove while maintaining the proper anatomy as closely as

possible and preserving the articular cartilage of the joint.

Next, a tibial tuberosity transposition will usually be performed. The prominence where the patellar tendon attaches to the tibia is cut away from the rest of the tibia and moved in either a medial or lateral direction as required. The amount of adjustment required is usually fairly small – often just one or a few millimetres. The tibial tuberosity is then reattached to the tibia either with small pins (small dogs) or a special bone plate called a tension band plate (bigger dogs).



The joint capsule is then imbricated to “tighten-up” the joint capsule and surrounding tissues to firmly hold the patella in place and prevent it from translating abnormally. Again there are a number of acceptable methods for performing this manoeuver. The method we most commonly use is referred to as “vest-over-pants” and involves the removal of a strip of tissue from the joint capsule and then suturing one edge over top of the other with a special mattress suture.

In rare extreme or unusual cases a fourth technique called a lateral fabellar suture may be employed to “lasso” the patella and restrain it to a small bone at the back of the stifle. This physically prevents the patella from translating in an improper direction. A number of variations of this technique also exist, some also including the use of bone anchors.



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Distal Femoral Osteotomy (DFO)/ Tibial Closing Wedge Osteotomy (TCWO)

For dogs that have severe deformities correction of the deformity is necessary to realign the limb and stop the patella from luxating. The femur and/or the tibia maybe affected. Either bone can have a torsional deformity (= “twisted”) and/or an angular deformity (= “bent”). DFO/TCWO are surgeries that involve cutting the affected bone(s) and removing a wedge of bone and/or rotating them to restore their proper alignment and anatomical relationships.

As these are complex surgeries, they will not be reviewed in detail here. It should also be noted that while a standard repair is a “beginner level” orthopedic surgery, DFO/TCWO should only be performed by a veterinary orthopedic surgeon with a great deal of advanced training and technical skill. Clients presenting patients with complex angular limb deformities requiring these surgeries will have the procedure reviewed with them during the orthopedic consult.

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. Physiotherapy includes icing, passive range-of-motion exercises, massage and controlled leash walks. 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!).

The leg is usually bandaged during the first 2 weeks and bandages are changed at 3 and 10 days post-op. Sutures and bandages are removed after 14 days and post-op x-rays are taken at 8 weeks. If post-op x-rays are within expectations, owners are instructed to continue with prescribed treatment and physiotherapy until 10-12 weeks post-op, at which point normal activity may be resumed. For dogs with bilateral patellar luxation, the second surgery can be booked at 8 weeks post-op if the x-rays show sufficient healing. Our long-term goal for our patients is maintenance with glucosamine, joint diet and if necessary annual laser treatments. Patients with more advanced disease at surgery may require more aggressive treatment for arthritis in the long term.

Cost

Orthopedic exam: \$450 + HST

- includes consult, sedation and whatever xrays are necessary

Surgeries:

Standard repair \$2500 + HST

DFO/TCWO \$3000 + HST

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



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****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.**