

# CUTTING EDGE

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Though a familiar malady, common in all our practices, we thought it might be helpful to review

**P**atellar luxations can occur in all breeds of dogs, and there have been increasing numbers of cases reported in cats. Patellar luxation (PL) has been described as the most common congenital anomaly in dogs. In fact, it is diagnosed in 7% of all puppies. Medial luxations (MPL) are more common than lateral luxations (LPL) in all dogs and cats. It is a bilateral problem in at least 50% of cases. At the DVSC,

breeds, including larger dogs such as the Akita, Great Pyrenees, flat-coated Retriever and Chinese Shar pei. Patellar luxations may be congenital or developmental, with congenital accounting for 82% of cases. Though a topic of debate, most scholars agree that there is likely a genetic component to the disease. This is supported by the established breed predispositions. Certainly, in a young patient

contracture/atrophy and abnormal patellar tendon length (patella alta/baja). These structural alterations cause a shift of the patella out of the femoral trochlear groove due to a shift of the weight-bearing forces over the patella. Patellar luxation used to be considered "a shallow groove and a loose joint capsule". We now recognize that the factors related to luxation of the patella extend well beyond the stifle and a thoughtful, reasoned approach is essential when planning surgical correction/repair.

## PATELLAR LUXATION: NEWS & TREATMENT

patellar luxation and some of the more recent literature and treatment options.

we see lateral luxations more commonly in large breed dogs than we do in small breeds or cats. However, medial luxations still make up the majority of all cases seen by us. Small-breed dogs are 10 times more likely to be affected than large dogs. Breeds commonly associated with patellar luxation include the miniature Poodle, Pomeranian, Boston terrier, Chihuahua and Yorkshire terrier. But a study of breed predisposition for patellar luxation identified it in 32

who has bilateral disease and an absence of historical trauma, a genetic basis should be assumed.

### Pathophysiology

The mechanism of patellar luxation is related to the complex function and alignment of the coxofemoral joint, femur, patella, stifle and tibia. Some conformational abnormalities that have been incriminated are coxa vara or coxa valga, malformation of the femur (angulation/torsion), tibial deformities, deviation of the tibial crest, quadriceps

### Classification

Preliminary classification of the degree of patellar luxation is an important part of the patient evaluation. However, the grade does not necessarily correlate to the clinical lameness. Additionally, we have observed and treated dogs who have a grade II MPL in one limb and a grade III in the contralateral limb and are more symptomatic on the less affected (grade II) side. So, the classification scheme allows collegial description among

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veterinarians and provides information on the looseness (and thus the repair method(s)) but does not always coincide with clinical signs or the prognosis.

**Grade I** – the patella is well seated in the groove and does not spontaneously luxate. It can be manually luxated, but returns to the groove once released.

**Grade II** – the patella is in the groove more than it is out, but it can be luxated manually and will luxate spontaneously. The patella will remain luxated until manually relocated or by extension of the stifle.

**Grade III** – the patella is out of the groove more often than it is in. It can be manually reduced, but will spontaneously re-luxate once released.

**Grade IV** – the patella is out of the groove all the time and cannot be manually reduced.

### Clinical Signs

The severity of the clinical manifestation with patellar luxation can vary greatly. In some cases, it is an incidental finding on routine physical

examination. In severe cases, it can cause a persistent non weight-bearing lameness. In most cases, however, it causes an intermittent “hopping” or “skipping”. Some patients will learn to extend the limb, thus reducing the luxation and resulting in an immediate return to a normal gait. As the disease progresses, the frequency of lameness increases and may eventually persist. In puppies with severe (grade IV) luxation, the abnormal stresses across the distal femoral and proximal tibial physes can result in a “bow-legged” appearance that worsens with continued growth.

### Diagnosis

Definitive diagnosis of patellar luxation is generally based on palpation of an unstable patella on orthopedic examination. Radiographs may or may not demonstrate the luxation depending on the position of the patella at the time the film is made. However, radiographs are critical in determining the confirmation of the hip, femur and tibia when planning for surgical correction. Three-dimensional CT reconstruction can be useful in severe cases, but is not part of the normal workup.

### Surgical Correction

A conservative approach is appropriate for subclinical patellar luxation. At the DVSC, we will counsel clients on the signs to watch for but we do not recommend surgery in patients who are asymptomatic. The surgical correction of patellar luxations can be divided into subparts for purposes of discussion. However, what is required or effective for one patient may not be suitable for another. Each case must be evaluated independently and a careful, thoughtful surgical plan should be arrived at prior to surgery. Admittedly though, there are some aspects that can best be evaluated intraoperatively.

#### Deepening the femoral trochlear groove:

**Abrasion trochleoplasty** – involves rasping the articular surface and subchondral bone of the groove. It will eventually be covered by fibrocartilage.

**Wedge recession trochleoplasty** – involves development of a V-shaped wedge from the groove. The resultant groove is further enlarged and the removed wedge is then replaced in

the groove. The original hyaline cartilage is maintained (Figure 1).

**Block trochleoplasty** – similar to wedge recession except a rectangular block is developed. Recent research indicates that this procedure results in a deeper recess and greater patellar stability. At the DVSC, we have been performing block trochleoplasties for the past couple years and agree that it may be superior to the wedge recession (Figure 2).

#### Tibial tuberosity transposition:

**Medial or lateral** – involves translocation of the tibial tuberosity to a position that is in axial alignment with the limb or, in some cases, beyond the neutral axis opposite the direction of the luxation. While all surgeons are comfortable transposing the tibial tubercle, some feel strongly it should never be transposed beyond neutral.

**Distal** – recent research (2006) evaluating vertical patellar position in large breed dogs found that dogs with medial patellar luxation had a more proximally positioned patella (patella alta) relative to the trochlear groove. Based on their findings, they suggested that “it may be advisable to distally transpose the tibial tubercle, in addition to any medial or lateral corrections, to place the patella in a normal vertical position within the femoral trochlear groove”.

#### Reconstruction of surrounding soft tissues:

**Capsulectomy/Capsular imbrication** – involves tightening of the joint capsule on the side opposite the direction of the luxation. The amount of capsule excised is based on a case by case basis and can vary greatly. Suture material (absorbable versus non-absorbable) depends on surgeon preference.

**Capsular release** – involves transaction of the femoropatellar ligament on the side to which the patella luxates. This is generally reserved for

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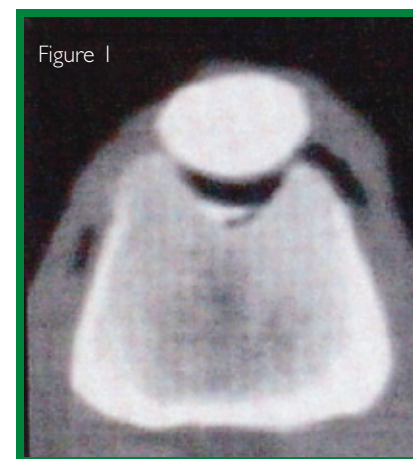


Figure 1

above: Wedge

below: Block

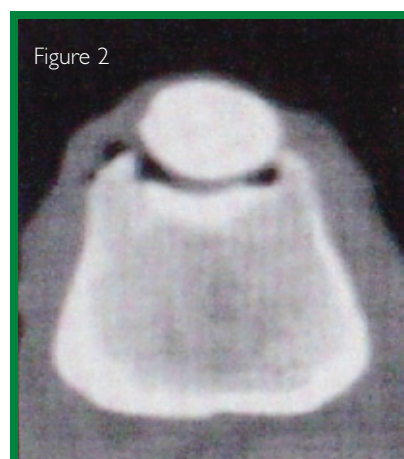


Figure 2

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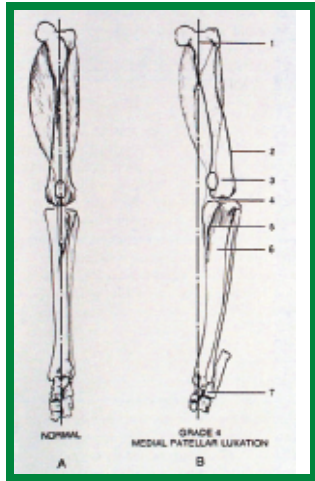
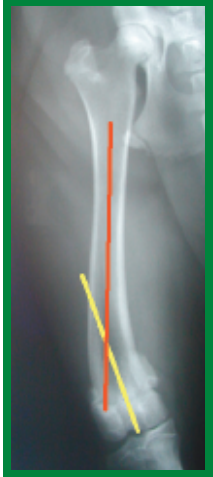
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# PATELLAR LUXATION: NEWS & TREATMENT

Figure 3



severe (grade IV) cases.

**Arthroscopic release of the medial femoropatellar ligament** – a relatively newer technique that was reported in five dogs of varying breeds and ages. It was combined with a tibial tuberosity transposition in some cases. The procedure resulted in good to excellent outcomes in four dogs and a fair outcome for the fifth patient.

**Rectus femoris transposition** – generally reserved for patient with a bowlegged

confirmation and a normally aligned patella/tibial tubercle. Can be appropriate for some patients (small dogs) in lieu of an osteotomy.

## Corrective osteotomies:

**Distal femoral varus** – primarily performed in large breeds that have a varus curvature of the distal femur (Figure 3). In these patients, the malalignment is severe enough where conventional patellar surgeries (deepening the trochlea, tibial tubercle crest transposition, capsular reconstruction) cannot overcome the mechanical pull and will fail. We have performed this procedure on numerous dogs with very good results (Figure 4).

## Conclusion

Patellar luxation is a common problem that is seen in both dogs and cats. In

general, it is a problem that can be surgically corrected and carries a high success rate. However, it can be a complex, complicated problem and each case must be evaluated independently. The surgical plan must be customized for each and every patient. What works successfully for one patient, may fail miserably in the next.



Figure 4:  
AP & Lateral  
Post-op  
Femoral  
Varus  
Repair



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