

# Treatment of Patella Luxation in Dogs. Some new ideas

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Patellar luxation is one of the most common developmental orthopedic condition diagnosed in dogs. Occasionally patella luxation can be traumatic but usually there was a preexisting luxation that increased in grade with trauma. The pathogenesis of patella luxation have been investigated but poorly understood. Patella luxation is not considered an isolated condition of the stifle, but rather secondary to complex skeletal anomalies affecting overall pelvic limb alignment. Specific abnormalities associated with patella luxation include coxofemoral joint conformation, distal femoral torsion and angulation, deviation of the tibial crest, shallow femoral trochlear groove and quadriceps muscle imbalance (weakness, atrophy contracture).

We think of patellar luxation as a condition of small and toy breed dogs but the condition is commonly seen in medium to large breed dogs where the condition is harder to treat than in the toy breeds. Small and toy breed are often associated with medial patella luxation and lateral luxation in large breed. The truth is that medial luxation is more common than lateral luxation in all sizes and breeds of dog.

## Initial Assessment:

Lameness should be graded at presentation and follow-up to be able to monitor the lameness over time. A useful grading scheme is as follows:

### Lameness Grade:

**Grade 0:** No lameness.

**Grade 1:** Mild or intermittent lameness. No lameness at rest but lameness with mild exercise.

**Grade 2:** Moderate lameness; using the limb greater than 50% of the time or greater than 50% weight bearing.

**Grade 3:** Severe lameness; using the limb less than 50% of the time or less than 50% weight bearing.

**Grade 4:** Non-weight bearing lameness.

### Patella luxation Grade:

**Grade 1:** The patella was easily luxated with manual pressure but returned to the femoral trochlea when released.

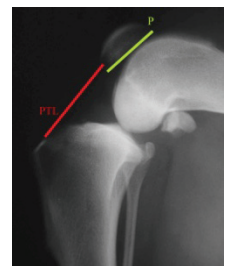
**Grade 2:** The patellar luxation spontaneously with flexion or rotation but reduces spontaneously.

**Grade 3:** The patella is luxated most of the time but can be manually reduced.

**Grade 4:** The patella was permanently luxated and can not be manually reduced.

### Radiographs:

Assessment of the location of the patella relative to the trochlear groove has gained recent attention of a possible cause of failure after patella luxation surgery in medium to large breed dogs. Patella alta is defined as the proximal location of the patella relative to the trochlear groove. Dogs with marked proximal displacement of the patella may have the patella articulation move completely proximal to the femoral trochlear groove during stifle extension. In human orthopedics, patella alta has been associated with recurrent patellar subluxation, chondromalacia, and pain in the anterior aspect of the knee. Patella alta and patella baja (distal location of the patella relative to the trochlear groove) have recently been defined in dogs. Patella alta is diagnosed if the patella tendon length (PTL): patella (P) ratio is greater than around 2 (1.97-2.06). Patella alta has been associated with medial luxating patella especially in larger dogs. Patella baja has been described by a PTL: P ratio of less than (1.47- 1.65) The normal PTL: P ratio is 1.47 to 1.97 in one study. (PTL: P ratio = PTL/P). Degenerative joint disease and the stifle flexion angle will have an effect on this measurement.



## **Surgical Repair:**

As with other orthopedic conditions multiple surgical techniques have been described to stabilize the patella in the trochlear groove. Surgical procedures to correct a patella luxation can include any or all of the following; trochleoplasty (block recession, wedge recession, abrasion sulcoplasty), tibial tuberosity transposition, lateral and medial soft tissue releases, releasing desmotomy, imbrication and femoral and/or tibial corrective osteotomy as well as others. Achieving biomechanical stability is the most important aspect of the procedure. Achieving a balance between the soft tissue release and imbrication is very important to ensure normal tracking of the patella and avoid re-luxation or luxation on the opposite side of the joint. Soft tissue procedures alone are not recommended as a sole method of treatment for patellar luxation in because of the high incidence of failure (up to 48%).

Trochleoplasty: Should be performed with the trochlear groove is shallow. If there is any question that the groove is deep enough it should be deepened. There are 3 main ways to deepen the trochlear groove. (1) block recession, (2) wedge recession, (3) abrasion sulcoplasty. The abrasion sulcoplasty should be avoided unless there is significant damage to the cartilage that renders it non-viable. The block recession has been shown to be superior to the wedge recession in that the improved trochlear groove depth can be maintained all the way to the proximal portion of the trochlea. Regardless of the technique used the goal of trochleoplasty to create a groove depth such that 50 per cent of the patella is seated within the trochlear ridges. Great care should be taken to maintain the new trochlear depth to the proximal extent of the trochlear groove.

## Tibial Crest Transposition:

This procedure should be performed in most dogs with congenital patella luxations. The exception can be made for the dog that had a low grade luxation and a traumatic worsening of the luxation grade. Tibial crest transposition is very important in aligning the quadriceps muscles and patella with the new trochlear groove. The tibial crest can be cut with a saw, osteotome or bone cutters, to name a few. After the tibial crest is transposed care should be taken not to rotate the tibial tuberosity. In humans this can cause abnormal point contact of the patella and can lead to chondromalacia and pain. When the tibial crest is moved wither laterally or medially the tibial crest is moved caudally and can result in increased contact between the patella and the femoral trochlea. The significance of caudalization or rotation of the tibial crest in the dog is unknown. The distal aspect of the tibial crest osteotomy should be left intact so the periosteum and soft tissues can act as a tension band. Fixation of the tibial crest should be performed with one or two K-wires in small dogs but two pins and a tension band should be considered in large breed dogs.

## Soft Tissue Procedures:

If after the trochleoplasty and the tibial crest transposition are complete the stifle should be placed through a range of motion and if the patella luxates then soft tissue procedures should be performed. The medial and lateral aspect of the soft tissues surrounding should be partially released to allow the patella to drop down into the newly deepened femoral trochlear groove. The soft tissues proximal and distal to the patella should not be incised. If the patella continues to luxate the fascia can be released and ultimately extended through the joint capsule to release the patella toward the trochlear groove. Imbrication should be performed with care to pull the patella toward the trochlear groove. Care should be taken to not over tighten the soft tissues as it can lead to luxation of the patella toward the imbrication. If the patella continues to luxate then consider quadriceps tie down or scar tissue pulling the patella out of the trochlear groove as well as femoral and tibial angulation. .

References available upon request.