

MEDIAL PATELLAR LUXATION

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Etiopathogenesis

The patella is an ossification in the tendon of insertion of the quadriceps femoris muscle. It normally acts as a pulley through the trochlear groove created between the trochlear ridges at the cranial aspect of the femur. Proper alignment of the patellar apparatus is mandatory, as improper alignment due to patellar luxation can result in angular, torsional, and other skeletal deformities and associated lameness. It has been proposed that medial patellar luxation increases stress on the cranial cruciate ligament and thereby increases risk of cranial cruciate ligament rupture. However, at least one study has shown that dogs with medial patellar luxation are not at increased risk for cranial cruciate ligament rupture compared to normal control patients. On the other hand, cranial cruciate ligament rupture and the resulting internal rotation of the stifle are associated with exacerbation of medial patellar luxation.

Patellar luxation is not typically a congenital disease. Instead, it is a developmental disorder associated with abnormalities that are congenital in origin. These skeletal abnormalities include coxa vara, relative retroversion, femoral varus, genu varum, shallow trochlear groove, decreased height of the trochlear ridges, and medialization of the tibial tuberosity.

Patellar luxation is considered a heritable disease process. Therefore, breeding severely affected patients should be avoided.

Types of patellar luxation

Medial patellar luxation is much more common than is lateral patellar luxation in small breed dogs (98% of small breed dogs with patellar luxation have medial patellar luxation). In medium, large, and giant breed dogs with patellar luxation, 81%, 83%, and 67% (respectively) have medial patellar luxation. Lateral patellar luxation is seen more in large breed dogs than small breed dogs, but is still less common than medial patellar luxation. Bilateral patellar luxation is common in patients with patellar luxation, and is seen in about 50-65% of patients with patellar luxation.

Physical examination

Medial patellar luxation is graded on a scale of 1-4

Grade 1: no lameness, can luxate in extension but then will return to normal position spontaneously and immediately, "IN:IN"

Grade 2: intermittent lameness associated with luxation, lameness typically will resolve with reduction of luxation, skipping lameness, "IN:OUT"

Grade 3: mild, moderate, to severe lameness seen, typically continuous luxation present at a walk that can still be reduced into the trochlear groove with pressure but will then spontaneously re-luxate, "OUT:IN"

Grade 4: severe lameness, permanent luxation that cannot be reduced due to scar tissue and fibrosis in the region of the patella, "OUT:OUT"

Locating the patella - follow the patellar ligament proximally to identify the location of the patella.

Joint effusion is more typically seen with cranial cruciate ligament rupture than with medial patellar luxation, though this is not a rule. Examination for stifle instability should always be performed concurrently with evaluation of patellar position.

Surgical decision making

Surgery is recommended in patients with lameness that is non-responsive to medical treatment (ie. NSAIDs, rest, or tramadol), with either recurrent episodes of lameness over a short period or persistent lameness for 3 weeks or more. Patients with grade 3 and grade 4 patellar luxations usually require surgery, as do patients with grade 2 patellar luxations that have non-resolving lameness.

Treatment options

Goal - anatomically realign the patellar mechanism, release any constraining tissue, and prevent relaxation.

Cases treated with tibial tuberosity transposition and trochleoplasty techniques have decreased complication and relaxation rates. Therefore I typically recommend tibial tuberosity transposition, trochleoplasty, medial desmotomy, and lateral imbrication with ancillary techniques if necessary.

Trochleoplasty options - sulcoplasty, wedge trochlear recession, block trochlear recession, chondroplasty. Block trochlear recession seems to be both more stable and associated with decreased arthritis.

Tibial tuberosity transposition with tension band wire. I recommend placing two Kirschner wires either axial to one another or proximodistal to one another in small patients. The transposed segment should be large enough to accommodate these implants without a risk of tuberosity fracture. An estimate for the size of the segment is at least 50% of the distance from the point of the tuberosity to the cranial aspect of the tibial plateau as identified on a lateral radiograph.

Soft tissue reconstruction including medial desmotomy and lateral retinacular imbrication (using modified Mayo mattress interrupted monofilament absorbable sutures - "vest-over-pants")

Ancillary options include:

- lateral fabellar suture - externally rotates the tibia to aid in realignment of the patellar mechanism
- fibular head transposition - externally rotates the tibia to aid in realignment of the patellar mechanism
- distal femoral osteotomy - reserved for patients for femoral angular or torsional deformities that the previous methods of treatment cannot address completely and maintain patellar reduction
- tibial tuberosity transposition and advancement (TTTA) for large breed dogs with concurrent patellar luxation and cranial cruciate ligament rupture

Postoperative management

- bandage management at the surgeon's discretion from 1-3 days postoperatively
- strict exercise restriction for 6-8 weeks until osteotomy has healed
- recheck radiographs at 6-8 weeks to document tibial tuberosity transposition (or distal femoral osteotomy) healing
- transition to normal activity once healed

Prognosis

Good to excellent in grade 2 to grade 3 patients

Fair to good in grade 4 patients

Grave to poor in patients that have had severe bony deformities, osteoarthritis, cartilage loss, muscle atrophy, and rotational deformity of the stifle.

Complications

The more significant complications include delayed union of osteotomies, infection, relaxation, and osteoarthritis. Complication rates are higher in patients over 20kg. The literature quotes an 18% complication rate with 13% requiring revision surgery and relaxation rate of 8%. Distal femoral osteotomy is associated with very low complication rates and no relaxations in one study.

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