



Patella Luxation in Dogs: A Comprehensive Approach

Puli Vishnu Vardhan Reddy*, Rajat Sagare¹,

*Ph.D. Scholar, Department of Veterinary Surgery and Radiology, Madras Veterinary College, TANUVAS

¹Ph.D. Scholar, Department of Veterinary Clinical Medicine, Madras Veterinary College, TANUVAS

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Abstract

Patella luxation is a prevalent orthopedic condition affecting dogs, characterized by the displacement of the patella from its normal position within the trochlear groove, either medially or laterally. Medial luxation is more commonly observed in small and toy breeds such as Chihuahuas, Pomeranians, Yorkshire Terriers, Maltese, Pekingese, Shih Tzus, and Miniature Poodles. Conversely, lateral luxation tends to occur less frequently and is typically seen in larger or giant breed dogs. Both genetic predispositions and acquired factors like quadriceps malalignment and angular deformities of the femur and tibia contribute to the condition, with additional predisposing factors such as hip dysplasia. Treatment approaches vary, ranging from conservative management strategies like range of motion exercises and the administration of joint supplements to surgical interventions. Surgical options encompass soft tissue reconstruction techniques such as imbrications and anti-rotational sutures, as well as corrective procedures addressing bone deformities, such as trochlear block resection, tibial tuberosity transposition, and corrective osteotomies.

Keywords: Patellar luxation, toy breeds, imbrications, trochlear block resection

Patella luxation, or "luxating patella," is a common orthopedic condition seen in dogs. The patella, or kneecap, is a small bone located in front of the knee joint. In a normal knee, the patella moves up and down in a groove at the end of the femur (thigh bone) during leg movement. However, in dogs with patella luxation, the patella slips out of its groove, causing discomfort and potentially affecting mobility.

Luxation of the patella can occur in: medial, lateral, or bidirectional. Among these, the most common is medial luxation, typically found in small breed dogs. Lateral luxation is less common and is often seen in large or giant breed dogs. Females are more predisposed to develop this disease than males. The neuter status appears to be a significant risk factor, with neutered dogs exhibiting approximately three times higher odds of developing patellar luxation.

Patella luxation in dogs can have both genetic and acquired causes. Here are some of the primary factors contributing to patella luxation:



1. **Genetics:** Patella luxation has a strong hereditary component, and certain breeds are predisposed to the condition. These include small and toy breeds such as Chihuahuas, Pomeranians, Yorkshire Terriers, Maltese, Pekingese, Shih Tzus, and Miniature Poodles. In these breeds, patella luxation is often an inherited trait, passed down from generation to generation.
2. **Anatomy:** Abnormalities in the skeletal structure and conformation of the knee joint can predispose a dog to patella luxation. This includes shallow femoral grooves (the groove where the patella should track) or abnormalities in the alignment of the femur and tibia.
3. **Muscle Weakness or Imbalance:** Weak or imbalanced muscles surrounding the knee joint particularly malalignment of the quadriceps mechanism, can contribute to patella luxation. When the muscles are not adequately supporting the knee, the patella may be more prone to slipping out of place.
4. **Trauma:** In some cases, traumatic injury to the knee joint can cause damage to the structures that support the patella, leading to luxation. This might occur due to falls, collisions, or other accidents.
5. **Obesity:** Excess body weight can put increased strain on the joints, including the knee joint. Over time, this can contribute to structural changes and instability that predispose a dog to patella luxation.
6. **Age-related Changes:** As dogs age, they may develop degenerative changes in their joints, including the knee joint. These changes can affect the stability of the patella and increase the risk of luxation.
7. **Other Orthopedic Conditions:** Dogs with certain orthopedic conditions, such as hip dysplasia or cranial cruciate ligament (CCL) injuries, may also be at increased risk of developing patella luxation.

There are several degrees of patella luxation, ranging from mild to severe:

Grade I: The patella can be manually luxated but returns to its normal position when released.

Grade II: The patella can spontaneously luxate out of its groove with activity, but it returns to its normal position on its own.

Grade III: The patella remains luxated most of the time but can be manually repositioned into its groove.

Grade IV: The patella is permanently luxated and cannot be manually repositioned.

Signs and symptoms:

Vary depending on the severity of the condition but may include:

Intermittent or persistent limping

Skipping or hopping on one hind leg

Holding the affected leg up while running or walking



Reluctance to put weight on the affected leg

Swelling or thickening around the knee joint

Pain or discomfort, especially when the patella is luxated

Bilateral medial luxation can determine abnormal, “crouched” gait rather than lameness, leg constantly semi flexed and internally rotated, as well varus deformity of the stifle.

Diagnosis:

Thorough physical examination is essential to determine the severity of luxation and to exclude any other conditions that may be causing hindlimb lameness.

Imaging:

Radiography: The lateral projection enables evaluation of the proper alignment of the patella within the trochlear groove. The craniocaudal projection enables the identification of the patella's position relative to the distal aspect of the femur, as well as the assessment of any varus or valgus deformities. The skyline (tangential) view is used to assess the depth of the trochlear groove and the integrity of the trochlear ridge.

Treatment:

Treatment options for patellar luxation in dogs depend on the severity of the condition, the dog's age, size, breed, overall health, and any concurrent orthopedic issues. Here are some common treatment options:

Conservative Management: In mild cases or when surgery is not feasible, conservative management may be recommended. This typically involves:

1. **Weight management:** Maintaining a healthy weight helps reduce stress on the joints.
2. **Exercise modification:** Low-impact exercises can help strengthen muscles without exacerbating the condition.
3. **Physical therapy:** Modalities such as therapeutic exercises, massage, and hydrotherapy can improve muscle strength, joint flexibility, and overall mobility.
4. **Joint supplements:** Supplements containing glucosamine, chondroitin sulfate, omega-3 fatty acids, and antioxidants may help support joint health and reduce inflammation.
5. **Surgical intervention:** Surgery may be recommended for dogs with severe or recurrent patella luxation. Surgical procedures aim to realign the patella and deepen the groove in which it sits, thereby stabilizing the knee joint. The specific surgical technique used will depend on factors such as the dog's size, the severity of the luxation, and the presence of any concurrent orthopedic issues.



I. Soft tissues techniques

Soft tissue procedures include medial desmotomy, lateral imbrication, antirotational sutures, and release of medial musculature

II. Common surgical techniques include

- Trochlear wedge recession (TWR): This procedure involves deepening the trochlear groove to better accommodate the patella.
- Tibial tuberosity transposition (TTT): In this procedure, the tibial tuberosity (the bony prominence where the patellar ligament attaches) is repositioned to realign the forces acting on the patella.
- Corrective osteotomies: Corrective osteotomies of the distal femur and proximal tibia may be performed if there is significant femoral and/or tibial malalignment.

Conclusion

Patella luxation in dogs requires a comprehensive approach encompassing accurate diagnosis, tailored treatment strategies, and diligent postoperative care.