



Chihuahua

Update

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When Knees Get Tricky: Treating Luxated Patellas

Owners and breeders of Chihuahuas may relate well to the following scenario: a Chihuahua puppy, full of youthful energy, is scampering around its owner's back yard. Suddenly, the little Chi yelps, halts in mid-stride, and lifts its right hind leg off the ground as though it is preparing to urinate. However, the dog doesn't anoint the ground; instead it performs a kind of bunny hop for several steps. After a few minutes, the dog drops the lifted leg back to the ground and resumes its backyard frolicking.

A few days later, a similar incidence occurs. Naturally, the concerned owner wonders what's going on, and takes the Chihuahua to a veterinarian.

The veterinarian examines the Chihuahua's affected leg, and compares that leg to the other hind limb. He observes the Chi walking, trotting or running, and examines the range of motion in the affected leg. While performing the latter examination, he and the owner hear a popping sound. The pop confirms the veterinarian's suspicions: the Chihuahua has a luxated patella.

Understanding Patellar Luxation

A luxated patella is a condition in which the kneecap pops or slides out of place. Instead of gliding within the natural groove in the upper bone of the knee joint (the femur), it becomes displaced either to the inside or the outside of the joint. The displacement, or luxation, can be temporary or permanent, and it can be partial or complete.

In most cases involving Chihuahuas, the luxated patella is more likely to become displaced on the inner side

of the knee joint rather than the outer side. This inside displacement is called medial patella luxation, or MPL.

Although MPL can result from trauma, it's much more likely to occur as a result of a genetic predisposition — and, in such cases, will often show up within the first year of a Chihuahua's life. The condition is prevalent not only among Chihuahuas, but also among other Toy or small-sized dogs. What is not clear is why these dogs are prone to patellar luxations.

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"Owners of small dogs are often told that this condition results from the 'dwarfing' of a regular-sized dog into a smaller-sized dog to create a Toy breed," says Cynda Seibert, a member of the health committee of the Chihuahua Club of America (CCA). "For example, a Pomeranian is considered a diminution of a Spitz. But Chihuahuas are naturally small, so the 'dwarfing' theory can't apply to them."

However, when it comes to knee problems, even *naturally* small is not necessarily normal, says Denis Marcellin-Little, D.E.D.V., associate professor of

orthopedic surgery at North Carolina State University's College of Veterinary Medicine. "You don't see wolves the size of the Chihuahua," Marcellin-Little points out. "Luxation may be a normal consequence of the miniaturization of the legs."

And the problem isn't really in the knees, according to Kurt Schulz, D.V.M., DACVS, associate professor of surgical and radiological sciences at the University of California-Davis School of Veterinary Medicine. "The origin of patellar luxation is not in the [knee] joint primarily but in the long bones on either side of the joint," Schulz explains. "Breeding small dogs results in a higher incidence of torsion and bending of the tibia than in large dogs. Why this occurs, we are not certain."

Although experts believe that the condition is genetic in origin, "the genetic mechanisms are not very simple," says Marcellin-Little. "The genes have a much more subtle influence [on luxation] than those that are involved with other [health] conditions."

That's because there are many different reasons why Chihuahuas' kneecaps pop out of place. One Chi's knee may have a groove that's too shallow for the kneecap to stay in place. Another may have ligaments

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Another Kind of Luxation

Although medial patellar luxation (MPL) is one of the most common knee ailments in dogs — especially Chihuahuas — it's not the only trick that knees can play. Another form of the condition is lateral patellar luxation (LPL). This occurs when the kneecap pops out of place and moves to the outside of the knee joint.

LPL occurs less frequently than MPL, but its occurrence may be more widespread. While MPL generally affects only Chihuahuas and other small breeds, LPL affects both very small and very large breeds such as Great Danes and Irish Wolfhounds.

Large breeds affected by this condition tend to be affected in both knees, and show signs of the condition when young. By contrast, a Chihuahua or other small dog is not likely to show signs of LPL until later in life.

Indications and treatment of LPL are similar to those for MPL. ■

| Grading a Luxated Patella | |
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| Grade | Characteristics |
| 1 | The patella is usually in a normal position but can be pushed out of place. Once out of place (luxated), it promptly pops back to the normal position. |
| 2 | The patella can be in either a normal or luxated position. If luxated, it can be placed into a normal position and will stay there. If in a normal position, it can be manually luxated and will remain in that position. |
| 3 | The patella is usually in a luxated position. Although it can be placed manually into a normal position, it will promptly pop back into the luxated position. |
| 4 | The patella is always in a luxated position and can't be manually pushed back into a normal position. |

Information based on criteria established by the Orthopedic Foundation for Animals.

Luxated Patellas

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that are too tight to allow for sufficient flexibility. Other factors that affect patellar luxation include the time it takes for a dog's legs to grow to maturity, and the time it takes for cartilage to mineralize. All of these structures and processes are affected, at least to some extent, by genetics.

Treating Patellar Luxation

The treatment of a Chihuahua's luxated patella depends on two factors: the severity and the precise cause of the condition.

Veterinary orthopedists grade an animal's luxation according to severity. A grade of 1 is the least severe. In such cases, the knee generally is in the correct position but can be pushed out of place; however, the knee will immediately return to the correct position. A grade of 4 indicates that the knee is always out of position and cannot be popped back manually.

Dogs with Grade 1 luxations may respond to medical management: restricted exercise, non-steroidal, anti-inflammatory medications, and conscientious monitoring. In more severe cases, however, surgery may be needed to return the kneecap to its proper position and correct the anatomical abnormality that prompted the luxation in the first place. However, because patellar luxations can result from a variety of causes, "there are many opinions about the best way to treat patellar luxations, and these vary with the surgeon and the severity of the condition," Schulz says.

A new, high-tech method could eventually result in more effective treatment of patellar luxations regardless of the cause. The technique, called rapid prototyping, uses computer images to develop models of body

parts. Veterinary surgeons could then practice on the models before operating on the animals. For a Chihuahua with a luxated patella, rapid prototyping could result in faster, more customized and less traumatic surgical treatment than conventional surgery.

Marcellin-Little is hoping to use the technique to investigate the mechanism of cranial cruciate ligament ruptures in dogs. These ruptures, which correspond to anterior cruciate ligament ruptures in people, affect one out of five dogs with luxated patellas, he says.

According to Marcellin-Little, rapid prototyping could not only help individual Chihuahuas that suffer from patellar luxation, but could also help narrow the scope of research of the genetic roots of the condition. By developing models that enable scientists to study exactly how patellar luxation affects the knee and leg apparatus, geneticists can target their inquiries to genes that are known to affect various aspects of that apparatus.

Multiple Challenges

Unfortunately, surgical treatment for patellar luxation can be very expensive. According to the CCA's Cynda Seibert, standard surgical treatment for one luxated patella in a Chihuahua costs at least \$1,200. And currently, rapid prototyping is even more costly: when Denis Marcellin-Little used the technique to treat a German Shepherd Dog's hind leg cruciate ligament problem, the cost came to about \$6,000.

For those reasons, improved data and prevention of the condition are two important strategies in the fight against patellar luxation. Some experts advise against breeding dogs with this condition because of its strong genetic component. Others, however, are concerned that the condition is so common that removal

of all affected dogs from the gene pool is virtually impossible.

Unfortunately, "we really don't know how prevalent this condition is," says Seibert. And while a comprehensive survey could shed light on just how many Chihuahuas suffer from patellar luxation, mechanisms already in place are not widely uti-

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lized. For example, the Orthopedic Foundation for Animals (OFA) maintains a patellar luxation registry — but between October 2001 and October 2002, only four male Chis were registered.

Experts agree that much remains to be learned about patellar luxation, including a better understanding of genetics, the physiological causes and prevalence of the condition, and more effective ways to treat affected Chihuahuas. For that reason, the CCA has established a luxating patella research fund to which members may contribute. The hope is that such funds can be used to start research studies that will provide insights into this potentially crippling condition. ■