

Traumatic Patellar Luxation in Agility Dogs

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CAVU is a 1.5 year old, male Pumi who presented to VOSM for a left hind limb lameness that began five months prior when CAVU fell after jumping in agility practice. Immediately after the fall, CAVU was nonweight-bearing in the left hind limb, but his nonweight-bearing lameness improved to intermittent skipping after one month with rehabilitation therapy.

At presentation, CAVU was weight-bearing lame in the left hind limb at a walk and a trot (2-3 out of 6). CAVU would off load the left hind limb at a stance. Mild

stifle effusion was noted on palpation of the left stifle. A grade 2-3 medial patella luxation was noted in the left stifle. No cranial tibial thrust was noted in either stifle. The right patella could not be luxated. Both hips had normal range of motion, however, on left hip extension the patella would luxate. The left iliopsoas and piriformis were tight upon palpation. The remainder of the orthopedic examination was within normal limits.

GAIT4Dog® **objective gait analysis** revealed a mild decreased pressure and shortened stride and step length in the left hind limb (16.9%) when compared to the right (19.4%). Radiographs of the left stifle were performed, which revealed a medially off-set tibial tuberosity, shallow trochlear groove, and mild stifle effusion. See **Figure 1**.

Diagnostic ultrasound was recommended to further evaluate the lateral retinaculum and soft tissue structures of the left stifle. Diagnostic ultrasound revealed the lateral

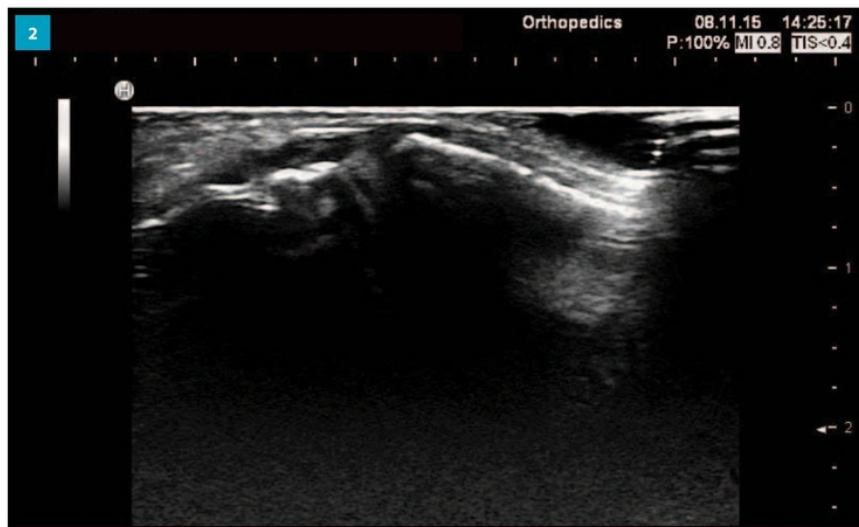


patellar retinaculum appeared irregular and showed increased thickness, fiber disruption and a generalized hypoechoic appearance, consistent with a grade 1-2 sprain of the left lateral patellar retinaculum. See **Figures 2 and 3.**

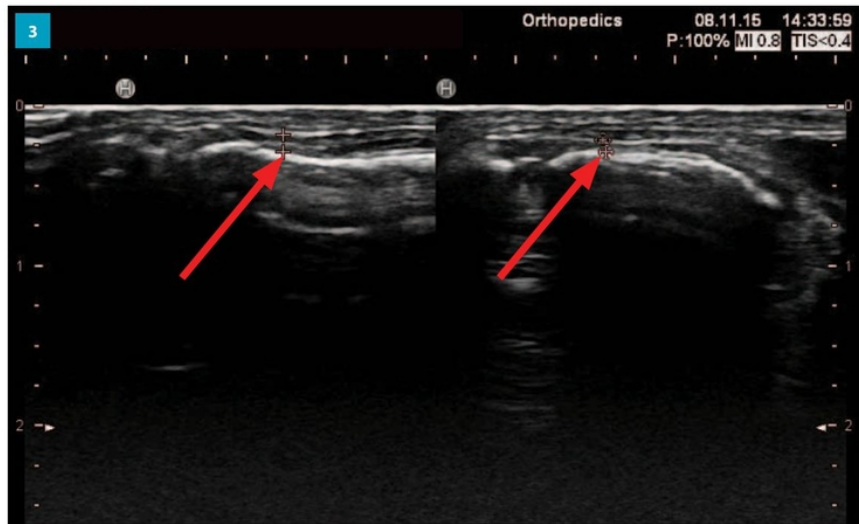
CAVU was diagnosed with a traumatic retinacular tear resulting in a medial patellar luxation. Surgical repair consisting of a retinacular repair, trochlear block recession, joint capsule imbrication, and tibial tuberosity transposition was recommended. In addition an ultrasound-guided injection of bone marrow derived stem cells and platelet rich plasma (PRP) was performed to further stimulate and encourage tissue healing.

Patellar Luxation in Dogs

Patellar luxation is one of the most common conditions affecting the stifle (knee) joint in dogs. The patella should glide nicely in the trochlear groove of the femur (thigh bone) with limb extension and flexion. If there is abnormal patellar tracking and the patella is dislocated out of its normal position, this is referred to as patellar luxation. Patellar luxation has been recognized in both small and large breed dogs. While patellar luxation is believed to most commonly have a developmental or congenital etiology, traumatic patellar luxation can be seen in both performance and companion dogs. In such cases, a significant force is sustained to the retinacular structures, particularly on the lateral side of the stifle joint. The retinacular structures provide passive restraint to the patella (knee cap) on either side of the stifle. If either of these structures is injured, the patella may track abnormally and luxate.



Diagnostic ultrasound revealed the lateral patellar retinaculum appeared irregular and showed increased thickness, fiber disruption and a generalized hypoechoic appearance, consistent with a grade 1-2 sprain of the left lateral patellar retinaculum.



Diagnostic ultrasound of the left lateral patellar retinaculum (left side) compared to the normal right lateral patellar retinaculum (right side), demonstrating an increased thickness and fiber disruption of the left lateral patellar retinaculum.

Common clinical signs of patellar luxation are a weight-bearing to nonweight-bearing lameness in the affected limb. Dogs may also be noted to occasionally skip or kick the affected limb backwards. The diagnosis is usually made on a combination of physical examination findings, radiographic findings, and diagnostic ultrasound findings.

On physical examination, the patella may be found initially within the trochlear groove and felt dislocating on range of motion of the knee or in severe cases may even be found dislocated. Your veterinarian should perform a complete orthopedic evaluation to rule out other orthopedic abnormalities or injuries that can be seen concurrently with patellar luxation, such as a cranial cruciate ligament (CCL) injury. After the examination the grade of luxation is determined on a scale of 1 to 4. A grade 1 patella luxation is classified as the patella being in the correct location; it can be luxated but pops back into place. This is different from a grade 2 patella luxation where the patella is in the correct location, but once

luxated will not easily pop back into place. With grade 3 and 4 luxations, the patella is always in a luxated position, while with a grade 3 the patella can be reduced and with a grade 4 the patella cannot be reduced.

Radiographs are performed to determine the location of the patella and if there are any underlying arthritis or bony abnormalities. A diagnostic ultrasound of the stifle is needed to evaluate the soft tissue structures of the stifle, particularly the medial and lateral retinaculum, which are often sprained or torn in traumatic patellar luxation. The grade of the injury can be determined using diagnostic ultrasound.

Treatment for Patellar Luxation

Depending on the grade of patellar luxation, the grade of the retinacular injury determined on diagnostic ultrasound, and if there are any concurrent injuries or anatomical abnormalities that may have predisposed the patient to patellar luxation, surgical repair and/or regenerative medicine may be indicated. Surgical repair often consists of a retinacular repair as well as procedures to ensure proper tracking of the patella.

Additionally, regenerative medicine may be recommended to further encourage the tissues to heal appropriately. Regenerative medicine therapy at VOSM consists of platelet rich plasma (PRP) and/or stem cell therapy since recent studies suggest that PRP therapy and stem cell therapy have a synergistic effect when combined. Both PRP and stem cells have been shown to regenerate tissues, increase blood supply, and break down scar tissue formation, replacing it with regenerated tissue.

Stem cells are the body's progenitor cells from which all other cells are derived and can be obtained from numerous sources from a patient's own body (autologous adult-derived mesenchymal cells). The most common places to harvest adult-derived mesenchymal cells are either from the patient's bone marrow or adipose (fat) tissue. Both bone marrow-derived and adipose-derived stem cells have the abil-



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