What Is Your Diagnosis?

History

A 5-month-old sexually intact male mixed-breed dog was referred for evaluation of a non-weight-bearing lameness in the right hind limb. The lameness had been evident since the dog was acquired when it was approximately 2 months old. Administration of NSAIDs did not improve the lameness.

In addition to the lameness, severely limited range of motion was also detected in the right stifle joint during examination. Signs of pain were not elicited during palpation of any portion of the right hind limb; however, there was a noticeable cranial protrusion proximal to the right patella, and soft tissue swelling surrounded the right stifle joint. Caudocranial and lateral radiographic views of the right femur were obtained (Figure 1).

Determine whether additional imaging studies are required, or make your diagnosis from Figure 1—then turn the page →

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Radiographic Findings and Interpretation

A malunion of the distal physeal and metaphyseal regions of the right femur with caudoproximal displacement of the distal fracture segment is evident. A large amount of solid, smoothly marginated, periosteal new bone surrounds the distal portion of the femur. Also evident are moderate soft tissue swelling surrounding the right stifle joint and mild effusion within the joint.

Comments

Given the age of the dog and location of the malunion, an unrepaired Salter-Harris type II fracture of the distal portion of the femur was suspected. Distal femoral physeal fractures account for 37% of all physeal fractures that occur in skeletally immature dogs. Type II Salter-Harris fractures involving the physis and metaphysis most commonly occur in the distal portion of the femur of dogs <25 weeks old, although there are some breed-related variabilities.

Craniodistal ostectomy of the remodeled, protruding portion of the distal femoral diaphysis was performed. The ostectomy allowed greater range of motion in the right stifle joint by removing the bone that prevented movement of the patella during flexion and extension. Abrasion trochleoplasty was performed proximal to the natural trochlear groove to facilitate motion of the patella without predisposing it to luxation (Figure 2). Corrective osteotomy with restoration of the length of the femur was another surgical option, but it was not pursued because of the chronicity and concerns about contracture of the quadriceps muscles.

Passive range of motion was greatly improved immediately after surgery; however, the dog was still not bearing weight on the right hind limb. Physical rehabilitation was initiated 4 days after surgery and included stretching exercises, application of heat, and massage. Once the sutures were removed, biweekly use of an underwater treadmill and slow walks on an incline surface were added to the regimen. The dog began touching its right hind toes to the ground 2 weeks after surgery. Exercise amount and duration were increased to include daily swimming, walks on a slow steep incline, and use of cavaletti rails, in addition to the initially prescribed range of motion exercises. Five weeks after surgery, the dog was consistently and correctly placing weight on the right hind limb while walking.

Approximately 1.5 years after surgery, follow-up radiography (Figure 3) revealed bony remodeling with proliferative new bone along the lateral aspect of the condyle of the right femur and formation of osteophytes and enthesiophytes along the patella. Effusion and degenerative changes within the stifle joint were also evident. At the time of the follow-up radiography, the dog used the limb well at a walk and run. Minimal lameness was evident, and there was no apparent discomfort during manipulation to assess range of motion of the stifle joint.