Use of arthroscopy for debridement of the elbow joint in cats

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- Arthroscopic evaluation and debridement of the elbow joint may be successfully used to access and treat intra-articular osteochondral fragments in a cat.
- Lameness in cats may be associated with osteoarthritis of the elbow joint without a known cause.

An 8-year-old 3.3-kg (7.3-lb) neutered male Persian cat was referred because of lameness in the left forelimb. The cat was housed indoors. The cat had jumped from the second floor of the house to the ground 6 years earlier; however, according to the owner, clinical signs of lameness were not observed at that time. Lameness developed 2 months prior to evaluation by the referring veterinarian without any notable cause. Mild improvement in lameness was seen after the cat's activity was restricted for 7 weeks; however, lameness recurred after the cat returned to normal activity.

Mild lameness of the left forelimb was detected on physical examination. Mild signs of pain and crepitation were detected on palpation of both elbow joints. Swelling or thickening of the elbow joints was not detected. Hyperflexion and hyperextension of the both elbow joints exacerbated the lameness.

Radiographs of both elbow joints were obtained. Radiography revealed multiple well-defined periarticular osteophytes in both joints (**Figure 1**). Extra-articular mineralized opacities were also evident. Radiographic findings were similar in both elbow joints but were slightly more severe in the right forelimb. The radiographic diagnosis was chronic, bilateral, nondestructive polyarthritis of unknown cause.

Computed tomography (CT) of both elbow joints revealed mild blunting of the **medial coronoid processes (MCPs)**; however, fragmentation of the medial coronoid processes was not evident. Periarticular osteophyte production was mild. Congruity of the articular surfaces was difficult to assess because of the small size of the cat and the CT images obtained. On the basis of the CT results, mild, degenerative joint disease of both elbow joints was diagnosed.

Arthroscopy of both elbow joints was performed by use of a 1.9-mm, 30° fore oblique arthroscope with a 2.2-mm cannula. The cat was premedicated with oxymorphone (0.05 mg/kg [0.023 mg/lb], IM) and atropine (0.018 mg/kg [0.008 mg/lb], IM). An IV catheter was placed in the right femoral vein, and anesthesia was induced with propofol (6 mg/kg [2.7 mg/lb], IV). After the trachea was intubated, anesthesia was maintained with isoflurane (2.5%) via inhalation. The cat received cefazolin (30 mg/kg [13.6 mg/lb], IV, once) and was positioned in lateral recumbency with the operated limb down. A medial scope portal was used as previously described in dogs.[1,2]

Arthroscopic evaluation of the anconeal process, trochlear notch, medial humeral condyle, radial head, MCP, and synovium in both elbow joints was performed. Two free-floating fragments were detected in the left elbow joint; 1 fragment was in the region of the MCP (**Figure 2**). A third fragment was detected adjacent to the anconeal process. In the left elbow joint, full-thickness cartilage erosion (cartilage injury grade 3 to 4)[3] was detected on the humeral trochlea opposite the MCP. A bony defect of the MCP was seen; this defect was believed to have been the source of the osteochondral fragments.

In the right elbow joint, the cartilage on the caudal portion of the humeral trochlea adjacent to the trochlear notch had a grade 3 injury (**Figure 3**). A large free-floating fragment and a small fragment that was attached to the synovium adjacent to the MCP were removed. A bony defect of the MCP was detected after removal of the adjacent fragments.

After removal of all osteochondral fragments in both elbow joints, the edges of the defects on the MCPs were debrided and subchondral abrasion was performed by use of a small joint shaver with a 2.5-mm full-radius blade. The periarticular osteophytes previ-

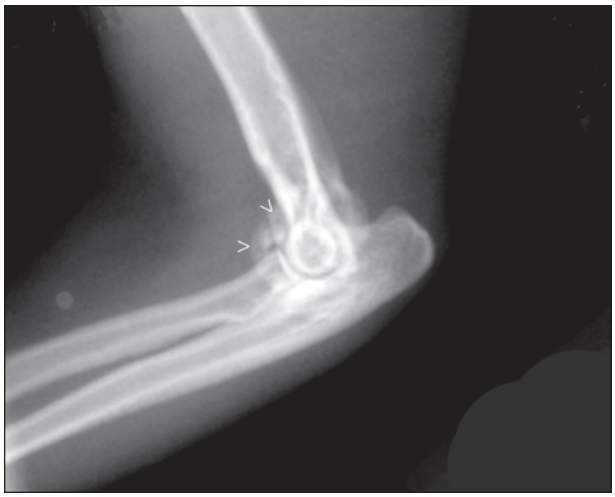

Figure 1—Mediolateral radiographic view of the right elbow joint of a cat. Notice multiple periarticular osteophytes (arrowheads).

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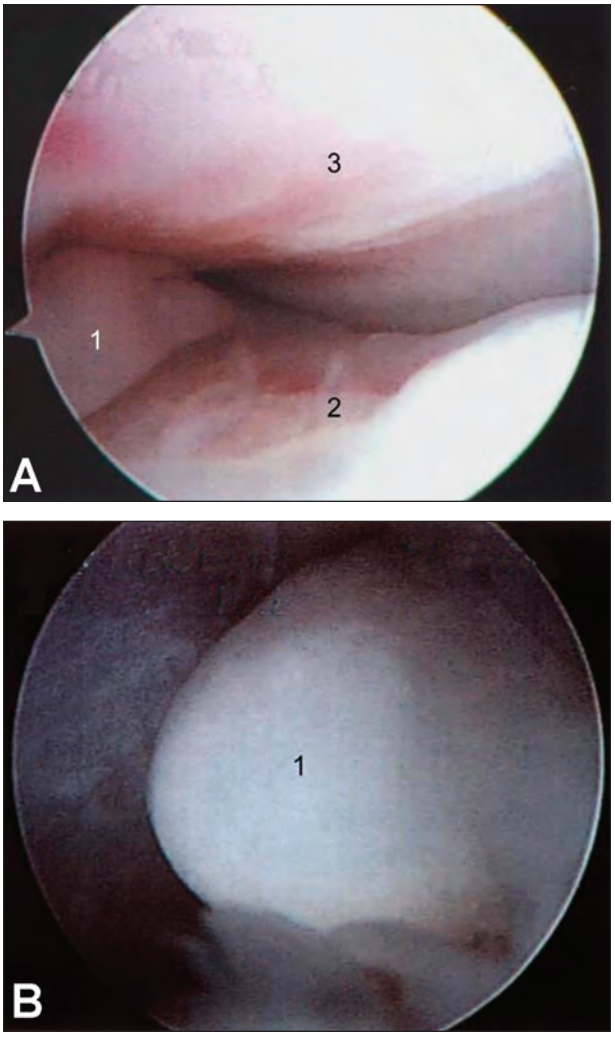

Figure 2—Arthroscopic view of the left elbow joint of the cat in Figure 1. A—A free-floating osteochondral fragment (1) can be seen between the medial coronoid process of the ulna (2) and the humeral trochlea (3). B—Isolated view of the osteochondral fragment (1) adjacent to the anconeal process.

ously identified on the radiographs were not visible arthroscopically.

Histologic evaluation of the fragments of both joints revealed degenerated articular cartilage, subchondral bone, and synovium. Multiple small proliferative clones and nests of chondrocytic cells surrounding areas of scalloping and microfracturing were detected on the surface of the articular cartilage. Moderate to marked erosive and proliferative degenerative articular chondropathy was diagnosed. Given the cat's history and location of the fragments, a fragmented coronoid process was suspected.

The cat quickly recovered from surgery. After surgery, the cat received cefazolin (30 mg/kg, IV, q 12 h) and oxymorphone (0.025 mg/kg [0.011 mg/lb], IM, once) and a 2.5-mg transdermal fentanyl patch (25 µg/h) was placed. Full range of motion of both elbow joints and full weight bearing were observed on the day after surgery, and the cat was discharged. The owners were instructed to give cefadroxil (30 mg/kg, PO, q 12 h for 5 days) and butorphanol (1.5 mg/kg [0.68 mg/lb], PO, q 8 h for 4 days). Restricted exercise was recommended for 2 weeks. Twelve days later, the owner reported that the cat was bearing full weight without any apparent lameness and the cat's agility had improved. Two years after surgery, the cat was evaluated for an unrelated problem. Lameness was not detected at that time, and the cat had a normal stance. Range of motion of both elbow joints and weight bearing on both forelimbs were also normal. Obvious progression of osteoarthritis that was seen on the initial radiographs was not detected radiographically 2 years after surgery (**Figure 4**). The appearance of the periarticular osteophytes previously identified had not changed appreciably.

As in dogs, the elbow joint in cats is composed of 3 articulations: the humeroradial, humeroulnar, and proximal radioulnar joint.[4] Although the anatomy of the elbow joint in cats is similar to that in dogs, there are some notable differences. The condylus humeri of cats are similar to that in dogs, having a lateral capitu-

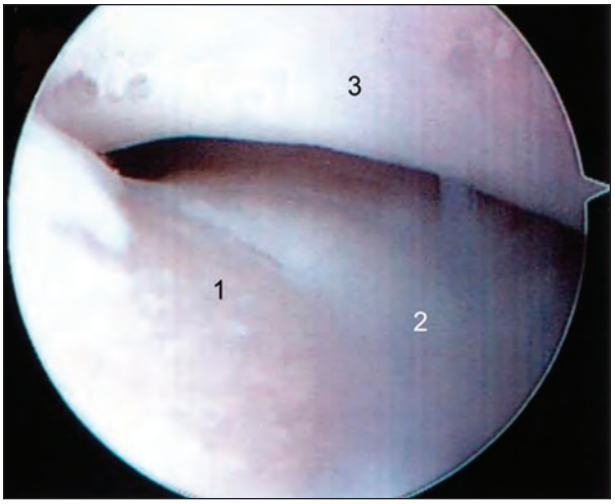

Figure 3—Arthroscopic view of the right elbow joint of the cat in Figure 1. Grade 3 cartilage injury (1) on the caudal portion of the humeral trochlea (2) adjacent to the trochlear notch (3) is evident.

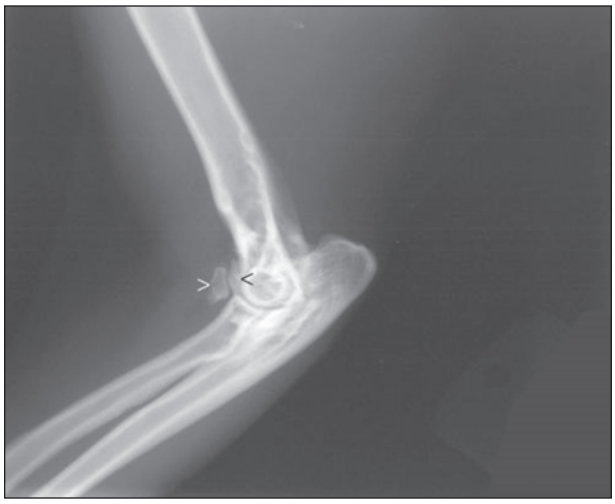

Figure 4—Mediolateral radiographic view of the right elbow joint of the cat in Figure 1 obtained 2 years after surgery. Notice the periarticular osteophytes at the cranial aspect of the joint (arrowheads) have not changed appreciably.

lum humeri and a medial trochlea humeri, but it is rotated medially at a 15° angle around the long humeral axis in cats.[5] In cats, the shape of the trochlea humeri is conical with the larger diameter medially and the smaller one axially. Amongst others, these main characteristics lead to inevitable medial movement of the radius and ulna during flexion of the elbow joints in cats.[5] In addition, the MCP in cats is proportionally larger than the MCP in dogs.[5]

Arthroscopy in dogs was first reported in 1978,[6] and there has been an increasing level of interest in and a rapid development of this procedure since that time.[7] The technique permits direct observation and a magnified view of tissues, reduces surgical time, and minimizes soft tissue trauma.[7] Arthroscopy also permits a more thorough evaluation of the anatomic structures of any articulation, compared with arthrotomy performed by use of a minimally invasive technique.

Arthroscopy is a more sensitive indicator of osteoarthritis than radiographic techniques[8] and is the preferred method for removal of osteochondral fragments associated with dysplasia of the elbow joint.[1] Arthroscopic assessment of the elbow joint provides the surgeon with the ability to clearly define the extent of the pathologic lesions before proceeding with definitive treatment.[9] Additionally, bilateral lesions can be treated arthroscopically during a single surgical procedure with minimal complications after surgery.

Arthroscopy has rarely been performed in cats, and to the authors' knowledge, use of arthroscopy for evaluation of the feline elbow joint has not been reported. In the cat of this report, arthroscopy was useful for evaluation of both elbow joints, removal of loose osteochondral fragments, and debridement of the defects in the articular planes.

Although the specific underlying cause is controversial, **fragmented medial coronoid process (FMCP)** most commonly develops in fast-growing, large- and giant-breed dogs 4 to 7 months old.[10–14] Onset of lameness usually develops early but may go undetected until clinical lameness appears later in life.[15]

To the authors' knowledge, FMCP has not been described in cats; therefore, it can only be considered as a possible cause of the osteoarthritis of both elbow joints and osteochondral fragmentation detected in this cat. Trauma must also be considered as a possible cause of the clinical signs and diagnostic findings in this cat. The cat was involved in a traumatic incident at 2 years of age; however, lameness was not detected at that time, and the cause of the onset of lameness 6 years later was not known.

In dogs, the prognosis after treatment of FMCP varies and is controversial.[10,12,13,16-19] In the cat of this report, the response to treatment was good. However, the prognosis for other cats after arthroscopical treatment of similar findings is uncertain at this point.

The periarticular osteophytes found on the radiographs before and 2 years after surgery showed no change in appearance. They were not detected arthroscopically, and their clinical relevance is not known.

Osteoarthritis of the elbow joint in cats is a potential cause of forelimb lameness. The origin of this condition is poorly understood. Arthroscopic evaluation of the elbow joint would provide a more accurate assessment of the degree of cartilage damage and may be useful in determining the underlying cause of osteoarthritis of the elbow joint in cats. Whether the cause of the loose osteochondral fragments in this cat were caused by FMCP is uncertain; however, this condition should be considered in other cats with similar findings.

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