

# Evaluation of cartilage lesions on the medial femoral condyle as a cause of lameness in horses: 11 cases (1988–1994)

Robert K. Schneider, DVM, MS; Paul Jenson, DVM; Rustin M. Moore, DVM, PhD

**Objective**—To evaluate clinical findings and response to treatment in horses in which cartilage lesions on the medial femoral condyle were a cause of lameness.

**Design**—Retrospective case series.

**Sample Population**—Medical records of 11 horses that had cartilage lesions on the medial femoral condyle detected during arthroscopy of the stifle.

**Procedure**—Signalment, history, lameness examination, response to intra-articular anesthesia, radiographs of the stifle, observations during diagnostic arthroscopy, and treatment were extracted from the medical record of each horse. Follow-up examinations and outcome were available for all horses.

**Results**—All horses in the study had lameness, but their gait improved after intra-articular injection of anesthetic. Abnormalities were not observed on radiography of the stifle. Diagnostic arthroscopy was performed on 12 affected joints in 11 horses. Cartilage was dimpled, wrinkled, and infolded, and a blunt arthroscopic probe could be inserted into the subchondral bone. In addition to focal lesions, 4 horses had generalized damage to cartilage on the medial femoral condyle. Focal cartilage lesions on the femoral condyle were debrided. In 2 horses, debridement was not performed because of extensive generalized damage to the cartilage. Six of 7 horses with focal cartilage lesions treated by debridement recovered completely and resumed previous activities.

**Clinical Implications**—Cartilage lesions on the medial femoral condyle can cause lameness in performance horses. Diagnostic arthroscopy is necessary to make an accurate diagnosis. Debridement of focal cartilage lesions may allow some horses to successfully resume performance activities. (*J Am Vet Med Assoc* 1997;210:1649–1652)

Osteochondrosis lesions in the medial femoral condyle are well recognized as a cause of lameness in the stifle of horses.<sup>1-6</sup> Other recognized causes of lameness in the stifle include traumatic injuries such as ligament and meniscal tears and intra-articular fractures.<sup>7</sup> Cartilage damage on the medial femoral condyle can result secondary to joint injury and subsequent arthritis.<sup>4,8</sup> Lesions also can develop in cartilage of the contralateral stifle of horses in which subchondral cystic lesions in the medial femoral condyle have been treated

From the Department of Veterinary Clinical Sciences, College of Veterinary Medicine, Washington State University, Pullman, WA 99164 (Schneider, Jenson), and the Department of Veterinary Clinical Sciences, College of Veterinary Medicine, The Ohio State University, Columbus, OH 43210 (Moore). Dr. Moore's present address is Department of Clinical Sciences, School of Veterinary Medicine, Louisiana State University, Baton Rouge, LA 70803.

by use of arthroscopy.<sup>7</sup> To our knowledge, treatment and follow-up evaluation of horses with cartilage lesions on the medial femoral condyle have not been reported.

Horses with lameness localized to the stifle and in which radiography did not yield a diagnosis can be treated with rest or anti-inflammatory medications or they can undergo further diagnostic evaluation. Lack of radiographic changes localizes the cause of lameness to soft tissues of the femoropatellar or femorotibial joints, including ligaments, menisci, or cartilage.<sup>9</sup> The most accurate method for detecting articular cartilage lesions when subchondral osseous changes are lacking is arthroscopic evaluation of the joint.<sup>4</sup> The objectives of the study reported here were to describe clinical findings, surgical treatment, and outcome in 11 horses in which cartilage lesions on the medial femoral condyle were the primary abnormality observed in the stifle.

## Criteria for Selection of Cases

Medical records of 11 horses that had cartilage lesions on the medial femoral condyle that were detected during diagnostic arthroscopy of the stifle were used in the study. Information reviewed and extracted from medical records included signalment, use of the horse, affected limb, duration and severity of lameness, evidence of joint effusion, response to a hind limb flexion test, and response to intra-articular local anesthesia of the stifle. All horses had lameness that was determined to be localized to the stifle on the basis of observation of improvement in gait after intra-articular injection of anesthetic and results of a diagnostic arthroscopic procedure. Radiographs of the stifle and videotapes recorded during arthroscopic surgery were reviewed.

**Surgical procedure**—Arthroscopic surgery was performed on all horses. Joint compartments in the stifle region (femoropatellar joint and medial and lateral pouches of the femorotibial joint) were evaluated in each horse, using techniques that have been described previously.<sup>4,10</sup>

Antibiotics (potassium penicillin G, 22,000 U/kg [10,000 U/lb] of body weight, IV; gentamicin, 2 mg/kg [0.9 mg/lb], IV) were given prior to surgery. Horses were anesthetized and positioned in dorsal recumbency. The affected stifle was prepared for arthroscopic surgery. Joints were explored, using approaches described previously.<sup>10</sup> Femorotibial joint compartments were evaluated initially with the limb flexed 90°. Following evaluation of these joint pouches, the limb was extended and the femoropatellar articulation was evaluated. Areas of cartilage damage were observed on the

medial femoral condyle in each horse. Focal lesions were curetted, with the curettage extending deep into the subchondral bone. Defects always were enlarged to at least 1 cm in diameter. Cartilage and bone debris from curettage were lavaged from the joint. Closure of arthroscopic portals was performed in a routine manner.<sup>10</sup>

**Postoperative care**—Horses were given phenylbutazone (4 mg/kg [1.8 mg/lb], PO, q 24 h) for 7 to 10 days after surgery. Antibiotics (potassium penicillin G, 22,000 U/kg [10,000 U/lb], IV, q 6 h; gentamicin, 2 mg/kg [0.9 mg/lb], IV, q 8 h) were continued for 24 hours. Horses were confined to a stall for 30 days and then were placed in a small paddock (9.2 × 9.2 m) for another 60 days. Horses were not allowed to resume regular exercise for at least 6 months after surgery.

**Follow-up evaluation**—Follow-up information was obtained for all horses via telephone interviews of the owners, referring veterinarian, or trainer. Horses were considered to have a successful outcome when they became clinically normal or were able to attain their previous level of performance in their original intended use. Outcomes were considered unsuccessful when lameness persisted or returned during exercising.

## Results

Horses in the study comprised 4 Thoroughbreds, 3 Standardbreds, 2 Quarter Horses, 1 Dutch warmblood, and 1 Arabian. Three of the 11 horses were female. Horses ranged from 2 to 14 years old (mean, 5.5 years). The right stifle was affected in 4 horses, the left in 6 horses, and 1 horse had cartilage lesions in both stifles. Ten horses had a history of chronic lameness ( $\geq 3$  months) prior to arthroscopic evaluation of the joint (range, 3 to 12 months), but 1 horse had been lame for only 1 month prior to surgery. Only 2 horses had joint effusion that could be detected by palpation (both had generalized cartilage damage on the medial femoral condyle). All horses had an increase in lameness after the affected limb was flexed for 90 seconds, but gait improved after injection of anesthetic into the femoropatellar joint and medial and lateral pouches of the femorotibial joint. The injection resulted in an improvement, but did not eliminate lameness in each horse; the horse with bilateral lesions developed lameness in the contralateral hind limb and another horse became sound after intra-articular injection.

High-quality radiographs for all horses were available. The stifle was normal in all horses. One horse had a mild increase in bone density on the lateral femoral condyle that was evident on a caudocranial view. Other lesions were not observed by the authors or by board-certified radiologists who interpreted the radiographs.

Twelve joints in the 11 horses were affected. All horses had focal areas of damage to cartilage on the weight-bearing surface of the medial femoral condyle. Cartilage was dimpled, wrinkled, and infolded and was not firmly attached to the subchondral bone (Fig 1). Palpation of damaged cartilage with a blunt arthroscopic probe consistently revealed an area of loose cartilage through which the probe could be easily inserted into the subchondral bone. Fibrillation and exposure of



Figure 1—Photograph of a typical cartilage lesion on the medial femoral condyle, as viewed during arthroscopic examination. A blunt probe is inserted into the subchondral bone, and a cartilage fold is evident on top of the probe.

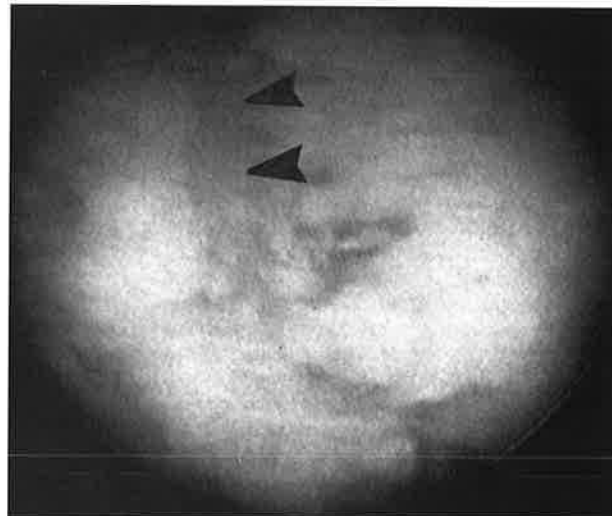


Figure 2—Arthroscopic view of generalized cartilage damage, including exposed subchondral bone (arrowheads), on the medial femoral condyle. Chondromalacia and fibrillation of the cartilage is evident over most of the femoral condyle.

subchondral bone were evident in some horses. Cartilage lesions were in the same location on the medial femoral condyle as the opening reported for horses with subchondral cystic lesions of the medial femoral condyle. Two horses had a second focal area of damage to cartilage on the medial femoral condyle. In addition to focal lesions, 4 horses had generalized damage to cartilage on the medial femoral condyle. This generalized damage consisted of multiple fissures and irregularities of the cartilage surface (Fig 2). An arthroscopic probe could be inserted into the fissures to varying depths; in some horses, the probe could be inserted all the way to the subchondral bone. Cartilage in these 4 horses was soft and less resilient than healthy articular

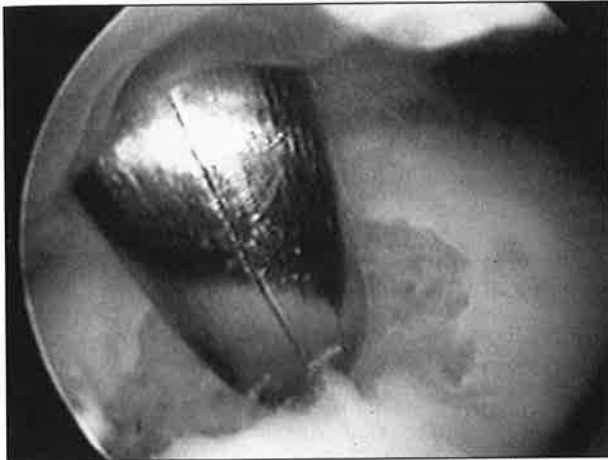


Figure 3—Arthroscopic view of a defect following curettage of a focal cartilage lesion on the medial femoral condyle. The end of a Ferris-Smith pituitary rongeur (4 X 10-mm cups) is inserted into the subchondral bone in the articular defect.

cartilage. Chondromalacia, fibrillation, and areas of exposed subchondral bone were evident in 2 horses with generalized damage. Both were racehorses that previously had raced after intra-articular injections of cortisone. Small focal abnormalities in the cartilage were found on the lateral femoral condyle in 2 horses. In all joints, ligaments that could be evaluated by arthroscopic examination were clinically normal.

Surgical treatment consisted of curettage and debridement of focal cartilage lesions. A focal cartilage lesion on the medial femoral condyle was debrided in 10 joints (Fig 3). In 3 of these joints, a second cartilage lesion also was debrided on the lateral femoral condyle, and in 2 other joints, a second cartilage lesion on the medial femoral condyle also was debrided. Areas of generalized damage to cartilage were left untreated. Surgical debridement was not performed in 2 horses because of extensive generalized damage to cartilage on the medial femoral condyle. These 2 horses were given a poor prognosis.

Follow-up information was available for all horses. Six of 7 horses that were treated for focal cartilage lesions recovered completely and resumed activities (successful racehorse, horse used in 3-day eventing, jumper, dressage horse, horse used in trail-riding competitions, and pleasure horse). A Standardbred racehorse that had intermittent lameness in the affected limb did not resume activities. Only 1 of the 4 horses with generalized damage to cartilage became clinically normal (show horse that was retired and used for pleasure riding). Two of the other 3 horses were Standardbred racehorses and 1 was a Quarter Horse used for ranch work. These horses were unable to resume their previous activities as a result of persistent lameness.

## Discussion

Cartilage lesions on the femoral condyle were identified as a cause of lameness in the horses of this report. Lameness in these horses was localized to the stifle, as determined by observing an improvement in gait after anesthetic was injected into the femoropatellar

and femorotibial joints. There may have been other problems in the femorotibial joints of these horses such as ligament injury or meniscal damage; however, other abnormalities were not detected on palpation of the joint or during radiography or arthroscopic evaluation, using a cranial approach. Movement of loose cartilage over the subchondral bone or exposure of the subchondral bone may have been a source of pain in these horses. Synovitis from cartilage particles also may have contributed to signs of pain and lameness.

More than 1 possible cause may have existed for the cartilage lesions observed in these horses. Cartilage lesions can develop secondary to ligament injury and arthritis.<sup>8</sup> Direct trauma to the femoral condyle may cause localized damage to cartilage. Blunt trauma can cause articular cartilage damage in femoropatellar joints of dogs.<sup>11</sup> Subfracture loads cause disruption of cartilage and subchondral changes that lead to arthritic-like degeneration of the cartilage within 6 months.<sup>12</sup> Chondral delamination injuries involving fracture of the cartilage surface and separation of uncalcified articular cartilage from calcified cartilage can cause pain in the knees of human athletes.<sup>13</sup> The most common location for this lesion in human beings is the medial femoral condyle.<sup>13</sup>

Osteochondrosis can cause cartilage lesions. Failure of endochondral ossification in a small area on the femoral condyle could result in thickened cartilage that would infold or become detached from the subchondral bone. Even in horses with generalized cartilage lesions, there was a focal area of infolded cartilage and abnormal subchondral bone. Focal cartilage lesions were in a similar location on the medial femoral condyle in all horses, and this was the same location as reported for the openings to subchondral bone cysts. It also is the location on the condyle that must absorb large forces when the stifle is in an extended weight-bearing position. Subchondral cystic lesions have developed after experimental creation of a small osteochondral defect in the medial femoral condyle of horses.<sup>14</sup> Cartilage lesions on the medial femoral condyle of the horses in our study may have been caused by osteochondrosis, but may not have been the right size or depth to result in cyst formation. One horse had bilateral cartilage lesions on the medial femoral condyles, which would support osteochondrosis as a cause. Five of these horses were > 5 years old. Cartilage lesions in older performance horses would be most consistent with a traumatic insult. There may have been more than 1 cause for cartilage lesions in these horses. Generalized damage to cartilage was observed in 4 horses and may have developed secondary to arthritis. Two of these horses received intra-articular treatment with cortisone and then were used in races before they underwent arthroscopy.

Cartilage lesions do not heal or reattach to the subchondral bone in weight-bearing areas of articulations in horses. The cartilage lesions in the horses reported here were on the weight-bearing surface of the medial femoral condyle. Therefore, these horses were treated by means of curettage of the cartilage, and subchondral bone was removed to create a defect in the femoral condyle that was well beneath the joint sur-

face. The goal of surgical treatment was to remove this area from weightbearing when the medial femoral condyle would be loaded against the opposing joint surface. This treatment was successful in 6 of 7 horses that did not have generalized cartilage damage. These horses may have done as well without curettage of the lesions if they had been managed by use of stall rest. However, some of these horses had been rested for 6 months prior to surgery. Lameness did not resolve in 1 horse and did not recur in the other 6 horses when they resumed exercising.

Size of defects remaining on the articular surface of the medial femoral condyle was not accurately measured during surgery, but was estimated to be 1.0 to 1.5 cm in diameter on the basis of examination of arthroscopic videotapes. These defects were not as large as defects created in the medial femoral condyle of horses with subchondral bone cysts that were treated by curettage. Horses with bone cysts that were treated by surgical debridement have a good chance (3/4) of becoming sound.<sup>7</sup> It was not surprising that horses with a smaller defect in the joint surface of the medial femoral condyle also would resume performance activities.

Follow-up radiography of the stifle was not performed. Defects may have become enlarged, as has been observed after surgical debridement of bone cysts in this location.<sup>7</sup> Enlargement of defects may have developed, but did not cause lameness in 6 of 7 horses treated for focal cartilage lesions.

Horses with lameness that can be localized to the stifle on the basis of examination after intra-articular injection of anesthetic and that do not have radiographic abnormalities have limited options for treatment. These horses commonly have ligament or soft-tissue injuries and are managed by use of prolonged stall rest. Other horses are given anti-inflammatory medications and, when possible, continue to be used in performance activities. Diagnostic arthroscopy is an option that should be considered in these horses. It can provide a more accurate diagnosis and also can be used in treat-

ment of horses with focal cartilage lesions. Horses with generalized cartilage damage appear to have a poor prognosis for becoming clinically normal and performing well after treatment.

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