How to Perform Arthrocentesis of the Compartments of the Stifle of the Horse

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1. Introduction

The stifle is the largest and the most complex of all the articulations of the horse and is composed of two joints, the femoropatellar and the femorotibial.[1] The femorotibial joint is composed of two compartments, the lateral femorotibial and medial femorotibial. The femoropatellar joint is the most spacious of the three compartments. It communicates directly with the medial compartment of the femorotibial joint in about 65% of horses, but it seldom communicates directly with the lateral compartment.[2] Because of the uncertainty of anatomical or functional communication between the compartments of the stifle[2–5] and because inflammation of these joints may result in obstruction of the anatomical communications,[6] a common recommendation is that all three compartments be injected with local anesthetic solution to accurately evaluate response to intra-articular analgesia of the stifle during an evaluation for lameness.[3,6,7]

2. Materials and Methods

One technique of centesis of the femoropatellar joint is to insert a 1.5-inch (3.8-cm), 18- to 20-gauge needle between the middle and medial patellar ligaments or between the middle and lateral patellar ligaments, 1 to 1.5 inches (2.5 to 3.8 cm) proximal to the palpable proximal aspect of the tibial tuberosity. The needle is inserted parallel to the ground through the large fat pad between the patellar ligaments and joint capsule (Fig. 1). The procedure can F1 be performed with the limb flexed or bearing weight,[2] but performing centesis with the limb flexed requires a longer (3.5-cm) needle and an assistant to hold the limb.[7] With this technique, fluid can seldom be aspirated if the joint is not distended with fluid. The volume of local anesthetic solution recommended for injection varies from as little as 10 mL[6] to as much as 100 mL.[8]

Another technique of centesis of the femoropatellar joint involves inserting the hypodermic needle into the lateral cul-de-sac of the joint.[9] Using this technique, a 1.5-inch (3.8-cm), 18- to 20-gauge needle is inserted perpendicular to the long axis of the limb, approximately 2 inches (5 cm) proximal to the palpable lateral edge of the lateral tibial condyle, just caudal to the caudal edge of the palpable lateral patellar ligament (Fig. 2). The needle is inserted F2 until its tip contacts bone and then withdrawn slightly.

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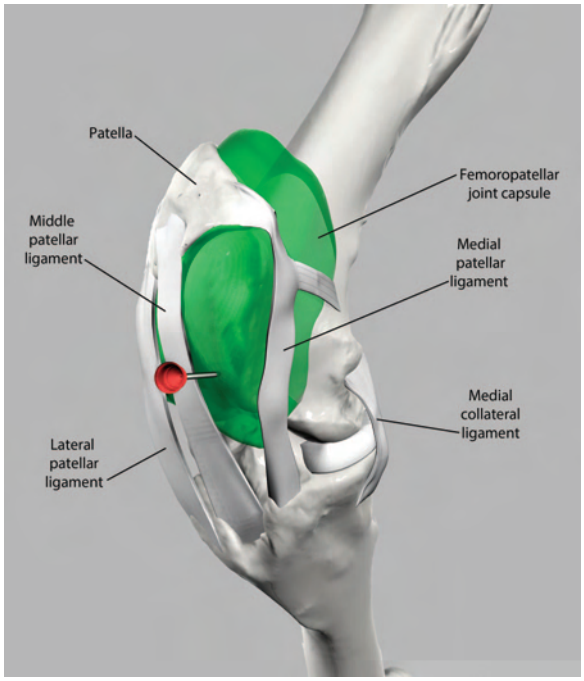

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Fig. 1. The femoropatellar joint can be accessed by inserting a needle between the middle and medial patellar ligaments or between the middle and lateral patellar ligaments, 1 to 1.5 inches (2.5 to 3.8 cm) proximal to the palpable proximal aspect of the tibial tuberosity. The needle is inserted parallel to the ground through the large fat pad between the patellar ligaments and joint capsule.

The site of injection of the medial compartment of the femorotibial joint is located between the medial patellar ligament and the medial femorotibial ligament just proximal to the palpable proximomedial edge of the tibia, or when closer to the medial femorotibial ligament, just proximal to the palpable proximal border of the medial meniscus (Fig. 3).[5,7,8] The joint is penetrated at a depth of 0.75 to 1 inch (1.9 to 2.5 cm). Often, fluid cannot be aspirated from this compartment with the use of this technique. An alternate approach to the medial compartment of the femorotibial joint is to insert a 1.5-inch (3.8-cm), 18- to 20-gauge needle into an indentation between the medial patellar ligament and the tendon of the sartorius muscle about 1 inch (2.5 cm) proximal to the tibial plateau (Fig. 4).[10] The needle is advanced in a cranial-to-caudal direction parallel to the ground and perpendicular to a plane that bisects the limb longitudinally. The joint is penetrated at a depth of about 1 inch (2.5 cm). Using this technique, synovial fluid is recovered consistently.

Some clinicians find centesis of the medial compartment of the femorotibial joint to be easier than centesis of the femoropatellar joint, and because this compartment communicates with the femoropatellar joint of most horses,[2–4,9] some clinicians choose to inject it rather than the femoropatellar joint in an attempt to desensitize this compartment and the femoropatellar joint with one injection.

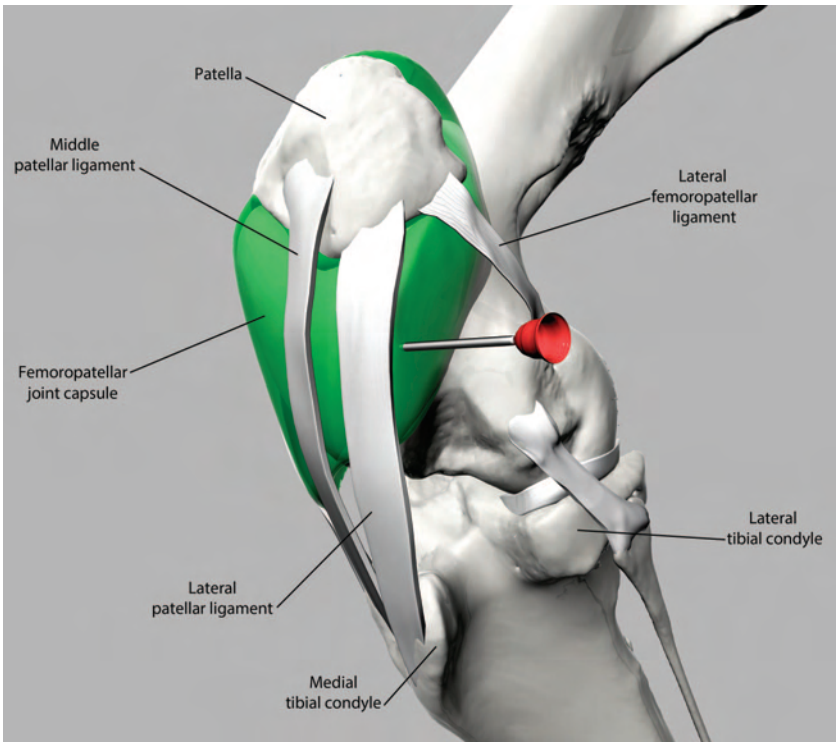

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Fig. 2. The femoropatellar joint can be accessed by inserting a hypodermic needle perpendicular to the long axis of the limb, approximately 2 inches (5 cm) proximal to the palpable lateral edge of the lateral tibial condyle, just caudal to the caudal edge of the palpable lateral patellar ligament.

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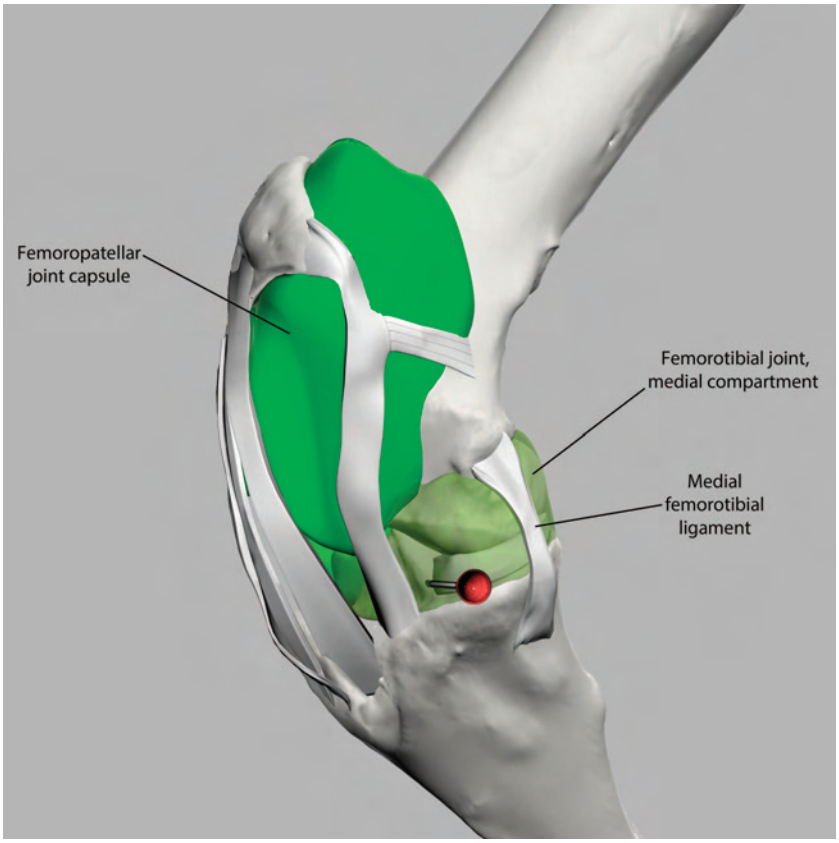

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Fig. 3. The medial compartment of the femorotibial joint is accessed by inserting a needle at a site between the medial patellar ligament and the medial femorotibial ligament just proximal to the palpable proximomedial edge of the tibia.

Centesis of the lateral compartment of the femorotibial joint is more difficult than is centesis of the femoropatellar joint or the medial compartment of the femorotibial joint because the lateral compartment is smaller and located deeper within the stifle.[7] A common technique of centesis of the lateral compartment of the femorotibial joint involves identifying the long digital extensor tendon, which is a reference point for needle insertion. The tendon of the long digital extensor muscle is readily palpable in the extensor groove (*sulcus muscularis*) that lies between the tibial tuberosity and the lateral tibial condyle. A hypodermic needle is inserted immediately cranial or caudal to or directly through the combined tendons of long digital extensor and peroneus tertius muscles proximal to the tibial plateau (Fig. 5).[6,7,11–16] Another commonly used technique for arthrocentesis of the lateral compartment is very similar to the technique just described but uses the lateral patellar ligament as a reference point, as well as the long digital extensor tendon. This technique entails inserting a hypodermic needle, lateral-to-medial, caudal to the lateral patellar ligament and cranial to the tendon of the long digital extensor muscle just proximal to the proximolateral edge of the tibia (Fig. 6).[5,7,8,13,15,17] Needles of various lengths inserted in various planes have been recommended for both of these techniques. In one study, both of these techniques of centesis of the lateral compartment of the femorotibial joint were found to be prone to failure when attempted by inexperienced clinicians.[18] Centesis of the lateral compartment of the femorotibial joint can be performed most reliably by inserting a needle into a diverticulum, or pouch, that surrounds the medial aspect of the tendon of the long digital extensor muscle and extends distally about 3 inches (7.5 cm) from the tibial plateau.[1,14,15,18] The combined tendons of the long digital extensor and peroneus tertius muscles are palpated in the extensor groove (*sulcus muscularis*) that lies between the tibial tuberosity and the lateral tibial condyle. Centesis of the diverticulum can be performed by inserting the needle directly through the center of the tendon of the long digital extensor muscle, 1 to 4 cm distal to the tibial proximolateral edge of the tibia, until the tip of the needle contacts bone (Figs. 7 and 8).[18] The needle is retracted slightly before local anesthetic solution is injected. Synovial fluid is not generally observed with the use of this technique, but accuracy of the technique is high.

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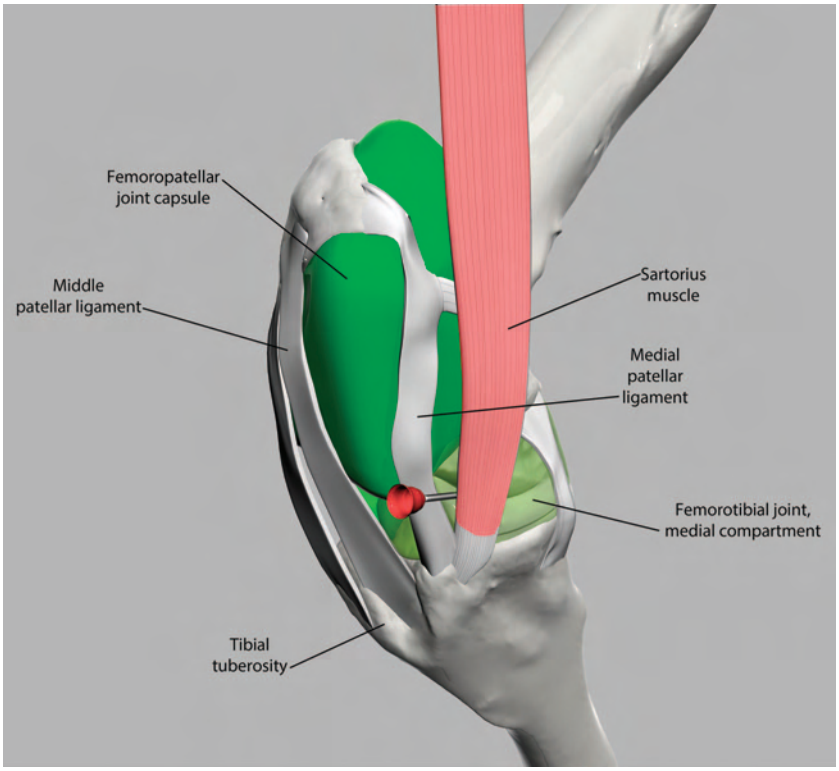

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Fig. 4. The medial compartment of the femorotibial joint can be accessed by inserting a needle into an indentation between the medial patellar ligament and the tendon of the sartorius muscle about 1 inch (2.5 cm) proximal to the tibial plateau. The needle is advanced craniocaudally and parallel to the ground.

3. Results

An advantage of centesis of the lateral-cul-de sac of the femoropatellar joint is that synovial fluid can usually be aspirated, ensuring that the tip of the needle lies within the joint.

An advantage of the cranial-to-caudal technique of centesis of the medial compartment of the femorotibial joint is that the needle is not directed toward the medial meniscus or articular cartilage. A pain-

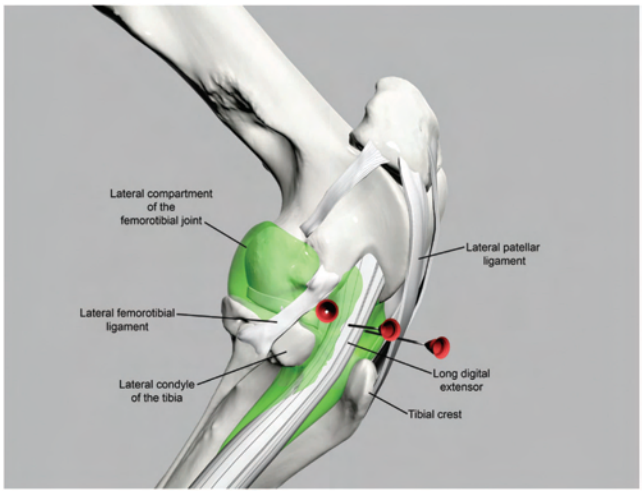

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Fig. 5. The lateral compartment of the femorotibial joint can be accessed by inserting a hypodermic needle immediately cranial or caudal to or directly through the tendon of long digital extensor muscle proximal to the tibial plateau.

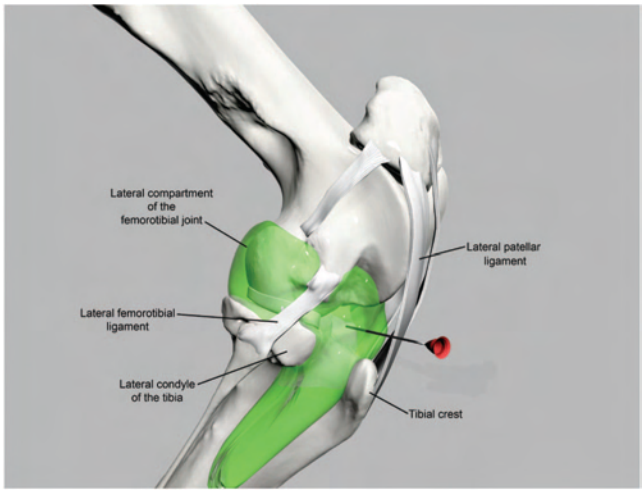

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Fig. 6. The lateral compartment of the femorotibial joint can be accessed by inserting a hypodermic needle medially, caudal to the lateral patellar ligament and cranial to the tendon of the long digital extensor muscle just proximal to the proximolateral edge of the tibia.

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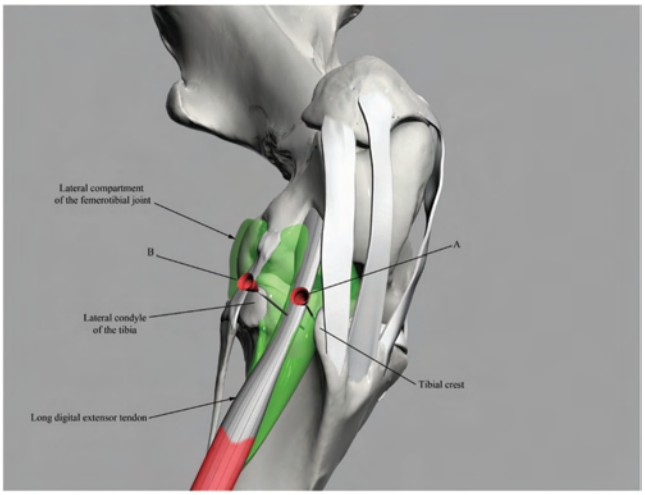

Fig. 7. The diverticulum of the lateral compartment of the femorotibial joint can be accessed by inserting a hypodermic needle directly through the center of the tendon of the long digital extensor muscle until the tip of the needle contacts bone.

ful reaction to arthrocentesis, which can occur if the meniscus is contacted by the needle, is less likely, therefore, than when other techniques for arthrocentesis of this compartment are used. Likewise, contact between the needle and the meniscus is avoided when performing centesis of the lateral compartment of the femorotibial joint at the level of the extensor groove.

Fig. 8. Radiograph demonstrating injecting radiocontrast medium into the diverticulum of the lateral compartment of the femorotibial joint by inserting the hypodermic needle through the tendon of the long extensor muscle.

4. Discussion

Results of a study by Gough et al[3] show a greater diffusion of local anesthetic solution between compartments of the stifle than previously assumed from results of anatomic, latex-injection, and contrast arthrographic studies. Blocking a specific compartment of the stifle may therefore desensitize the other two compartments not blocked directly.

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