How to Perform Arthrocentesis of the Fetlock Joint by Using a Distal Palmar (Plantar) Approach

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1. Introduction
Arthrocentesis of the metacarpophalangeal or metatarsophalangeal joint (fetlock joint) is a commonly used procedure for obtaining diagnostic synovial fluid samples, infusing local anesthesia for lameness diagnosis, injecting medications such as hyaluronan and corticosteroids, and distending joints for fetlock arthroscopy. There have been several recent reviews of approaches for fetlock joint arthrocentesis, including the dorsal and palmar (plantar) pouches and through the collateral sesamoid ligament.1–3 Limitations of these approaches are that hemorrhage is associated with the approach through the proximal palmar (plantar) pouch; the approach through the lateral collateral sesamoidan ligament requires flexion of the fetlock; and the dorsal pouch technique is difficult to perform if there is minimal synovial effusion. Further, swelling associated with the sesamoid bones and suspensory ligament makes this more proximal approach difficult, for example, in horses with sesamoid fractures and concurrent suspensory ligament desmitis.

Van Pelt4 described a technique for arthrocentesis of the fetlock joint distal to the lateral sesamoid bone and between the middle and superficial distal sesa-}

moidean ligaments, using the lateral margin of the superficial digital flexor tendon as a landmark. The major limitation with this approach is that the digital sheath is often penetrated during needle insertion, which is contraindicated in horses with septic arthritis of the fetlock joint. The purpose of this paper is to describe a modification of the distal palmar (plantar) pouch technique for arthrocentesis of the fetlock joint in horses.

2. Materials and Methods
Six cadaver limbs and 12 clinical cases were used to evaluate the application and repeatability of a distal palmar (plantar) pouch technique for arthrocentesis of the fetlock joint. Methylene Blue dye was injected into cadaver limbs to determine the distribution of fluid using this approach and to determine the distal limits of the palmar (plantar) pouch. Following injection of the cadaver limbs, the structures adjacent to the fetlock joint were dissected to determine the insertion site of the needle into the joint, and other structures penetrated with this technique.

Arthrocentesis of the fetlock joint using a distal palmar (plantar) approach was performed with the
horse bearing weight on the limb. Landmarks for the procedure were the distal aspect of the lateral proximal sesamoid bone and the collateral sesamoidean ligament proximally, the palmar (plantar) eminence of the proximal phalanx distally and dorsally, and the palmar (plantar) digital vein, artery, and nerve palmarly (plantarly; see Fig. 1). An area 2 cm × 2 cm was clipped and aseptically prepared prior to arthrocentesis. A 20-gauge 3.3-cm needle was inserted into the joint at an angle approximately 10° proximad and 10–20° dorsad to facilitate placement into the joint.

3. Results

Arthrocentesis of the fetlock joint using this technique was repeatable, easily performed, and well tolerated by horses. We have used the procedure clinically for obtaining synovial fluid, for intrasynovially infusing local anesthesia and intra-articular medications, and for distending the fetlock joint prior to insertion of the arthroscope, particularly the palmar (plantar) pouch in cases of sesamoid fracture and concurrent suspensory ligament desmitis. Synovial fluid, without blood contamination, is commonly observed in the hub of the needle after needle placement.

Injection of Methylene Blue demonstrated distribution throughout the joint. The distal aspect of the palmar (plantar) pouch, however, was small and was not obvious at the site of injection, suggesting that this approach is as accessible in joints with and without synovial effusion.

Dissection of the limb revealed that the needle entered the joint through the distal sesamoidean ligaments. A common concern with a distal approach to the fetlock joint is entering the digital sheath. Dissection of the digital sheath through the annular ligament confirmed that the needle did not go through the digital sheath. However, placement of the needle dorsal to the neurovascular bundle is crucial to preventing penetration of the digital sheath.

4. Discussion

Techniques that are routinely used for fetlock joint arthrocentesis include the following: the dorsal pouch approach, an approach through the lateral collateral ligament, and the proximal palmar pouch.1–3 The palmar (plantar) pouch has a vascular synovial membrane and large, highly mobile synovial villi, which may cause hemorrhage during arthrocentesis and occlusion of the lumen of the needle, with villi inhibiting sample collection. The dorsal approach is difficult in horses without synovial effusion and may result in iatrogenic damage to the dorsal distal metacarpus (metatarsus). The major limitations to the approach through the lateral collateral sesamoidean ligament are that fetlock flexion is required, which may be difficult in some horses, and that maintenance of sterile technique is a challenge. In horses with soft-tissue swelling associated with sesamoid bone fractures or suspensory ligament desmitis, landmarks for a proximal palmar (plantar) approach for arthrocentesis are difficult to palpate.

With the distal palmar (plantar) approach, it is important to insert the needle dorsal to the palmar digital vessels and nerves, immediately proximal and palmar (plantar) to the palmar (plantar) eminence of the proximal phalanx to avoid penetration of the digital sheath. Although insertion of the needle through the digital sheath in most cases would not cause a problem, in horses with septic arthritis of the fetlock joint, contamination of the digital sheath upon withdrawal of the needle may result in a septic tenosynovitis of the digital sheath. Additionally, it is imperative to angle the needle proximally and dorsally to enter the joint capsule, because a straight lateral to medial approach results in needle insertion parallel to the joint capsule and distal sesamoidean ligaments along the palmar (plantar) aspect of the joint.

Although we have not had problems with this technique, potential limitations include iatrogenic damage to the cartilage on the palmar (plantar) distal metacarpus (metatarsus), penetration of the palmar (plantar) digital vessels and subsequent hematoma formation, insertion of the needle parallel to the joint capsule, and penetration of the digital sheath. The advantages of the described technique compared with other techniques is that there is minimal synovial villi and vessels in the distal palmar (plantar) joint pouch, fluid is easily obtained in joints with and without effusion, landmarks are easily palpated, and the procedure is performed with the horse bearing weight on the limb. This tech-
nique is useful for horses that have swelling associated with a sesamoid bone fracture and suspensory ligament desmitis, because the landmarks can be easily palpated. Additionally, a distal palmar (plantar) approach provides an additional site for needle insertion for joint lavage in horses with septic arthritis. Finally, we find this technique easier to perform than the other techniques. Therefore, a distal palmar (plantar) approach to the fetlock joint provides a repeatable and easy alternative technique for arthrocentesis of the fetlock joint.

References