lameness originating from tendon sheathes.

Lisa A. Fortier, DVM, PhD, Diplomate ACVS
Cornell University, Ithaca, New York, USA
Laf4@cornell.edu

The most commonly affected tendon sheathes associated with lameness is horses are the digital, carpal, and tarsal sheaths. In general, the diagnoses of lameness originating from tendon sheathes is increasing with awareness and with the more common use of MRI. Clinical signs associated with tendon sheath lameness are variable with respect to degree of lameness and extent of synovial distension. In general, the lameness will worsen with flexion and with work, but the degree of lameness is not directly associated with prognosis for return to athletic performance.

Lameness associated with the digital sheath

Lameness can be localized to the digital sheath with a low 4-point block or intrathecal anesthesia. If sepsis is suspected, a clean (non blood-contaminated) synovial fluid sample can be obtained at the base of the sesamoid bones and axial to the palmar digital neurovascular bundle.

Simple annular ligament constriction, without involvement of the superficial (SDFT) or deep digital flexor tendons (DDFT) is a common cause of lameness associated with the digital sheath. When viewed from the side, the palmar/plantar profile of the digital sheath will have a "notched" or "cut-in" appearance at the fetlock joint. The integrity of the annular ligament (thickness and structure) should be evaluated using ultrasonography to be sure there are no other structures involved such as the SDFT or DDFT. Horses can be treated with intrathecal hyaluronic acid with variable success prior to surgical intervention. If the annular ligament is the sole structure involved and there are no adhesions within the tendon sheath, then a closed or semi-open annular ligament transection could be performed rather than a tenoscopic transection. If ultrasound examination reveals adhesions or synovial masses within the sheath, then tenoscopic exploration and removal of the masses/adhesions is warranted.

Performing surgical maneuvers or exploratory surgery under tenoscopic guidance has distinct advantages as compared to open approaches. Tenoscopy allows for more complete examination of the entire tendon and tendon sheath, resulting in a more accurate diagnosis than can be provided by ultrasonography and the surgeon has an opportunity for removal of pathologic tissues such as synovial proliferative masses, hyperplasic synovial tissue, and adhesions. Additionally, the use of tenoscopic portals instead of an open approach reduces potential iatrogenic damage to neighboring structures and decreases the incidence of postoperative synovial fistulation. The biggest take-home message of these notes should be that the presence or extent of synovial masses/adhesions is not directly correlated with prognosis and many horses return to full athletic performance after tenoscopic surgery and removal of adhesions/masses and annular ligament transection.

Longitudinal tears in deep flexor tendon are increasing commonly diagnosed. Like adhesions and masses, tears are frequently worse on tenoscopic exam than on ultrasound. In these cases, the tendon tear appears to be the primary cause of the tenosynovitis and the annular ligament constriction is likely secondary. Currently, debriding the tendon edges is the only treatment, but some tendon repair technique seems warranted. Ian Wright described a combined approach to repair these tears, but has subsequently discontinued this practice and simple debridement of the granulation tissue between tendon edges is recommended.

Lameness associated with the carpal sheath

Several pathologies can be associated with the carpal sheath. The anatomy and tenoscopic approach to the carpal sheath has been described. Within the carpal canal, osteochondromas and remnants of the distal radial physis can cause damage to the overlying deep digital flexor muscle/tendon juntion. Horses can also present with carpal canal syndrome. Horses with distal radial physis exostosis, osteochondromas, or constricture of the carpal canal present with intermittent, typically unilateral, carpal sheath effusion (noted cranial to the ulnaris lateralis tendon) and mild-moderate lameness. In these horses, the lameness is usually exacerbated by carpal flexion and is alleviated following direct infiltration of anesthetic into the carpal sheath. In the case of physeal exostosis or osteochondromas, radiographs will confirm the diagnosis. Ultrasound examination of the carpal sheath typically reveals more boney protuberances than noted on radiography and the deep flexor tendon is usually within normal limits, although lesions have been identified.

Through tenoscopic guidance, the boney exostoses are removed with an osteotome, biopsy punch, or motorized burr. It is quite common to find hemosiderin staining of the carpal sheath and excoriations on the cranial side of the deep digital flexor tendon, which should be debrided. In horses with constricture of the carpal canal, ultrasonography may reveal mid-severe tendonitis of either tendon within the canal, or a subjective assessment of less free space within the canal. For both diseases a lateral approach, as initially described by Southwood, with surgical manipulations for carpal canal release, or removal of boney exostosis is performed.

Tendonitis of the musculotendinous junction of the SDFT in aged horses is increasingly recognized. Affected horses are older, often mid-teens to twenties, more lame, and have a poorer prognosis for return to soundness than horses with typical locations of tendonitis. It is unclear what treatment combination (surgical or medical) might help these horses. These cases highlight the importance of performing an ultrasound examination from the musculotendinous junction within the carpal canal all the way down to the foot and not only in the metacarpal/metatarsal region.

Lameness associated with extensor tendon sheaths

The extensor carpi radialis and long digital extensor tendon sheath is most commonly injured in jumping horses or may be penetrated with foreign objects such as thorns leading to hyperplasia of the synovial membrane and adhesion formation. Synovial distension of these sheathes is usually visually apparent and frequently addressed with leg wraps, sweats, and NSAIDS as a first line treatment. If the effusion and the lameness fail to resolve, ultrasound examination +/- tenoscopic exploration of the affected sheath is warranted.

Lameness associated with the tarsal sheath

Conditions of the tarsal sheath that can lead to lameness include thoroughpin/tarsal canal syndrome, deep digital flexor tendinopathy, and mineralization of the deep digital flexor tendon. The anatomic structures of the hock are quite complex and seemingly tarsal sheath-associated lameness continue undiagnosed for a longer period of time than lameness associated with other tendon sheathes. The natural history of tarsal sheath injuries is very difficult to ascertain because of the delay in diagnosis. Reported histories might include kick injuries, falling over jumps, or fractures of the sustentaculum tali. Ultrasonographic and endoscopic examination of the tarsal sheath has been described.

In summary, tendon sheathes and associated soft tissue structures should be included in an

initial list of differential diagnoses. Once diagnosed, medical therapy might alleviate signs for an extended time period. However, when indicated, tenoscopic surgery provides a minimally invasive approach for maximal exposure to tendon sheaths and their structures. The increased exposure allows for improved surgical maneuvers such as synovial mass removal and adhesiotomy. With a small surgical wound, a decrease in postoperative synovial wound complications such as dehiscence and synovial fistulation can be anticipated. A reduced surgical wound also permits early return to exercise which is crucial to prevent the reformation of adhesions.

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