Ultrasonography of the Pastern: 1. Anatomy and Pathology. 2. Outcome of Selected Injuries in Racehorses

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The use of ultrasound for the diagnosis of injuries in the pastern region has been described. Ultrasonography of the tendons and ligaments of the pastern can be difficult; however, imaging of each structure individually in its short and long axis facilitates the identification of lesions. Ultrasonography is an important tool in excluding injuries of these structures because more than one half of the horses evaluated in our practice with effusion of the digital sheath, edema of overlying soft tissues, or lameness isolated to the pastern area did not have injuries to the tendon or ligaments of the pastern. Injuries of these structures (particularly the superficial digital flexor tendon branches and the oblique distal sesamoidean ligaments) are not uncommon, however, and they may have a better prognosis than previously believed with appropriate rehabilitation. This in part may be due to the earlier recognition of such problems. Author’s address: Rood and Riddle Equine Hospital, 2150 Georgetown Rd., Lexington, KY 40580. © 1997 AAEP.

1. Introduction
The purposes of this study are to demonstrate the technique for ultrasonographic evaluation of the tendons and ligaments of the pastern by using videotape and slides, demonstrate the ultrasonographic appearance of normal and abnormal tendons and ligaments, and provide follow-up information of injuries to these structures in horses evaluated in our practice over a 5-year period.

2. Materials and Methods
A 7.5-MHz linear array transducer, with or without a standoff pad, or a 7.5-MHz sector transducer with a built-in fluid offset were used for the ultrasound studies. The hair was clipped with a number 40 clipper blade, the skin was cleaned with alcohol, and a liberal amount of coupling gel was applied. The following structures were specifically evaluated: superficial digital flexor tendon (SDF) branches, deep digital flexor tendons (DDF’s), straight (superficial) distal sesamoidean ligaments (SDSL’s), and oblique (middle) distal sesamoidean ligaments (ODSL’s). Each structure was imaged from its proximal to distal aspect in both short- and long-axis planes. To obtain images of the SDF branches and the ODSL’s in which the ultrasound beam was as perpendicular as possible to the tendon or ligament fibers, the transducer was positioned in planes that were oblique relative to the limb. Images were recorded on printer paper.

The case records of all horses that underwent ultrasound evaluation of the pastern in our practice from March 1992 to March 1997 were reviewed. Follow-up information was obtained for those horses.
in which it was available at the time of preparation of this manuscript.

For the purposes of this paper, abnormalities were specifically categorized retrospectively in racehorses. (These categories are not necessarily meant to be taken as recommendations for grading these injuries in general.) Lesions were considered mild if there was a short segment of decreased echogenicity, thought to represent mild interfiber edema or scarring. Moderate injuries were those in which a distinct area of injury was identifiable and was hypoechoic to anechoic, involving 10–50% of the cross-sectional area. Moderately severe injuries include those injuries in which 50% or more of the cross-sectional area of the ligament was hypoechoic to anechoic. Severe injuries were considered to be those in which 100% of the cross-sectional area of the structure was anechoic, indicating apparent complete disruption of the structure at that level.

3. Results

One hundred and seven horses underwent ultrasonographic evaluation of the pastern. Reasons for ultrasound included lameness isolated or suspected to be originating from the pastern region, thickened soft tissues over the pastern region, effusion of the digital sheath, or radiographic abnormalities suspected to be associated with the tendons or ligaments of the pastern. Abnormalities of the tendons or ligaments were found in 41 (38%) of the horses. There were 24 racing Thoroughbreds (TB’s), five racing Standardbreds (SB’s), six jumpers, one Tennessee Walker, three yearlings, and two sedentary aged horses. The forelimb was involved in all but seven horses.

Of 23 TB racehorses with forelimb injuries, the right fore was injured in 13 horses, and the left fore in ten. Of injuries to the SDF in Thoroughbreds (n = 14), the medial side alone (n = 9) was injured more often than the lateral side alone (n = 3); two horses had biaxial injuries. Two horses had an associated severe proximal SDF injury. Injuries of the ODSL’s were found in ten TB’s (one of these also had an injury to the ipsilateral SDF branch); five involved the lateral side, three involved the medial side, and two were biaxial. Of four SB race horses with forelimb injuries, the SDF was involved in three cases (two with an associated severe proximal SDF injury); the other had severe biaxial ODSL disruption.

The remaining group of horses (including hindlimb injuries of racehorses, and all injuries of nonracing horses) had abnormalities of the SDSL (two), the fore SDF (two), the hind SDF branches (three), the fore or hind DDF (four), or the ODSL in the hindlimb (two) and the fore ODSL (one).

Follow-up information for TB and SB racehorses with injuries to the SDF branches or ODSL’s was obtained for all 27 horses. Of Thoroughbreds, all but two horses (one with a severe injury and one with a mild injury) had moderately severe (four) or moderate (nine) injuries. This included two horses with moderate biaxial injuries and one horse with an ipsilateral mild ODSL injury. Of the 14 TB’s with SDF injuries, three horses were retired upon the diagnosis. Of the remaining 11, eight returned to racing, four of which have completed five or more starts. Of these four horses, two moved up in class, one was unchanged in class, and the remaining horse dropped in class. Another horse raced four times, moved up in class, and won two stakes races before being retired for an unrelated skeletal injury. One horse raced two times before becoming a jumper without any recurrences, and two horses raced only once. The time from injury to return to racing ranged from 9 to 16 months.

Of the ten TB’s horses with ODSL injuries (four mild, three moderate, two moderately severe, and one severe), six moved up in class and completed five or more starts (four mild injuries, one moderately severe, and one severe; these data include the horse with ipsilateral moderate SDF and mild ODSL injuries). One horse with a moderate injury completed four starts but dropped in class. The time from injury to return to racing ranged from 7 to 12 months. One horse with an associated basilar avulsion fracture remained unraced. Two horses were retired upon diagnosis of biaxial moderate to moderately severe ODSL injuries.

Of the SB racehorses, one with severe biaxial ODSL disruption has recently qualified and raced once thus far (10 months from the time of injury). Of SDF injuries in SB’s, one horse has not raced; of the remaining two (both of which had severe proximal SDF injuries in conjunction with moderately severe to severe injuries of the SDF branches), one resumed racing 6½ months from the date of injury and was retired after two starts, and the other resumed racing 5½ months from the date of injury and completed 14 starts.

4. Discussion

Ultrasoundography is very important in documenting whether injuries to the tendons or ligaments of the pastern exist in horses with swelling, lameness, or effusion in the digital sheath. More than half of the horses presented to our practice with these signs did not have such injuries. Likewise, it is important to evaluate the tendons and ligaments carefully so that the injury may be recognized and properly treated. Rehabilitation recommended by us for these injuries was similar to the conventional conservative therapy recommended for tendon and ligament injuries of the palmar metacarpus.

To our knowledge, there is little information in the literature regarding the prognosis for injuries to the tendons and ligaments of the pastern. It has been generally believed that injuries in particular to the SDF branches and the ODSL’s have a guarded prognosis. In this study, several horses with injuries to the SDF branches or the ODSL’s returned to racing in spite of having been given a guarded prognosis and in some cases for whom rehabilitation...
was advised against for racing purposes. With ear-
lier recognition of these injuries and appropriate 
rehabilitation, the prognosis appears to be less 
guarded than generally believed. There may also 
be an influence of the type of athletic performance on 
the prognosis for these injuries. The type of horses 
in this study reflects the distribution of those seen in 
our hospital population. There were too few jump-
ers with injuries to the ODSL’s to justify statements 
on prognosis; however, our clinical impression that 
these injuries may be more difficult to manage in 
jumpers is shared by others.²

References

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