Carpal Tunnel Syndrome in Horses

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Carpal tunnel syndrome in horses has been described in the literature for a number of years. Accessory carpal bone fracture is a common cause of the acute syndrome; however, the etiologies vary considerably and require a careful assessment.

Clinical signs are variable but usually include a partial non-weight bearing posture of the affected limb and a dramatically positive carpal flexion test. The degree of lameness is variable. The syndrome can be found in all ages. Swelling of the proximal palmar medial and lateral metacarpus and/or the proximal lateral carpus between the lateral digital extensor and the ulnaris lateralis and/or the medial proximal carpus between the flexor carpi ulnaris and flexor carpi radialis muscles can be present if carpal sheath hemorrhage or effusion is extensive. The perimeter of the carpal sheath does not allow soft tissue swelling of any degree.

Differential diagnoses include caudal radial solitary osteochondromas, radial cartilaginous exostoses, superior check ligament desmitis, superficial or deep digital flexor tendonitis, inferior check ligament desmitis, palmar carpal bone fractures, focal synovial tissue proliferation within the carpal sheath, accessory carpal bone fractures, desmitis of the proximal suspensory ligament, uncomplicated diffuse carpal sheath inflammation and rarely septic carpal sheath inflammation. In other words, any process that increases the volume of the tissues in the carpal tunnel has the potential to cause a carpal tunnel syndrome.

Diagnostic methods include the physical examination including carpal flexion. Survey radiographs are usually taken to rule out bony lesions. It is important to not confuse the lateral bony reaction at the insertion site of the rudimentary ulna as a cause of carpal tunnel syndrome. Most bony lesions are on the physeal scar or in the mid to medial surface of the radius just proximal to the physis. Ultrasonographic diagnosis is particularly valuable in this syndrome since most of the above listed problems can be visualized.

Cartilaginous Exostosis or Osteochondromas: Radiographic examination may or may not confirm the presence of small areas of bone surface or physeal irregularity in some horses. Dorsal palmar views of the carpus will often have a small area of increased bone density visible just proximal to the physis. Lateral and slight oblique views are also usually taken. Cartilaginous exostoses may project at 90º to the radial surface just proximal to the physis. Occasionally there will be a separate physis and epiphysis present. The largest one seen by this author extended 22 mm from the radius to the tip and 11 mm from proximal to distal. Sharp bony projections that often curve proximally can be found proximal to the physis. Diagnostic ultrasonographic findings include bony...
projections from the caudal radius just proximal to the physeal margin that may correspond to the radiographic examination. Small projections from the physeal margin and radius are sometimes found during sonography when radiographs are negative. There is usually echolucent fluid along the border of the caudal radius and depending on the size of the bony projection, variable amounts of echolucent deep digital flexor muscle compatible with traumatic myositis. Sonographic imaging of the distal carpal sheath in the proximal metacarpus will usually have excess composite fluid. If pressure is increased and decreased alternatively with the ultrasound transducer while scanning in long axis, the echogenic fluid can be displaced proximally and distally. This correlates with tendon sheath hemorrhage.

**Superior Check Ligament Desmitis:** Ultrasound of the superior check ligament is usually required to confirm the diagnosis unless bony reaction is present at its origin and soft tissue swelling is present. The ligament can be found between the medial margin of the distal radius and the chestnut. It usually has a densely echogenic fiber pattern with parallel fibers and can be compared to the contralateral ligament if necessary. Rupture of the fibers usually causes enlargement and disruption of the fiber pattern with a variable amount of echolucent fluid. Occasionally diffuse soft tissue swelling is present. Fluid effusion into the carpal sheath can be present that produces the carpal tunnel syndrome.

**Superficial and/or Deep Digital Flexor Tendonitis:** Any enlargement of the SDF or DDF tendons in the palmar carpus has the potential to cause the syndrome due to the increased soft tissue mass. SDF or DDF tears that extend beneath the carpal retinaculum can create an acute carpal tunnel syndrome. Gradual enlargement due to chronic tendonitis can cause carpal tunnel syndrome that has a slower onset and less dramatic signs.

**Inferior Check Ligament Desmitis:** Acute rupture of the inferior check ligament in the proximal metacarpus can cause an acute carpal tunnel syndrome. Chronic enlargement over an extended period may cause pain only on carpal flexion. Lameness may not be apparent in those horses.

**Palmar Carpal Bone Fractures:** This creates a space occupying reaction that is capable of causing acute signs. Care must be taken to rule this out if no other cause of carpal tunnel syndrome can be found especially in racehorses.

**Synovial Tissue Proliferation in the Carpal Sheath (Tenosynovitis):** This can produce enough increase in soft tissue mass to cause carpal tunnel syndrome and an exaggerated response to carpal flexion.

**Accessory Carpal Bone Fractures:** The acute reaction of the fracture creates a similar increase in mass of tissue in the carpal tunnel.

**Proximal Suspensory Ligament Injury:** Horses with injury of the proximal suspensory ligament with or without avulsion fracture will occasionally have significant swelling of the tissues beneath the carpal retinaculum and exhibit signs of carpal tunnel syndrome.
It is very important that the differential diagnoses be considered for each horse. A search must be made for a cause or causes to correlate with the clinical signs. Treatment varies depending on the etiology of the carpal tunnel syndrome. Occasionally horses will exhibit clinical signs of carpal tunnel syndrome and no etiology can be found. Exploratory surgery is indicated in those horses. Usually bone irregularity that is not readily apparent is found at the caudal physeal level on surgical exploration. Smoothing the bone surface usually alleviates the signs.

**Treatment Options:** Most horses with carpal tunnel syndromes require surgery of some form because of the space occupying nature of the problems. Osteochondromas or cartilaginous exostoses are amenable to removal. Once the offending bone is removed, signs decrease and the tissues are allowed to heal.

Chronic space occupying reactions such as tendonitis, proximal suspensory ligament desmitis, inferior check ligament desmitis, and synovial proliferation may require surgery to relieve the carpal tunnel pressure by excising the retinaculum. Focal proliferation of synovial tissue can be removed surgically.

Palmar carpal bone fractures can be associated with more serious injuries and can lead to carpal joint instability and chronic carpal tunnel syndrome. These cases can be complicated.

Superior check ligament injury usually heals with conservative therapy as do accessory carpal bone fractures.

Carpal sheath effusion with no obvious detectable etiology, in my opinion, requires surgical exploration because of the possibility of physeal roughening that is not detectable by other diagnostic methods.

Conclusion: Carpal tunnel syndrome in horses has a multitude of possible causes that need to be considered to allow proper treatment to be given. The prognosis of most of the etiologies is favorable with the exception of septic tenosynovitis, palmar carpal fractures and some severe flexor tendon injuries.

**Reference**


**Suggested Reading**
