Proximal Suspensory Desmitis in the Sports Horse in Forelimbs

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Proximal suspensory desmitis (PSD) results in sudden onset lameness, which can be remarkably transient, resolving within 24 hours unless the horse is worked hard. In horses with more chronic injury lameness may be persistent. PSD in forelimbs occurs in horses of all ages and from all disciplines. Extravagantly moving young dressage horses and older upper level competition horses are particularly at risk of injury. Lameness varies from mild to moderate and is rarely severe, unless the lesion is extensive and/or involves the enthesis. Bilateral PSD may result in loss of action rather than overt lameness. Lameness is usually worse on soft ground, especially with the affected limb on the outside of a circle and, when subtle, may be more easily felt by a rider than seen by an observer. Occasionally lameness is only apparent ridden, sometimes with the limb on the inside of a circle. Lameness may not be apparent at the working trot, but may be detectable only at medium or extended trot. Lameness is often transiently accentuated by distal limb flexion. Presumably this is because the suspensory ligament (SL) is relaxed during flexion and is then stretched when the limb is again loaded. In the acute phase there may be slight oedema in the proximal metacarpal region, localised heat and distension of the medial palmar vein, but these features may be transient or absent. Pressure applied to the SL against the palmar aspect of the third metacarpal bone may elicit pain. Forced extension and protraction of the limb may elicit pain.

The feet should be evaluated carefully since frequently foot imbalance is a predisposing factor. PSD is a common compensatory injury, therefore the horse should be evaluated as a whole to insure that other causes of lameness are not missed. Foot pain and PSD often occur concurrently.

Local analgesic techniques

Forelimb lameness is often worse after palmar (abaxial sesamoid) nerve blocks. It is presumed that proprioception is altered and previous protective gait alterations are reduced. Perineural analgesia of the palmar/plantar nerves (at the junction of the proximal 2/3 – ¼ and distal 1/3 - ¼ of the metacarpal/metatarsal region) and palmar metacarpal/plantar metatarsal nerves may result in improvement in lameness, due to proximal diffusion of the local anaesthetic solution, and if a ‘4 point’ or ‘6 point’ block is done more proximally the risk of false positive results increases. Minimal quantities of local anaesthetic solution (1.5 – 2 ml per site; less in ponies) should be used, and the blocks evaluated at 5 - 10 minutes after injection to minimise confusion.

Perineural analgesia of either the lateral palmar nerve (2 ml mepivacaine) or the medial and lateral palmar metacarpal nerves (2 ml per site) should result in substantial
improvement in, or alleviation of, lameness within 5 - 10 minutes, assuming PSD is the only cause of lameness. However, neither technique is necessarily specific. Blockade of the lateral palmar nerve also has the potential to alleviate pain associated with a lateral source of pain in the more distal aspect of the limb (e.g. a ‘splint’). Using the lateral approach to the lateral palmar nerve, the risk of influencing middle carpal (MC) joint pain is less than using the sub-carpal approach, but local anaesthetic solution may be placed into the carpal canal. Although many lesions in the carpal canal are associated with effusion, exostoses at the level of the distal radial physis impinging on the deep digital flexor tendon or less commonly an osteochondroma, can be present with no localising clinical signs. A medial approach to the lateral palmar nerve eliminates the risk of injection of the carpal sheath and is therefore potentially more specific. However, in my experience it is quite easy to hit the lateral palmar nerve using an approach on the medial aspect of the accessory carpal bone, causing the horse to strike. Perineural analgesia of the palmar metacarpal nerves may alleviate pain associated with either the MC or carpometacarpal (CMC) joints, due to local diffusion or inadvertent deposition of local anaesthetic solution into the distopalmar outpouchings of the CMC joint capsule. A false negative result may be achieved either due to inadvertent injection into the carpal sheath, or failure of the local anaesthetic solution to diffuse proximally to the most proximal extent of a lesion. Although the SL receives innervation from fibres from both the median and ulnar nerves, perineural analgesia of the ulnar nerve usually resolves, or substantially improves lameness associated with PSD. The choice of which technique to use is to some extent personal preference and is in part influenced also by the discipline in which the horse is used and thus the likelihood of MC joint pain.

Intra-articular analgesia of the MC joint may result in either partial improvement, or complete alleviation, of pain associated with the proximal suspensory ligament in some horses (15/25 horses, 60%)⪞. Perineural analgesia of either the deep branch of the lateral palmar nerve, or the palmar metacarpal nerves alone should not alleviate pain associated with the deep digital flexor tendon (DDFT) or its accessory ligament (ALDDFT), the superficial digital flexor tendon (SDFT) or the fetlock region, without simultaneous blockade of the palmar nerves.

**Radiography**

Radiography is important for differential diagnosis to identify an avulsion fracture at the origin of the SL on McIII, and for identification of stress fractures of the palmar cortex of McIII

**Ultrasonography**

Ultrasonography is crucial for diagnosis. Abnormalities include: enlargement of the cross sectional area, which may result in reduction of space between the SL and the palmar cortex of McIII, or between the SL and the ALDDFT; poor demarcation of the margins of the SL, especially the dorsal margin; focal or diffuse areas of reduced echogenicity which may extend less than 1 cm proximodistally and occupy from less than 10%, to up to the entire cross-sectional area of the ligament; focal hypoechogenic or anechogenic core
lesions; reduced strength of fibre pattern; focal mineralisation (rare in acute cases); and entheseseous new bone on the palmar cortex of McIII (Fig. 1). In a horse with bilateral PSD an obvious lesion may be detectable in the lamer limb, but abnormalities may be much more subtle, and occasionally not apparent in the less lame limb.

The degree of ultrasonographic abnormality (cross sectional area involved and proximodistal extent of the lesion) usually reflects the severity of the lameness. If the ultrasonographic abnormalities are not consistent with the degree of lameness the diagnosis should be reevaluated. In horses with acute PSD the ultrasonographic abnormalities may be very subtle, although if lameness is unilateral, slight enlargement of cross-sectional area may be detectable. Care should be taken to compare measurements in the contralateral limb at the same distance distal to the accessory carpal bone. Ultrasonographic abnormalities may deteriorate over the next 10 to 14 days and re-evaluation may be useful to confirm the diagnosis. In very chronic cases the SL may be diffusely hyperechogenic due to fibrosis and lesions are easily missed.

Fig. 1. Transverse and longitudinal ultrasonographic images of the proximal metacarpal region of the left forelimb of a 6 year old dressage horse with low grade left forelimb lameness that was only apparent when the horse was ridden on the right rein. Lameness was abolished by palmar metacarpal (subcarpal) nerve blocks. There is diffuse reduction in echogenicity of the proximal dorsal aspect of the suspensory ligament. Note the artefacts in the longitudinal image created by overlying blood vessels.
Nuclear scintigraphy

Nuclear scintigraphy is not a sensitive means of detecting PSD in forelimbs. Pool phase images were positive in only 25% of 20 horses with ultrasonographic evidence of PSD. Approximately 12% of 126 horses with forelimb (40 horses) PSD had increased radiopharmaceutical uptake in bone phase images. However, nuclear scintigraphy is indicated if the degree of lameness is disproportionate to the suspensory lesion identified ultrasonographically (Fig. 2).

Fig. 2. Dorsal and lateral bone phase (delayed phase) scintigraphic images of the carpi of a 3-year-old Warmblood stallion that had been purchased at a German auction 6 weeks previously and was lame on arrival in England. Severe (grade 5/8) left forelimb lameness was abolished by palmar metacarpal (subcarpal) nerve blocks. There was diffuse reduction in echogenicity of the proximal aspect of the suspensory ligament in both transverse and longitudinal images; however, bone involvement was suspected based upon the severity of the lameness. There is focal intense increased radiopharmaceutical uptake in the proximopalmar aspect of the left third metacarpal bone medially confirming an entheseous involvement.

Differential diagnosis

PSD should be differentiated from pain associated with the MC or CMC joint, an avulsion fracture of the McIII at the origin of the SL, and primary stress reactions in the McIII. A stress fracture may result in some similar imaging findings, with increased opacity of the third metacarpal bone and/or increased radiopharmaceutical uptake, but affected horses have a different clinical presentation. In our clinical population these injuries occur most commonly in the forelimb of young horses with a recent increase in work intensity, particularly in racehorses (flat and National Hunt), and less commonly in dressage, showjumping, event and endurance horses. They are rare in general purpose riding horses. Lameness is sudden in onset and often more severe than that associated with proximal suspensory desmitis, and tends to persist longer, despite rest. Typically lameness deteriorates the further the horse trots on each occasion, whereas lameness associated with proximal suspensory desmitis is more consistent. Lameness associated with proximal suspensory desmitis is usually worse when the horse trots on a soft surface.
with the affected limb on the outside of a circle, whereas a stress fracture results in lameness being most pronounced on a hard surface. Horses with primary stress-induced bone injury have no detectable ultrasonographic abnormalities of the suspensory ligament. Increased radiopharmaceutical uptake associated with a palmar cortical stress fracture is usually much more intense than that associated with proximal suspensory desmitis, and may extend further proximodistally.

Magnetic resonance imaging is likely to improve recognition of subtle SL injuries and other differential diagnoses.2,3

**Treatment**

Acute injuries of the proximal aspect of the suspensory ligament in forelimbs have a favourable prognosis, with 90% of treated horses returning to full athletic function with conservative management (box rest and controlled walking exercise for 3 months).4 However, more chronic injuries are more challenging. Shock wave or radial pressure wave therapy is useful in some horses, although the results are unpredictable. Fifty-three percent of 20 horses with forelimb lameness of at least 3 months’ duration were sound and in full work 6 months after treatment.5 A successful outcome following desmoplasty has been reported, with 3 of 4 horses (75%) returning to full work within 7 to 12 months post operatively.6 However, my personal experience has been less favourable (3 of 7 horses [43%] returned to full work), perhaps because injuries have been more chronic. I have also been unable to replicate the reported success of either bone marrow injection7 or urinary bladder matrix.8 Stem cell therapy may show promise.

There are anecdotal reports of ulnar neurectomy, or neurectomy of the lateral palmar nerve for management of chronic forelimb PSD, but I have no personal experience.

**References**